

Mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe.

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ROBSON MUKWAMBO
G11M7058

SUPERVISOR
DISTINGUISHED PROFESSOR HEILA LOTZ-SISITKA

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ABSTRACT

The study sought to mediate and examine expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in Ward 8 of Chimanimani District in the Manicaland province of Zimbabwe. Therefore, the main foci of the study were to investigate how multidimensional complexities have come to be the way they are (historicizing) and how they enable or constrain learning of household food production. The study utilized Cultural Historical Activity Theory and the Expansive Learning Cycle (Engeström & Sannino, 2010) to examine and mediate collective learning in response to the multidimensional complexities and also to contribute to transforming the farmers' activity systems towards more sustainable practices to ensure household food security.

The study used a qualitative research approach, utilizing an insider formative intervention approach in a case study design in which Nyanyadzi irrigation scheme was the case study. I have adopted the insider formative interventionist role as a 3rd generation farmer, born and bred in Nyanyadzi area, and my family has been involved in the Nyanyadzi irrigation scheme for three generations. I see this as synergistic with the need for deep cultural understanding in CHAT research. However, this role also provided challenges for me to maintain a rigorous approach to the research in which I also reflexively review my own role and influence in the research process. Following CHAT expansive learning methodological guidance, data was generated through fifteen (15) face to face interviews with three generations of farmers in the scheme (historical ethnographic data); four focus group discussions (contemporary ethnographic data) and eight (8) sessions in a three (3) day change laboratory workshop (expansive learning data). Double stimulation and 'mirror' data was used to surface and prioritise responses to contradictions in the Change Laboratory Workshops (CLW), which is a methodology developed in and for CHAT research (*ibid*). The data was analysed using both inductive and abductive approaches and were conducted in a three-phased process focusing firstly on the history of the object, followed by current perspectives on the object of activity and lastly on transformations emerging in the object of activity via the expansive learning process.

Cultural Historical Activity Theoretical tools informed activity system analysis and analysis of the

history of the object and emerging contradictions; and the expansive learning cycle (ELP) process framework associated with and emergent from CHAT was used to analyse the emergence of transformative agency and expansion of the object. Four levels of contradictions were used to describe and explain the emergent contradictions namely, primary, secondary, tertiary and quaternary contradictions and are presented in this sequence as catalytic opportunities for expansive learning as proposed in CHAT. In addition, the four types of discursive manifestations of contradictions namely, dilemma, conflict, critical conflict and double bind were used to describe and explain the manifestations of contradictions in this study and their role in catalysing transformative agency. The concept of linguistic cues for discursive manifestations of contradictions was adopted and employed in the preliminary data analysis phase. In addition, the transformative agency expressions and zone of proximal development (ZPD) concept was applied in and to the CLW data to examine the learning pathways and to co-develop and expand farmers' and other stakeholders' transformative agency and ZPD respectively. I found myself as formative insider researcher having to take on a strong role as co-engaged researcher / participant in the irrigation scheme expansive learning process.

The study concluded that the farmers' activity system is the central activity system and it interacts with other activity systems on a partially shared object "*improved crop production and marketing under irrigation scheme*". Through interactions with other neighbouring activity systems, the farmers have faced multidimensional complexities that constrain their ability to fully realise their object. These multidimensional complexities manifest in three critical contradictions as a critical conflict in leadership and management crisis; a dilemma and double bind in a lack of farmer education and training; and lastly, a dilemma and double bind in poor crop marketing. These multidimensional complexities have a historical account and they have evolved in complexity over time and I argue in the thesis that, *a careful cultural-historicity of the object of activity and mediation of the situated learning can help to collectively come up with solutions to these multidimensional complexities.*

The study further concluded that despite these multidimensional complexities in the scheme, learning has been taking place and such learning was sometimes mediated through demonstrations as "*learning by doing*," "*seeing is believing*" and the "*winners and losers*" concept. Furthermore,

through the CLW process the farmers and other stakeholders' cognitive horizons were expanded by the mirror data and double stimulation processes, and the expansive learning process developed their individual and collective transformative agency pathways and expanded their collective zone of proximal development. In this study I argue that *there has been little said about collective learning in irrigation schemes and given the dearth of detail on such learning, it seems that this learning is either going unnoticed or is ignored*. Hence, I further argued that *the multidimensional complexities in irrigation schemes are both a stimulant for learning and provide a space (object) for collective learning*, as was also shown by Baloi (2016). The study also shows that *the collective learning potential in these irrigation schemes can be pro-actively mediated via expansive learning formative interventions* in support of improved crop production and marketing for produce developed under irrigation in irrigation schemes such as the Nyanyadzi Irrigation scheme.

Lastly, being an insider formative interventionist researcher in this study, with intergenerational engagement and perspective on the history of the object and integrational engagement with the transforming object, I became part of the intergenerational transformation of the irrigation scheme's object. The intergenerational co-construction of the history of the object, coupled with the insider formative interventionist researcher approach opened up and allowed me as a current generation agent or actor to develop an in-depth understanding of the multidimensional nature and historicity of the object. This was crucial for opening up the transformative agency pathways. It also produced a responsibility for me as an insider formative interventionist researcher to carry the summative findings of the study back into the social context to widen the engagement and mediation of the transformation needed in the community. Overall not only does the study offer an intergenerational perspective on multidimensional complexities of the object and how this can generatively be mobilised via expansive learning into emerging transformative learning agency pathways, but it also offers a new vantage point on the role of the insider formative interventionist researcher. Through this, the study offers insight into how we as third generation members of the community can be brought closer to our communities through the application of our skills, thereby also offering a new type of engaged and rigorously framed and executed research with roots in our communities. As shown in this study, not only does this expand the knowledge and experience of those we engage with, but it also expands our own knowledge and expertise in order to be more able to contribute to both the challenges of our own communities but also that of other communities

and situations similar to ours, and beyond these bounded contexts. The study's contribution is both practical, but also methodological from this vantage point, especially in an African context where there is much critique of 'outsider research', yet little pro-active articulation of what insider (in this case, formative intervention) research may look like.

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LIST OF ACRONYMS

CHAT	: Cultural Historical Activity Theory
AGRITEX	: Agricultural Technical and Extension Services
NVTC	: Nyanyadzi Vocational Training Centre
ZINWA	: Zimbabwe National Water Association
ZETDC	: Zimbabwe Electricity Transmission and Distribution Company
SAFIRE	: Southern Alliance for Indigenous Resources
ZPD	: Zone of Proximal Development
IMC	: Irrigation Management Committee
CRDC	: Chimanimani Rural District Council
DERUDE	: Department of Rural Development
Devag	: Department of Agricultural Development
GoZ	: Government of Zimbabwe
DoA,	: Department of Agriculture
SSA	: Sub-Saharan Africa
WFP	: World Food Programme
SADC FANR	: Southern African Development Community- Food, Agriculture and Natural resources
NVACs	: National Vulnerability Assessment Committees
FAO	: Food and Agriculture Organization
USAID	: United States Agency for International Development.

CHAPTER ONE: RESEARCH PROBLEM AND ITS CONTEXT

1.0 INTRODUCTION

Global poverty statistics provided by the World Bank place the highest number of people living in extreme poverty (pegged at \$1.90 per day since 2015) at 383 million in Africa (<https://ourworldindata.org/extreme-poverty/>). Of these, the majority depend directly on agriculture for their survival (IPCC, 2007; 2014). The IFAD (2012) reports that over three billion people living in rural areas in developing countries are exposed to food insecurity, hunger and severe malnutrition conditions. Hence, food security is a topical issue and continues to be a key concern for the Food and Agricultural Organisation (FAO) in the context of the Sustainable Development Goals (FAO, 2017), but also in planning towards 2050 (FAO, 2012).

Previous studies conducted in the Sub-Saharan African region where climatic conditions are poor and most people live on rain-fed agriculture, have identified and recommended irrigation schemes as a critical intervention to address the current food insecurity in the region (Nhundu & Mushunje, 2010; Mutsvangwa, 2006; Chazzovachii, 2012; Nezomba, 2015; Kombora, 2015). However, while much is said about such irrigation schemes, little is said about the collective learning that is required to establish and make such irrigation schemes work in practice (Baloi, 2016). Yet, there is and must be collective learning occurring but given the dearth of detail, this learning is either going unnoticed or is ignored. Such learning can also be pro-actively mediated as shown by Baloi (2016) via expansive learning formative interventions (Engeström & Sannino, 2010; Baloi, 2016). In my experience of working with smallholder farmers, I have noticed that they are faced with complex challenges which can be multidimensional. One such challenge faced by the farmers in this time of climate change is the need to increase food production using less water (FAO, 2017). Little has been written about expansive learning in attaining food security via irrigation schemes, hence this study. In this study, I explored whether the multidimensional complexities faced by smallholder farmers could potentially also be an *enabler* to expansive learning processes that are oriented towards improved household food security in the Nyanyadzi irrigation scheme context.

In essence, this chapter is an introductory one, which presents the historical and chronological development of Nyanyadzi irrigation scheme. It describes the research context and justifies the rationale for carrying out this study. The chapter further points to the collective social learning processes that are involved in the development and in sustaining the irrigation schemes as one of the facets this study was interested in. In this chapter there is also a presentation of the researchers' positionality as an insider formative interventionist researcher and my interests in this study. Lastly, the chapter presents the objectives and critical questions this study aimed to answer and gives an overview and outline of the chapters.

1.1 THE RESEARCH CONTEXT: NYANYADZI IRRIGATION SCHEME

Unlike many irrigation schemes in Zimbabwe, Nyanyadzi was conceived in a dream by Rev. Emory D. Alvord (Bolding, 2004). Rev. Alvord was said to have received a letter of appointment as Agriculturist for Natives and expected to assume duty on the 1st of October 1926. Before the sunrise on the 26, Rev. Alvord and his '*African servant*' left Mount Selinda mission for Salisbury (now Harare) on a motorcycle with sidecar. They travelled through the hot and arid Save valley, across three Reserves along the edges of large belts of almost flat, riverside alluvial soil. According to Rev. Alvord,

the road crossed several strong flowing, perennial streams coming down from the Melsester (Mt. Selinda) highlands, where the annual rainfall was up to 80 inches (2.03m) and I thought, "What a waste of wealth!" As I camped for lunch, under a large tree (Mucha) on the bank of the Nyanyadzi River, at the north end of a fertile alluvium area belt of several hundred acres, I told my Native servant (...) that in a few years' time all this land would be under luxuriant crops grown with irrigation and hundreds of prosperous 'Native families' would be living here. He looked at me in alarm, thinking I had suffered a heat stroke in the hot valley, then remarked, - "Warota! Akuna mvura kuno!" (You are dreaming! There is no rain here!). I told him he would one day see that dream come true (Alvord n.d., 28; 1958,12).

Over the time Alvord's dream become part of the cultural repertoire available to Nyanyadzi

residents. However, the dream has been told in many varying versions in relation to the existence of Nyanyadzi irrigation scheme. The dream has also become a subject to various interpretations among researchers and the community members. But, two things that are undeniable are the big tree (*Mucha*) where Alvord purportedly took his rest and the dream which is Nyanyadzi irrigation scheme. Hence, Nyanyadzi irrigation scheme remains one of the oldest and celebrated irrigation schemes in Zimbabwe.

Adding to the conception of Nyanyadzi irrigation scheme Bolding (2003: 125) claims that between 1933-34 there was a famine in the Save valley and by July 1934 he:

toured the Save valley to identifying suitable locations for the establishment of irrigation schemes, as a means to save future government expenditure on famine relief... and a furrow on the northern bank of the Nyanyadzi river proved most promising, comprising a small venture, which could be expanded in future (Bolding, 2004: 125).

Because of the famine, he thought that most of the local Africans living in Nyanyadzi area and other surroundings would turn out in numbers at once to dig the furrow in exchange for food. But this was not the case, in his autobiography Alvord wrote:

Food supplies and tools were dispatched and I went down to survey the furrow and start them on the job. Upon arrival, I found that all able-bodied men had gone to seek work to earn money with which to buy food. Only women and children were left in the kraals. These people were in an advanced state of semi-starvation, eagerly agreed to work for food. So, 26 women and 3 old grandfathers, working with picks and shovels, dug the main furrow to a width of 3 feet (0.914m), a depth of 18 inches (0.457m) and a length of 600 yards (548.64m). Then, while myself and the old men and some of the women put in the weir and head gate, the rest of them cleared the lands and got them ready for planting. In early October, 29 acres in one-acre plots were planted maize. When the men returned home at the end of the year, they found that their abandoned wives and children were well fed and healthy with more food than they could possibly buy with the money they had earned. The average yield from these 29 plots was 14.5 bags per acre (3.2 t/ha, AB) (Alvord 1958: 25).

There are substantive narrations on how far he had to convince Nyanyadzi people to dig the furrow.

Archive records left by Rev. Alvord and the Irrigation supervisor Mr. Sigauke, reveal that Rev. Alvord went to great lengths to convince Nyanyadzi residents. In one account he is said to have walked on his hands to demonstrate that there is more than one view on the world (Bolding, 2004: 125). In another account Rev. Alvord was said to have attended a meeting dressed up like a woman, his hair painted purple, and sat on the ground with other women. It was further reported that Rev. Alvord negotiated profusely with the local kraalheads, with some of them reported to be keen and in favour of the motive, since they had benefited from working with the missionaries in their career as labour migrants. Other residents of Nyanyadzi were reported to have purportedly fled because they were afraid of the heavy work that the irrigation approach entailed. Some were said to have fled because they suspected it was a plot by the whiteman to test the fertility of the land before they take it away (Bolding, 2004). On another occasion, it was reported that Rev. Alvord “*tip silver coins and a big cloth which were thrown into the river and by throwing the coins in the river, permission was begotten from the water spirits residing in the river to open the furrow*” (Ibid, 2004: 125).

By September 1934, there were twenty-one men and eight women working on the furrow in exchange for free food rations (amounting to 1.25 bags per person) and one pound tax restitution and amongst them there were only eight men who were tax defaulters (Bolding, 2004). The furrow was completed in three and half weeks. It is believed that the 35 acres (14.5 ha) which were split among 29 plot owners were cleared by early 1935 and were ready for planting. However, the number of plots is inconsistent across authors and history tellers, but a more reliable source (Bolding, 2003) maintains that there were 35 Acre plots. The plots were split as follows. The resident demonstrator was entitled to three irrigated acres. Four local kraalheads and supervisor Sigauke had two acres each, and the 23 Nyanyadzi residents were entitled to one acre each (*ibid*, 2004). The farmers had their first ever bumper harvest on beans crop as early as April 1935, wheat in August and maize crop by December 1935 (Alvord 1958: 28). Early in 1936 Nyanyadzi irrigation scheme received another 90 people who were fleeing from famine. Manzungu and Van Deer Zaag (1994) argue that most of the plot holders in Nyanyadzi irrigation scheme came from outside the Nyanyadzi communal area itself. By the 16th of October 1937 building the large of a furrow to the southern bank of Nyanyadzi river commenced and this was intended to irrigate the vast stretch of flat alluvial lands that had precipitated Alvord’s daydream (Bolding, 2003: 31).

History has it that Nyanyadzi river discharge kept on throwing spanners in the works, dragging down progress towards the dream. The 1938/39 growing season was delayed because of low river discharge and the following growing season a subsequent flood came flushing out the weir and further lowering the riverbed. As if this was not enough, during the 1940/41 rainy season the river diverted its course towards the furrow itself, thereby flushing out the top end stretch, and the farmers had to deepen the head of the gate and the furrow in order to install a new weir. By 1940 the northern scheme was expanded and fenced off to cover a peak span of 48 acres (19.4 ha), but the river obstinately refused to co-operate. Eventually, in February 1942 an unprecedented flood came and washed away the whole furrow, headworks and some five acres of standing maize leading to the abandonment of the northern irrigation work (Alvord, n.d.; 45).

Serious work then commenced on the southern bank furrow which was tipped to supply irrigation water to the present Block A. In 1943 the majority of plot owners in the northern bank irrigation scheme were shifted to the other side of the river and accommodated in the newly opened up block C of the big Nyanyadzi irrigation scheme. In 1949 a night storage dam was constructed and then by 1951 more irrigable blocks B, and D (see Figure 1.2) were opened and became functional (National Archives of Zimbabwe (NAZ), 1958). The old northern bank irrigation scheme and Block C on the southern bank irrigation scheme are shown in Figure 1.1 below,

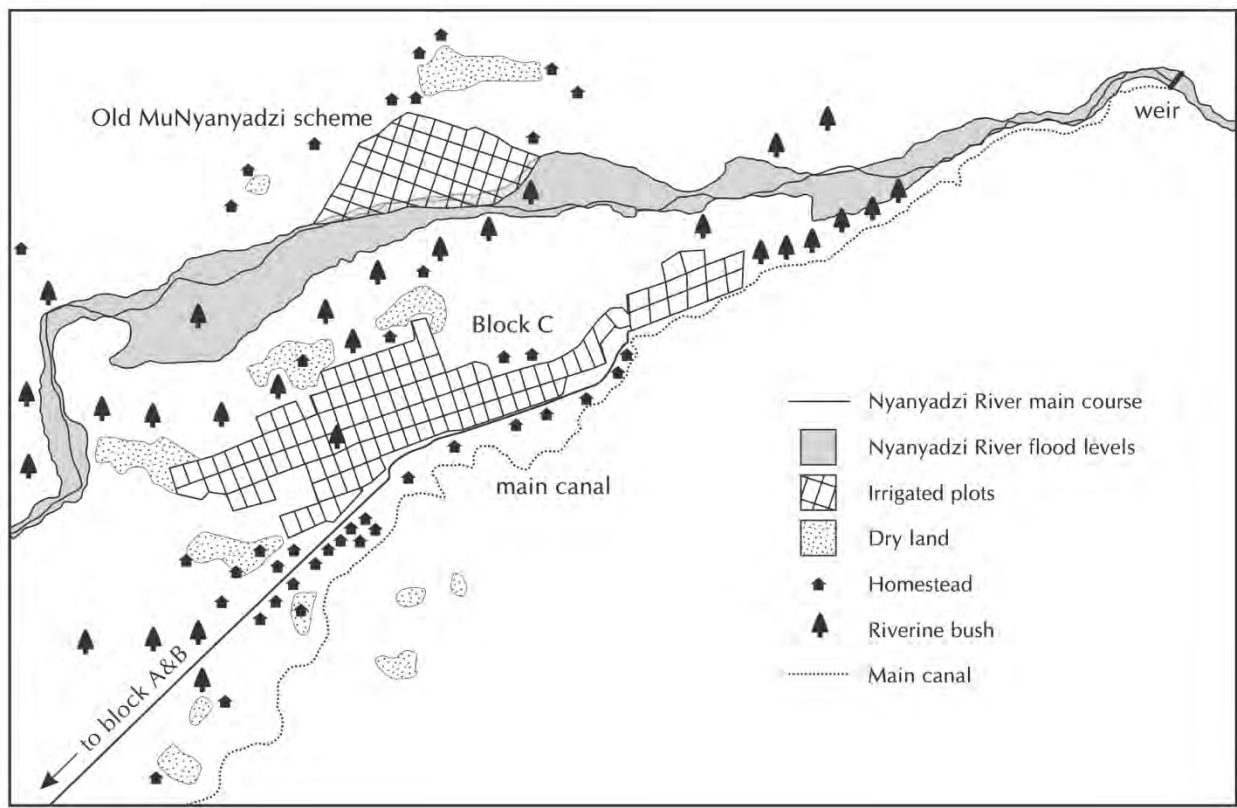


Figure 1.1: The Northern bank irrigation scheme and Block C on the Southern bank by 1950

Source: Bolding (2003: 127).

Roder (1965: 106) posit that, “by 1960 there were 304 hectares of land under irrigation... and between 1961 and 1963 through the Native Department a total irrigable area of 380 hectares was allocated” and the area was further extended in 1983 by including the illegal plots that had developed over time in blocks A, B and D, to a total of 414 ha irrigable land (Woodworth, 1971: 1). However, since 1983 to date, more encroachments are believed to have occurred and presently the irrigation scheme size is estimated between 430 and 450 hectares, but official records maintain 414ha. Each plot holder has 4 acres = 1.96 ha which is capable of producing enough for household food security and surplus for commercial purposes. According to Bolding (2003) the inception of Nyanyadzi irrigation scheme is said to have costed the Rhodesian government £86 in construction and repair costs, a cash outlay which had been amply compensated by the food security (and famine relief savings) offered by the scheme’s grain output (NAZ, 1928). Block A and B are shown

in Figure 1.2 below.

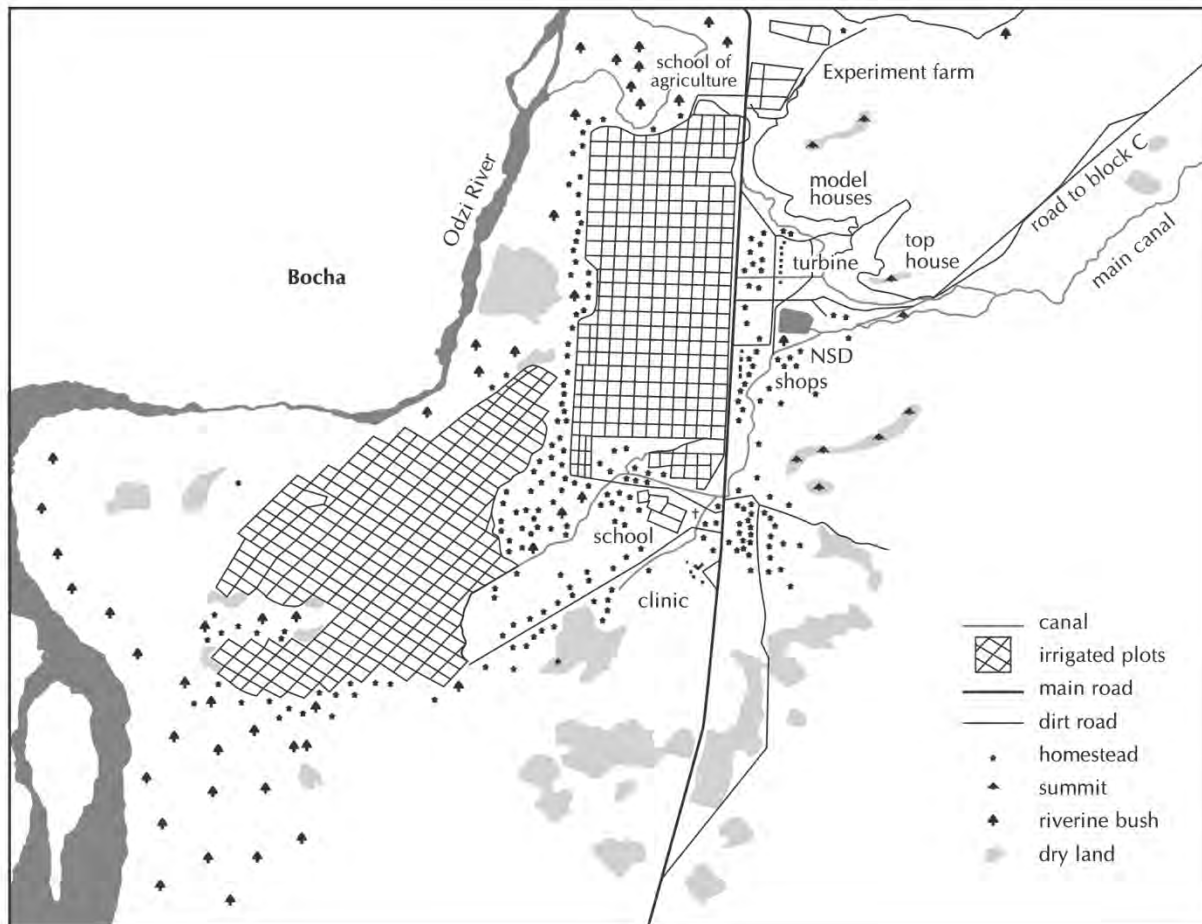


Figure 1.2: Block A and B by 1950

Source: Bolding (2003: 141).

Nyanyadzi irrigation scheme is situated in ward 8 in Chimanimani West constituency under the Chieftainship of Chief Muusha of Muusha Communal Land in Manicaland Province of Zimbabwe (see Figure 1.3). Chimanimani West constituency has 11 wards, largely comprised of peri-urban centres like Nyanyadzi, Biriwiri, Hot Springs, Wengezi and Chakohwa. The people rely on subsistence farming and market gardening for livelihoods and in 2003, 51% of the households in Chimanimani district were classified as being extremely poor (Zimbabwe Election Support Network, 2008). Nyanyadzi irrigation scheme sits on the confluence of three major perennial rivers namely, the Nyanyadzi (Munyanyazi) and Odzi river as well as the confluence of Odzi and Save

river.

Notably, the irrigation scheme grew in hectare capacity as well as in population sustenance with age. Currently, it is a sole provider to 800 small smallholder farmers and benefits approximately 30 000 people residents to and surrounding Nyanyadzi Communal area (see Nyanyadzi sphere of influence or catchment area in Figure 1.3). The scheme is well known for its fresh vegetable produce which includes tomatoes, sweet beans, okra, cabbages, king onions and its contributions to household food security mainly through the traditional and staple grains i.e. sorghum, millet and maize.

Geologically Nyanyadzi irrigation scheme is situated in the dry region five and irrigates 440 ha that are sub-divided into four irrigational blocks, that is, block A (137 ha), block B (147), block C (65 ha) and block D (69 ha) as illustrated in Table 1.1, 1.2 and Figure 1.4. The irrigation scheme is located at an altitude of 530 m above sea level right in the Save Valley and on the foot slopes of the Eastern Highlands. The soils are of alluvial origin comprising of deep, well-draining sand loams and clays underlain by coarse river sand (Ministry of Water Development, 1975). The region experiences short spells of rainfall (less than 600mm per annum) and hot temperatures (min 22°C and max 38°C) and an average annual pan evaporation rate of 2000 mm/year. Due to continued water shortages in 1952 and again in 1954, the Irrigation Development (ID) engineers and the local management were convinced of the need to construct a water pumping plant on the Odzi river, to augment water supply to Nyanyadzi irrigation scheme. The first tender for four pumps capable of supplying some 40 l/s each was published in December 1953 and by January 1954 the tender board recommended its choice, and the pumps and engines were acquired and by December 1957 the pump house was operational (Bolding, 2004: 158). It was a complicated process and remains a complicated water network system up to date. The irrigation scheme is water fed by two water supply systems namely, 2 hydro-electric pumps installed at Odzi pump house and an 8-kilometer gravitational canal system that feeds water into the reservoir. The gravitational canal system draws its water directly from Munyanyazi river (commonly known as Nyanyadzi river). The water directly waters Block C (Chitinha block) on the upper river course and Block A (in the lower river course), the reservoir and was later distributed to Blocks B and D (see Figure 1.1; 1.2 and 1.4). Figure 1.3 below shows Nyanyadzi irrigation scheme's sphere of influence or catchment area.

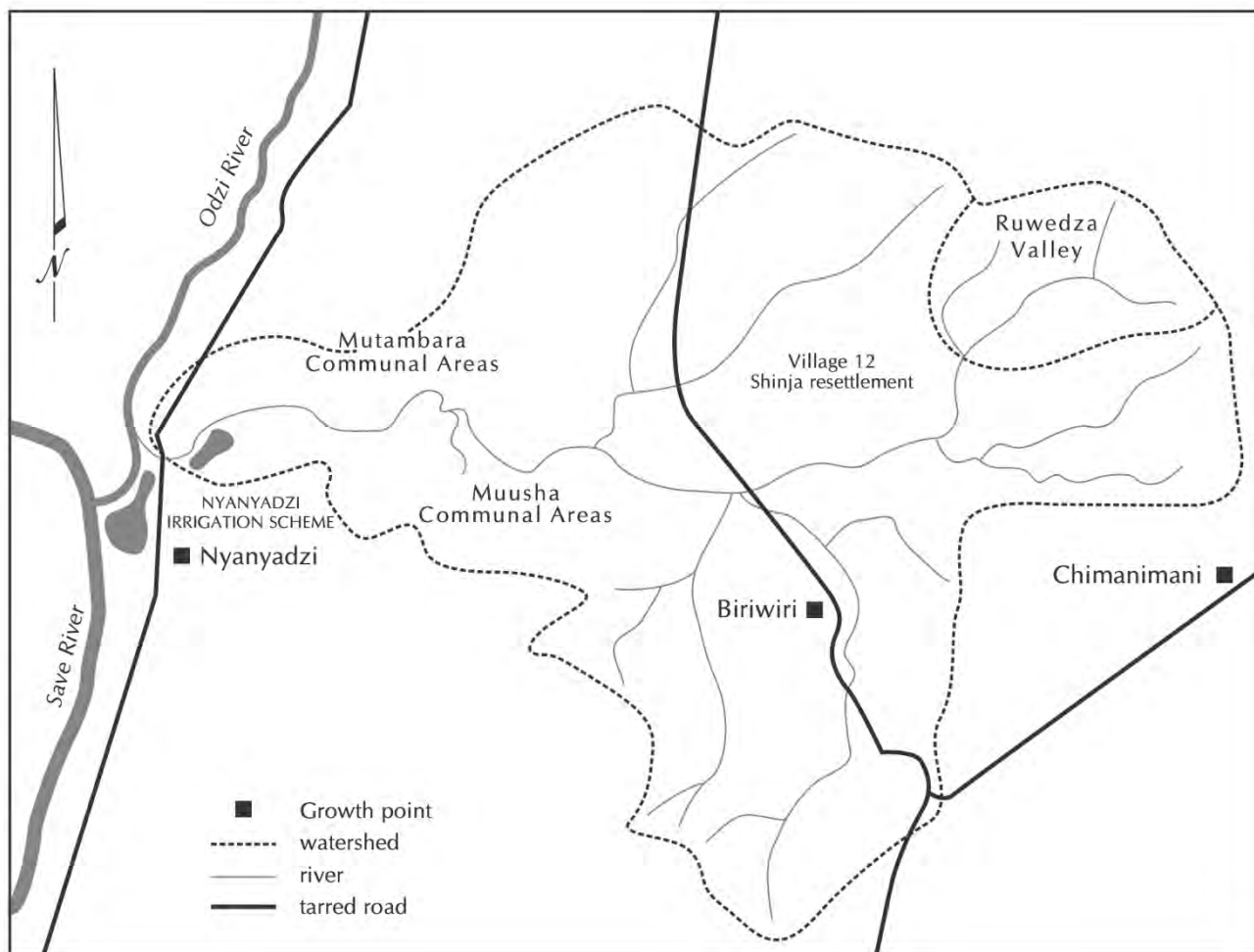


Figure 1.3: Nyanyadzi Catchment

Source: AGRITEX, 1998

Table 1.1: Nyanyadzi Blocks, Command area, registered plot holders and water source

Block	Command Area (ha)	Plot-holders (no.)	Water source
A	137	125	Odzi and Nyanyadzi
B	147	193	Odzi and Nyanyadzi
C	65	67	Odzi
D	69	75	Odzi and Nyanyadzi
Total	414	460	

Source: AGRITEX Nyanyadzi Office (1995).

Adopted from Manzungu and Van deer-Zaag (1996: 70)

Figure 1.4 shows the water network system in Nyanyadzi irrigation scheme.

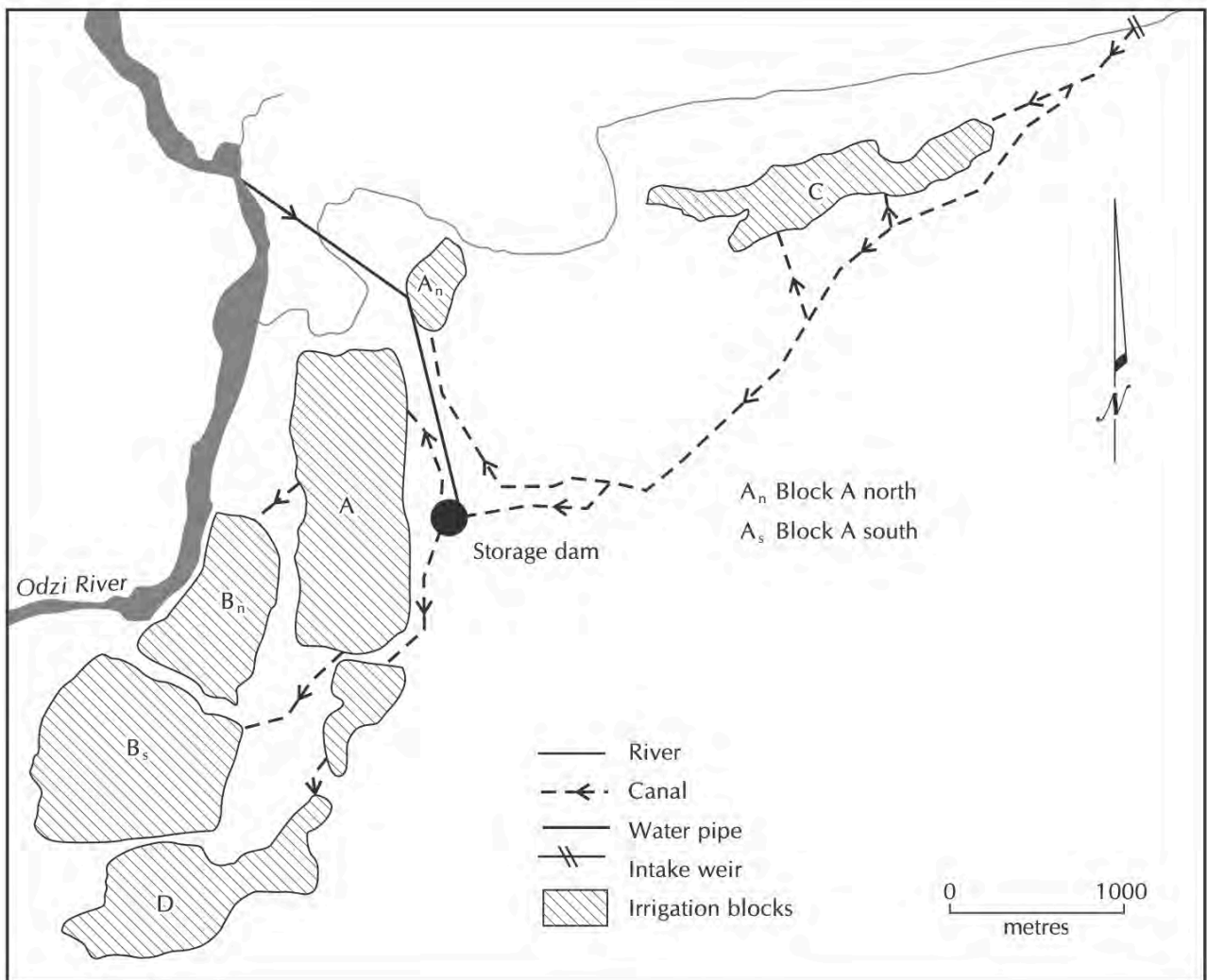


Figure 1.4: Nyanyadzi irrigation scheme

Source: AGRITEX (1998)

According to Manzungu and Van deer-Zaag (1996) from the late 1980s until the present, a new paradigm of irrigation development came to the forefront which they basically described as the *era of reform*. One of the key highlights to this era was signalled by Bolding (1996) in his book **“Wielding water in unwilling works: Negotiated management of water scarcity in Nyanyadzi irrigation scheme, winter 1995.”** In the book he analysed how the state agency, AGRITEX, coped with water scarcity in Nyanyadzi smallholder irrigation scheme, which he described as *“complex, difficult to manage and marred by scarcities since its outset”*. According to Bolding *et al.*, (1996)

the turning point of Nyanyadzi irrigation scheme was after independence (1980) when the government-imposed a (farmer) Irrigation Management Committee (IMC) replacing the former Farmer Representative Body (FRB) that was known as the 'Kraalhead Committee' before independence. From that moment going forward the irrigation scheme was muddled in a complex management crisis, in which the AGRITEX and other various groups of irrigators have been wrangling to manage it. The sheer number of people involved in the management, as well as the imposed character of the IMC certainly did not make things easier in controlling the operation of the scheme. In this space of The Radical Reform Era, Bolding *et al.* (1996) highlighted that the diverse nature of the farmers was problematic. He went on to describe the Nyanyadzi irrigation farmers' population as "*people of different and multiple backgrounds who were comprised of the dryland farmers, irrigators, businessmen, traditional leaders and politicians but importantly, people who align themselves in numerous factions organized along dynamic political, social and professional lines*" (*ibid*, 1995: 69). The alignment mentioned above was problematic and because of this alignment Nyanyadzi community was known to have inherited a legacy of political resistance to government interference.

The hostile nature of Nyanyadzi community can be tracked back to the colonial era in the mid-1960s where it was reported that, "*farmers who followed government extension advice were intimidated and suffered physical or material damage*" (Reynolds, 1969: 12). Particularly, in 1979 the scheme was closed for reasons of sabotage by the local irrigators (PC files, 1979). After independence, government initiatives to support Nyanyadzi irrigation scheme have also received resistance from different political corners, and within government circles they have labelled Nyanyadzi community with unpopular connotations such as "*difficult and troublesome*" (Bolding *et al.*, 1996). All the above-mentioned factors have resulted in a complex and difficult to manage situation which calls for a sophisticated calibration of the technical, managerial and socio-political aspects of water control. Hence, it is in this context that, a careful cultural historicity of the object of activity and mediation of the situated learning can potentially help to collectively come up with solutions to these multidimensional complexities the smallholder farmers in Nyanyadzi irrigation scheme are faced with.

Added on to the managerial complexities mentioned above is the issue of water management crisis. Water management crisis can be trekked back to as late as 1950 onwards because of the critically low water discharge during the early summers (Manzungu & Van deer-Zaag, 1996). Since, then water supply has never been able to cope with the continuous expanded irrigation scheme, resultantly the water crisis deepened. Efforts to augment water crisis in Nyanyadzi irrigation scheme have been discussed earlier. However, the early 1980s were marked by another era of Nyanyadzi river's water deficit due to increased irrigation developments upstream. There was a drastic increase in land use since independence in as well as increased land degradation in the upper catchment resulting in high siltation causing problems at the weir and in the main canal (Bolding, 1996). Consequently, there has been a heavy burden on the scheme's maintenance demands, causing the irrigation system to continuously become unreliable. Furthermore, between 1990-1995 the river dried up three times before or during the winter season, resulting in Block C farmers without any winter crop. This affected household food security and increased climate refugees. Table 1.2 below show the years of water scarcity in Nyanyadzi irrigation scheme.

Table 1.2: Years of water shortage in Nyanyadzi

Decade	Years of water shortage	Years Nyanyadzi river was dry
1940-1949	1947,1949	
1950-1959	1952, 1954, 1957	
1960-1969	1960,1961,1964,1968	
1970-1979	1970,1971,1973	
1980-1989	1983,1984,1987	
1990-1995	1991,1992,1994,1995	1992,1994,1995

Source: Roder (1965: 146)

In addition to the aforementioned challenges, the effect of climate change did not go unrecognized. In April 2016, a Chimanimani District Climate Change & Watershed Management Dialogue Platform was initiated with the prime intention to promote and facilitate an inclusive dialogue process concerning Climate Change and Watershed Management with all the relevant Government departments, traditional leaders, NGOs and other civil society organisations, private sector, rural community representatives and other interested individuals or actors. One critical observation at

the dialogue was the realisation that, the volume of water in the major rivers in Chimanimani and their river flow regimes has drastically declined between 1991 and 2015 with Nyanyadzi river among others reported to have declined by 99.29 % with a total rainfall decrease of 41.89 % from the 2013/14 to the 2014/15 season (AGRITEX, 2016).

In a nutshell, Nyanyadzi irrigation scheme is bemoaned by complex and multidimensional challenges. These complexities are directly influenced by the social, cultural, political, environmental as well as the economic terrain in Zimbabwe. One of the AGRITEX Extension Officers (name withheld), stated that, *“currently there is nothing to show in the scheme, it has been dismantled because of the current political, social and economic situation”* (Pers. Comm, 2018). He went on to point out that, *“the unfortunate part is that the people are politically divided and have muddled the scheme into a political fighting battle. Secondly, the selection of the recent scheme’s management committee (IMC) was more politicized than on virtues of charisma.”* Hence, poor irrigation management, political persecution, victimisation of few targeted individuals and mismanagement of finance, resulting in the sky rocketing debts (approximately, \$60 000) to Zimbabwe Electricity and Transmission Company (ZETDC) (a parastatal electricity utility company), barely a few months after displacing the Committee Chairperson (name withheld) were reported (Pers. Comm, 2017).

Also visible in the scheme are lack of production, water management crisis, unreliable season temperatures and rainfall spells due to climate change, unaffordability of hydro-electric pumped water from Odzi river due to the staggered \$18. 00 per Acre per watering Cycle (Pers. Comm, 2018). There could be more reasons to the dysfunctionality of the irrigation scheme which are worth probing in more depth, which is what I did in this study (see Chapters 4, 5 and 6).

1.2 DEMOGRAPHY

As highlighted earlier, Nyanyadzi is situated in ward 8 of Chimanimani West constituency, the constituency has an approximate population of 48 327. The population is scattered in about 10 143 households with an average household size of 4 people (Zimbabwe Election Support Network, 2008). Ward 8 alone has approximately 7500 people (see Figure 1.4) (Chimanimani West

Constituency Profile, 2017). In terms of education, Zimbabwe is well known for its high primary level education and Chimanimani west constituency is host to 32 primary schools that house some 13 584 pupils of which an approximated 6 657 (49%) of the pupils are girls and the boys constitute a total of 6 657 (51%) of the total enrolment. At secondary level, the constituency had a total enrolment of 4 972 pupils in 11 secondary schools of which 44% are girls and boys constitute the remaining 56% of the total enrolments. Chimanimani west constituency has 19 537 herd of cattle serviced by 5 animal health centres and 265 dip tanks. Of interest to this study is that Ward 8 (Nyanyadzi) has the highest number of cattle, served with 2 dip tanks one in the lower catchment and the other one in the upper catchment area. Herds of cattle not only resemble wealth since most people invest their money in livestock, but they also show available draught power in the irrigation scheme. A bigger herd means more draught power, high manure for crop fertilizer, high productivity in the fields as well as better household food security.

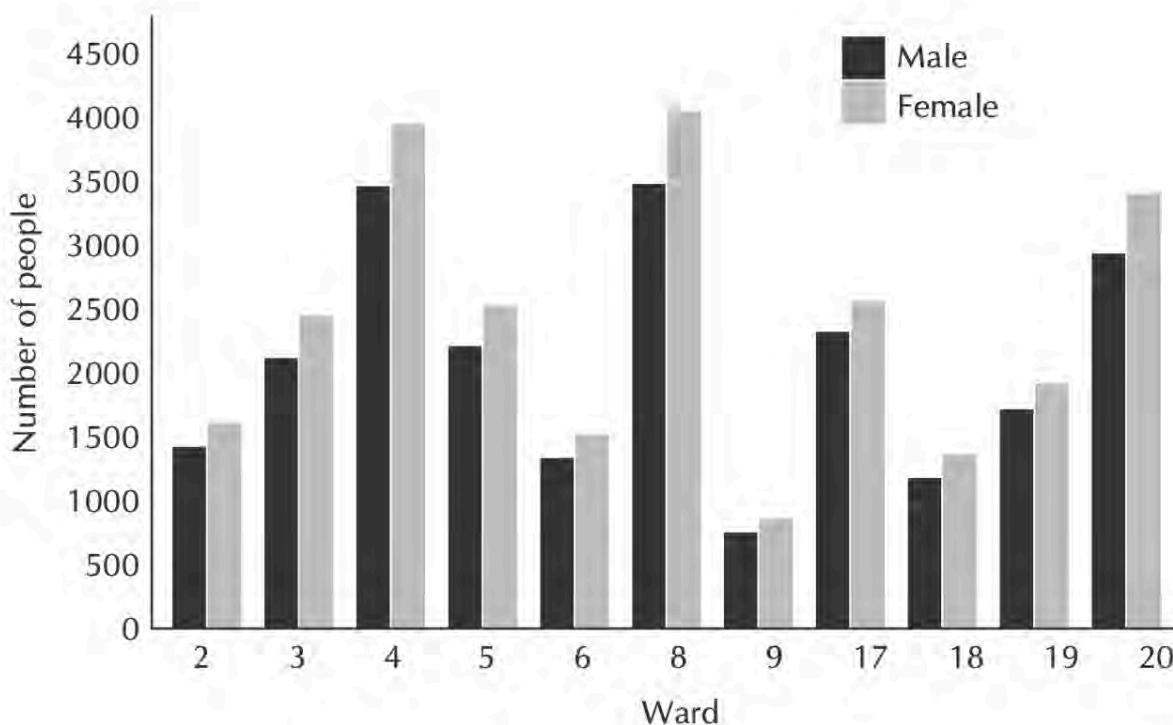


Figure 1.5: Population Distribution in Chimanimani West Constituency

Source: Chimanimani West Constituency Profile (2011: 4)

1.3 MY ROLE AND RESEARCH INTEREST

My role in this study was of an *insider* formative interventionist researcher. Midgley (2000; 113) defined intervention study as “*purposeful action by a human agent to create change.*” An interventionist researcher is engaged with ongoing reflective mediation in which his/her role is seen as a means of supporting and mediating change in activities and creating new collective activities (Lektorsky, 1980). Engeström and Sannino (2011) further argue that, the *formative* intervention design (used in this study) is driven by historically formed contradictions in the activity systems and is the result of the collective efforts to understand and face these contradictions and the problems they engender. Lektorsky (1980) describes an interventionist researcher as being engaged with ongoing reflective mediation in which his/her role is seen as a means of supporting and mediating change in activities and creating new collective activities. Regarding reflective mediation, Lektorsky (*ibid*) further argued that if the study outcomes are accepted by the community, the knowledge obtained may re-mediate activities and change human reality. In simpler terms, Midgley (2000: 113) posits that, an intervention may be defined as a “purposeful action by a human agent to create change” (Engeström & Sannino, 2011). In essence, an insider formative interventionist researcher is viewed as “part of or coming from within” the social context or the problem (Midgley, 2000; Pesanayi, 2016). The understanding here is that the researcher comes from the community where the research is being conducted (like in my case) or the researcher is part and parcel of the context. For instance, researching within own workplace, you might not be directly involved in the problem formulation but can intervene from within for change or to rectify the situation. In simpler terms insider formative interventionist research can be safely described as a purposeful action and agency for change mediated by a member of the community.

I (the researcher) was born on and have participated in the irrigation scheme for 25 years hence my acquired knowledge as well as my historical and social-relational exposure were ideal opportunities for developing an *insider formative* interventionist research approach as I am already familiar with some of the multidimensional dynamics associated with the irrigation scheme, but nevertheless I also needed to learn more. I am a trusted member of the community and despite the politics of the current situation, I had the relational ability to request that farmers and other

stakeholders from associated activity systems participate in a reflective and future orientated process to engage with these complex multidimensional concerns.

However, this positioning as an *insider formative* interventionist researcher also created challenges for me to be more reflexive (see ethics application attached as Appendix U), but there is also merit in being an ‘insider’ in research that takes strong account of cultural history, as is the case in CHAT. I have an education and social learning background and experience and was able to mediate an expansive learning intervention using the Expansive Learning Process (ELP) to facilitate collective and transformative change in the current multidimensional complexities currently experienced by the farmers working towards improving their household food security (Engeström & Sannino, 2010), (reported in Chapters 3, 5 and 6).

My research interest lied in the uniqueness of Nyanyadzi irrigation scheme. I was more enticed by the scheme’s unique history of existence (1931-2018) which provided a rich space for collective learning of crop production within the past-present-futures window in this study (see Table 4.2; Table 4.4 and Table 4.5 for an initial view of the historicity of the scheme). Probing of this historicity (i.e. the history of the object) provided a rich, longer term cultural historical data that was important in informing this study. Furthermore, the evolution of the past and present smallholder farmers’ activity systems and their interactions with other external activity systems presented potentially rich opportunities for learning as well as complex challenges for the farmers. These multidimensional complexities were important as they can hinder or stimulate successful learning of household food production in the scheme.

1.4 RESEARCH GOALS AND QUESTIONS

1.4.1 Goal of the Study

The study sought to examine and mediate expansive learning in the context of the multidimensional complexities affecting household food security activity systems in an irrigation scheme in Zimbabwe.

1.4.2 Main Research Questions

1. What are the multidimensional complexities that have (in the past), and are (in the present) enabling or constraining learning of household food production in interacting farmers' activity systems?
2. How can the multidimensional complexities (outlined in 1) be mobilised as a source of expansive learning via mediation in a formative interventionist expansive learning process to enhance food security (into the future)?

1.4.3 Specific Research Objectives

The study was mainly guided by the following objectives that is to:

1. Historicize the multidimensional complexities and learning of crop production (food security and marketing) in Nyanyadzi smallholder irrigation scheme prior to 1980 (year of independence) and 1980 and beyond (past perspective).
2. Identify and describe the existing learning and activity systems that interact with the smallholder farmers' activity system in crop production in the irrigation scheme (present perspective).
3. Surface contradictions embedded in multidimensional complexities in smallholder farmers and key stakeholders' activity systems involved with crop production in the irrigation scheme for food security (present perspective).
4. Use the contradictions as a source for expanding farmers and other stakeholders' learning to collectively tackle the multidimensional complexities arising in the irrigation scheme using a mediated expansive learning process (present to future perspective).

1.5 HISTORY OF IRRIGATION FARMING

Earlier authors have defined irrigation, "*as the practice of applying water to the soil to supplement the natural rainfall and provide moisture for plant growth*" (Uphoff, 1986: 13). Recent researchers have reconceptualised the definition of irrigation to include various aspects of development. For instance, Nigussie (2002: 16) defines irrigation, "*as a case of agricultural development in which technology intervenes to provide control for the soil moisture regimes in the crop root zone in order to achieve a high standard of continuous cropping.*" Mutsvangwa *et al.* (2006: 6) define irrigation as, "*the artificial application of water to the land to ensure double cropping as well as steady*

supply of water in areas where rainfall is unreliable.” In summary to the above definitions, irrigation farming’s primary objectives are to supply essential moisture for plant growth, which includes transport of essential nutrients, and to leach or dilute salts in the soil. It also provides a cooling effect to the soil and the atmosphere to create more favourable environment for crop growth.

The known history of irrigation farming stretches back to 8000 years of human existence. Humans depends on irrigation to improve food security, reduce volatility in production, add crop seasons and allow a diverse range of higher-value crops to be grown. Irrigation is described as an age-old art practised for thousands of years in Africa starting in the Nile Valley. Egypt claims to have the world’s oldest dam built about 5000 years ago to supply drinking water and for irrigation in order to promote agricultural development. By 1800, it was estimated that eight million hectares of land were irrigated worldwide. During the early 1950s, the irrigated area expanded to approximately 94 million hectares worldwide (Wolff & Huebener, 1996). A century later, irrigated land increased by about 40 million hectares and in 2008 irrigated areas in the world increased to 304 million hectares partially as a result of new irrigation technology (Wolf & Huebener, 1996; Shirsath, 2009; FAO, 2012). Historically, irrigation development accelerated rapidly after the Second World War (1945) and reached a peak in the 1970s with heavy development financing.

In Southern Africa, smallholder farmers have a critical role to fulfil in the global agricultural village. Smallholder farmers accounts for the eighty percent (80%) of household food production in the Less Developed Countries (Fair Trade Foundation, 2013; Altieri & Koohafkan, 2008). Secondly, smallholder farmers contribute to poverty reduction initiatives in most developing countries and contribute much towards food security efforts (Wenhold, Faber, van Averbek, Oelofse, van Jaarsveld, Jansen van Rensburg & Slabbert, 2007). Smallholder farmers in Sub-Saharan Africa provide 30-40% of the GDP in sub-Saharan Africa economy (Rockström, Barron & Fox, 2007). Despite smallholder farmers’ contribution towards regional and household food security, they are faced with a host of multidimensional challenges which this study aimed at surfacing to expand the farmers and key stakeholders’ learning and activity systems to collectively formulate measures and strategies to fight these challenges.

In Southern Africa, particularly in Zimbabwe, smallholder irrigation schemes date back to 1913 then they were developed to settle black farmers displaced from designated areas for White commercial farmers and also for famine relief (Makumba, 1996). In 1928, the Colonial Government introduced a programme to provide services to existing smallholder schemes and to assist in developing new schemes (Makumba, 1996). In 1931, Nyanyadzi irrigation was started and became fully functional by 1935. The long history of this irrigation scheme is of much interest to this study. The long historicity makes it unique and provides possibilities for mediated collective learning, transformative agency and expansion of the Zone of Proximal Development (ZPD) in crop production and marketing among the farmers and other interacting key stakeholders (Engeström, 2016; Pesanayi, 2016).

Many irrigation schemes were established and are spread across the country and their benefits are enjoyed to date. Hussain and Hanjra (2004) highlighted that smallholder irrigation farming is crucial in facilitating the use of fertilizers, adoption of high-yielding seed varieties which saw yields doubling between 1995 and 2001 in Zimbabwe, although these practices were not always as sustainable as they could be (Mukute, 2010). FAO (2000) further argue that smallholder irrigation farming has an unequivocal and substantive significance in drought relief savings as illustrated by comparative analysis in developing smallholder irrigation schemes and drought relief supplies. In the light of the above argument, smallholder irrigation farming becomes a viable and sustainable option since it reduces donor dependence and results in government savings. Furthermore, it affords the smallholder farmers an opportunity to produce food in a dignified manner. Lastly, irrigation development in Zimbabwe has led to increased crop production in vegetables, tomatoes, beans and this has broadened the people's nutritional requirement leading to better health and an increase in life expectancy (Chazovachii, 2012).

Studies by Dube and Sigauke (2015) in the Lower Gweru irrigation scheme in Zimbabwe realised the critical role of smallholder irrigation farmers in providing household and community food security. The study further realised that rural irrigation systems enable farmers to become net food

sellers allowing them to benefit from food price volatility. Dube and Sigauke (2015) indicated that the nearby 87% of dry land farmers in the area were vulnerable to hunger, famine starvation and malnutrition. In contrast, irrigation farmers engaged in intensive commercial farming and multi-cropping of high yield variety crops in the same area. In support the Oxfam (2011), also mentioned that irrigation farming allows the farmers a full year of multi-cropping, generating higher annual yields per unit area together with diverse and alternative cash or food crops all year.

1.5.1 Smallholder Irrigation farming in Zimbabwe in the post-colonial period (1980-2019)

Poulton, Davies, Matshe, and Urey (2002: 37) noted that both government and donors funded irrigation schemes from after independence (1980) such that, *“by 1999 there were an estimated 187 smallholder irrigation schemes covering an estimated 11,000 ha, plus 2,200ha on out grower schemes.”* However, post-independence smallholder irrigation farming in Zimbabwe has been described by many authors to absent any clear policy, they argue that smallholder irrigation sub-sector was never adequately developed (Bolding, 2004; Chabayanzara, 1994; Chitsiko, 1995; Hughes, 1974; Mupawose, 1984; Roder, 1965), a perspective also confirmed by the ex-director of AGRITEX, Makadho (1994, 20), who stated that, *“irrigation policy is not in black and white: it is only understood.”* Bolding (2003: 195) further observed that in the post-independence era Public Service department was expanded and Africanised but did not produce new attitudes and practices towards the qualities of African farming practices. Instead, they perpetuated the same technocratic and segregated development policies of the Colonial Rhodesian era (Riddell, 1981; Chavunduka, 1982). In fact, there was a continuity in the reproduction of the same assumptions of the *“wasteful and environmentally destructive qualities of African farming practices, that were held by a now expanding bureaucracy, still largely unaccountable to representative institutions”* (Alexander, 1994: 323-33; Drinkwater, 1989: 1991). In essence, nothing changed much except for race and numerical representations but the same colonial policies were the ones being used in the new democratic Zimbabwe.

One more important thing to understand during this period is the fact that, resettlements and irrigation schemes were envisaged as self-contained islands of modernisation, and the settlers *“were expected to sever all social and cultural ties with their past lives in order to achieve new levels of productivity under the tutelage of the state”* (Alexander, 1994: 334). To add on, an

important development in the post-independence era was the shift by the government from both an irrigation rehabilitation focusses to management and development of new irrigation projects so as to increase efficiency in water resources use.

A second important development was the abandonment of segregation policies to a more accommodative path through a policy of equal access by both blacks and whites to development funds for new irrigation projects. The mandate for irrigation development and management was also split among three departments namely, the Department of Rural Development (Derude) in the Ministry of Lands, Resettlement and Rural Development; AGRITEX in the Ministry of Agriculture; and Department of Water Development (DWD) in the Ministry of Water and Natural Resources (Bolding, 2003: 194-195). The following policies were adopted in the post-independence era with intent to improve smallholder irrigation farming in one way or another, but the outcome has varied.

It is important to mention that this study was conducted in three layered contexts. The three layered contexts are a) political environment; b) economic environment and c) inter-generational farming (three generations of farming) in Nyanyadzi irrigation scheme. These three layers can also be represented in political context as periods of: a) colonial era 1931-1980; b) post-colonial era (1980-2000) and c) beyond 2000. Where three distinctive power shifts were experienced. Notably, irrigation farming in the first era (colonial era) was under strict colonial rule and this coincided with the first generation of farming in Nyanyadzi irrigation scheme. The same first phase was also characterised by distinctive economic developments.

The second phase is also referred to as the post-colonial era and was characterised by political and economic shifts. The governance shifted from colonial rule to independence under the leadership of the ZANU-PF. During this period the ZANU-PF party dominated in the politics of the country. It is in the same period Nyanyadzi irrigation scheme experienced a leadership and management shift, from the colonial government rule and management through the Land Development Officer (LDO) to ZANU-PF government rule through community-based management systems via the Irrigation Management Committees (IMCs). This is the same period in which the second generation of farmers became actively involved in Nyanyadzi irrigation schemes.

During the third phase described above, the economy of the country began to decline from being described as the Breadbasket of Africa to a mere informal economy. The post year 2000 saw the rise of the Movement of Democratic Change (MDC) challenging the dominance of ZANU-PF in the political arena. Economic wise, it is the same period Zimbabwe experienced the worst inflation hampering any economic growth in farming. Afterwards, there was a complete share of political power through the Unity Government of 2009 between ZANU PF and the MDC. Regrettably, this is the period the third generation of farmers became actively involved and started to dominate plot holding in the Nyanyadzi irrigation scheme yet, most supporting structures and systems had crumbled down and became dysfunctional.

It is in this three layered historicity that my study was situated and understanding the intertwined events can help to understand the multidimensional complexities in Nyanyadzi irrigation scheme. This is exactly what this study aimed to achieve. It is also important to understand some of the policies and how they affected or influenced development in the irrigation arena in Zimbabwe. These issues were further discussed in detail in Chapter four. Below are some of the policies that affected the irrigation schemes.

1.5.1.1 The Derude policy (1981)

In 1981, the Derude took over from the Department of Agricultural Development (Devag). Derude was responsible for the construction and management of smallholder irrigation schemes, AGRITEX for agricultural extension, while Department of Water Development was responsible for water delivery to the irrigation schemes. The separation of the management and agricultural extension was believed to have been influenced by the earlier extension officers who despised their dual roles as policemen and agricultural advisors to the irrigation farmers (Bolding, 2003). According to Chitsiko (1988: 70) the separation of the dualism was problematic because,

co-ordination of the departments was poor and their co-operation inadequate. Staff members of the departments were confronted with the problem of divided loyalties. Personality clashes between management and extension staff at some schemes have not helped matters either.

The result was a discord and lack of clarification on roles until July 1987 when the irrigation component of Derude was transferred to AGRITEX, effectively merging the extension and management functions into a single department (Chitsiko, 1988). Bolding also noted that between 1980 to 1997, the smallholder irrigation sub-sector was massively assisted by donors. It was difficult for government departments mandated with irrigation development to deal with these huge funding institutions and their differing funding conditions. The area under smallholder irrigation expanded, *to 4,270 ha in 1983; 4,572 ha in 1990; and 9,958 ha in 1997* (Government of Zimbabwe (GoZ) 1997: 9). Also notable was the growth in both influence and staff numbers of the irrigation engineering division within AGRITEX.

Another important development of this era was the adoption of neo-liberal policies in the 1990s. This resulted in the government reducing or withdrawing its funding obligations for both the operations and maintenance of the existing irrigation schemes (Bolding, 2003). Secondly, irrigation management turnover was realised in most of the smallholder irrigation schemes towards the end of the 1990s, since the government withdrew financial obligations, whilst the majority of the donor funds were used to experiment with new forms of smallholder irrigation development and management. The political unrest and unpopular land invasions by the war veterans in the late 1990s dried up the international and bi-lateral funding who were earlier interested in irrigation development work. This left irrigation farmers with the high burden of financing the operational and maintenance costs of the smallholder irrigation schemes.

With the introduction of Derude in 1981 policy attempts aimed to introduce “*a self-regulatory, self-disciplining machinery at the irrigation scheme to enhance maintenance of discipline, cropping patterns and recommended agronomic practices*” (Pazvakavambwa, 1984: 423) (see Table 1.3). The policy attempt was a mixed blessing, it sometimes left the smallholder irrigation sector with “*a host of contradictory, objectives, all policy aims that had been applied in the past that included the provision of food security, the generation of rural employment, the production of export crops, and relief of population pressures on the land to the ignition of a rural industrialisation process*” (Bolding, 2003: 196). The policy provided room for local interpretation and prioritisation of the policy goals. Hence, many of the smallholder irrigation communities were

left with ambiguity in prioritisation since there could be an option to “*maximise settlement and food security by decentralising decisions on cropping strategies to as many plot holders as possible, or alternatively maximise production by centralising management in the hands of the irrigation manager*” (*ibid.*, 196). Because of the colonial historicity the majority of smallholder irrigation farmers preferred the former as it gave them freedom to move away from the so-called restrictions of settlements and farming patterns. This kind of prioritization had repercussions for economic plot holding (see Chapter 4), influenced by the pressures of population growth and productivity per acre. In fact, in the case of Nyanyadzi irrigation scheme this caused multidimensional complexities in the scheme which are rather difficult to understand and worth critically and carefully exploring with intent to mediate an expansive learning process as done by this study.

Another ambiguity was associated with the policy’s management strategy. The policy gave much managerial power to the Irrigation managers who could “*withhold three annually renewable permits to plot holders on account of lacking performance*” (Bolding, 2003: 196), with this being a continuity of the disciplinary irrigation factory policy practised prior to and shortly after independence. Yet, on the other hand, “*the policy proposed a gradual turn-over of operation and maintenance responsibilities to users by increasing their financial contribution and forming Irrigation Management Committees to achieve self-management*” (*ibid.*, 196). Hence, this posed more of a contradiction than a complementary system. Another important observation is the omission of the irrigators’ rights, as issues to do with ownership and user rights of irrigation infrastructure after hand-over were not clarified. Additionally, there were no time frames provided as to when and how the irrigation scheme qualified for turnover. Meinzen-Dick (1993: 35) argues that, “*despite the fact that the Derude policy was never endorsed as official policy, it is considered the most definitive statement of smallholder irrigation policy in Zimbabwe*”. As later witnessed in inter-departmental conflicts over the implementation of the policy, the top level Derude staff insisted that the IMC approach was necessary. As top level staff under the Derude they insisted on the relevance and importance of the IMC approach to management of the smallholder irrigation schemes because they perceived that the plot holders were no longer prepared to co-operate with the old-style Irrigation Managers.

Such a stance was motivated by the “*widespread defiance of irrigation rules and non-payment of water rates in the schemes during the first years after independence*” (Bolding, 2003: 196). Hence, the idea was to strengthen the IMCs as a strategy to avoid strict government supervision and continued subsidies on operation and maintenance. In essence, to move into self-governance and self-sustaining systems where the government was less involved. However, the Devag and AGRITEX staff interpreted the policy “*as a continuation of the colonial management style, whereby IMCs were used to enforce discipline amongst the plot holders, thus ensuring sustained productivity of the schemes*” (*ibid.*, 197). Interestingly, the latter view succeeded when the AGRITEX replaced Derude as the managing agency for smallholder irrigation in 1987. Notably, the director and deputy director of Derude who were pushing for the IMC approach to management of the smallholder irrigation schemes became the directors in AGRITEX in 1985 and 1988, respectively. Hence the subsequent take-over of smallholder irrigation schemes by AGRITEX in 1987 (*ibid.*, 2003). The Derude IMC policy which was a source of ambiguity is described in Table 1.3:

Table 1.3: The Derude Policy

According to the assistant director Derude, later director of AGRITEX, the aims of the irrigation management committees were: 1) To enhance farmer participation in management and decision making at the local level. 2) To prepare the farmers for a complete take-over of management functions currently carried out by government. 3) To create a responsible attitude and a sense of belonging to the scheme so that farmers could view the schemes as their and not simply a government project. 4) To introduce a self-regulatory, self-disciplining machinery at the irrigation scheme to enhance maintenance of discipline, cropping patterns and recommended agronomic practices.

Source: Pazvakavambwa (1984: 423)

1.5.1.2 National Farm Irrigation Fund (1985)

Another visible policy in the post-independence era was the National Farm Irrigation Fund (1985) which was meant to benefit the smallholder irrigation farmers in Zimbabwe. This policy was meant to alleviate government spending on financing operational and maintenance costs of the

smallholder irrigation schemes. In essence, the policy aimed at providing the smallholder irrigation farmers with loan facilities to maintain and expand their irrigation schemes' infrastructures using the land as collateral. This initial plan was to involve the irrigation farmers in the financing of own irrigation schemes. However, the policy was not received as expected. There were two issues that overly undermined the success of the policy namely, unclear ownership rights in the irrigation schemes and secondly, politics and humanitarian work. The latter involved electoral promises made by the state president and various ministers to build dams and irrigation schemes in each district for free as a stimulant to the lack of interest in the loan funds. Lastly, the donor support to smallholder irrigation development work at no charge severely undermined the policy (Rukuni & Makadho, 1994).

1.5.1.3 The FAO initiative (1990-1994)

In 1990 FAO and GTZ (a German Development Agency) were said to have financed the development of an irrigation policy and strategy in Zimbabwe which resulted in the FAO Report (1994) (Bolding, 2003). However, there is confusion with regards to this report, some claim it was a policy in force, while others felt it was not but rather a semi-official document which was never endorsed as a policy by the government (*ibid.*, 2003). In essence, the FAO report (1994) advocated for improvement and efficiency in irrigation water use through the adoption and implementation of more effective irrigation practices like sprinkler and drip irrigation. In addition, the report proposed a replacement of the Irrigation Management Committees which were perceived to be inefficient. The proposal was to replace them with effective Water User Associations as well as stringent financial reforms that included “*a water pricing policy that reflected the scarcity value of the commodity water and the recovery of operation and maintenance costs directly from the beneficiaries*” (Bolding, 2003: 197). The report further proposed that the government should claim responsibility for irrigation infrastructure development on state land, and further encouraged private sector investments in smallholder irrigation farming. Although, this FAO policy was deemed to never be endorsed by the government, it resonated well with the capacity of the irrigation department of AGRITEX since most of the personnel were trained irrigation engineers.

1.5.1.4 Decentralisation Policy (1991-1993)

Decentralisation was a national policy adopted in 1991 with the intent to establish a participatory system of local government. It was based on the devolution of authority to various levels, at village (VIDCO), ward (WARDCO) and district level (District Council). The idea was to involve the local communities in all governance processes. Early attempts were made in 1994 through the formations of the VIDCO, WARDCO and District Councils as representative bodies. But, in this new dispensation these elected representative bodies were “*meant to replace Rhodesian governance structures that had been dominated by traditional leaders*” (Bolding, 2004: 197) and at the same time the central government wanted to capture and establish control over the local political party committees in the communities. Most of these committees were dominated by the District Development Committees and Provincial Development Committees that consisted of government bureaucrats and very few elected representatives. In addition, the local authorities were primarily regarded as policy implementers, not policy formulating agencies. Therefore, their understanding and interpretation of people's participation, “*meant assent and compliance, thus easing the implementation of centrally formulated government policies*” (Alexander 1994, 329-31).

A further step through the Rural District Council Amalgamation Act of 1991 (implemented in 1993) saw a more serious attempt to entrench the involvement of line departments in the administration, operation and management of local projects, including smallholder irrigation projects. Resultantly, the Rural District Councils through their own professional capacities were expected to replace government experts with their own staff. The attempt was heavily resisted by the line ministries, “*fearing the dominance of party politics over administrative and technical competence*” (Roe, 1995: 839).

1.5.1.5 The National Water Policy and Strategy (1995-1998)

Another policy incepted in 1995 was the National Water Policy and Strategy (Government of Zimbabwe, 1995), with the aim to re-distribute water access, commercialise government departments involved in the management of water and involve the water users in the development and management of water on a river basin/catchment scale. Hence, a new Water Act (GoZ, 1998)

was established to enforce the water reforms and privatisation of the Department of Water Development proceeded and it was changed to the Zimbabwe National Water Authority (ZINWA) (Bolding, 2003). Therefore, ZINWA became the first commercial parastatal agency to provide water services on a cost recovery basis. In addition, Water Catchment Councils were formed in the country's eight major river basins. The Water Catchment Councils were constituted of all the stakeholders and involved them actively in the allocation of water permits and development of new (irrigation) infrastructure (*ibid*, 2003). The National Water Policy and Strategy (GoZ, 1995) resulted in two outcomes namely, the rise in national blend price charged for agreement water and withdrawal of electricity subsidies on pump operated smallholder irrigation schemes. This seriously affected the operation of many smallholder irrigation schemes including Nyanyadzi irrigation scheme which is the context in which this study was conducted.

1.5.1.6 The Zimbabwe Agricultural Policy Framework (GoZ, 1996)

In August 1996, the Zimbabwe Agricultural Policy Framework was launched. This framework provided national objectives and policies for the agricultural sector (Bolding, 2003). In essence, the framework was a general reflection on the trends of several ongoing policies without outlining any specific implementation guidelines. The main aim of the framework was “*to facilitate the release of international funding for the implementation of World Bank mediated Public and Agricultural Sector Investment Plans*” (Bolding, 2003: 198). However, to the smallholder irrigation schemes the policy advocated for “*increased commercialisation of irrigated production, sustained growth of irrigated area, establishment of an efficient institutional structure, and equitable and efficient use of scarce water resources by means of a new water pricing policy*” (*ibid*: 198). On the other hand, the policy was a guide to irrigation management reforms implemented by several internal and international agencies that have been highly active in the development of irrigation schemes such as the FARMESA project, financed by FAO and Sida (a Swedish donor agency) and the Smallholder Irrigation Support Programme (SISP), financed by IFAD and DANIDA (a Danish donor agency). According to Manzungu (1998) the policy also guided the methodologies for irrigation management transfer in most government run irrigation schemes. And this was in line with the SISP which sought to develop and test turn-over models in irrigation management transfer and strengthen organisational capacity of rural district councils,

irrigation service institutions and farmers by means of framing (GoZ, 1997 cited in Bolding, 2003: 198).

What can be seen in the discourse on smallholder irrigation farming in the post-colonial era is the issue that non-management turnover was motivated by two factors, namely improved productivity and improved cost recovery by the government. Notably, one important absence in the smallholder irrigation policies and dialogues is the rights and responsibilities of the irrigation users (farmers). As a result, most of the Irrigation Management Committees on most of the smallholder irrigation schemes in Zimbabwe lack a legal basis for sustained operation and this manifests the strong continuity of colonial agrarian policies. Added to this is the active donor support which has also precipitated an expanded role of the government in the smallholder irrigation schemes (Bolding, 2003). Ferguson (1990) noted that the attempts to decentralise and devolve authority by the government to locally elected bodies in the smallholder irrigation schemes were restricted by the expanding state bureaucracy during that period.

1.6 MULTIDIMENSIONAL COMPLEXITIES IN IRRIGATION SCHEMES:

The term multidimensional has been loosely used across disciplines to mean multi-faced or complex challenges. The term was loosely used by Hussain, Giordano and Hanjra (2002) to describe the multifaceted nature of poverty. In this study multidimensional complexities in irrigation schemes is defined as the complex array of *intersecting dynamics* associated with food security and irrigation practice which includes, stability, utilisation, availability, asset creation, sustainability, safety nets and risk management, access, and global – local system market and political relations (see Section 2.2). It also refers to social, cultural, political, economic and environmental induced challenges faced by the smallholder farmers and other key stakeholders working together towards improved household food security, especially as this relates to irrigation practices.

According to Dube and Sigauke (2015) despite the smallholder farmers' significant contribution in ensuring food security they are faced with a host of challenges. Such challenges include, lack of funding, climate change (heat, drought, increased water scarcity) and increased population

among other factors and these challenges hinders the Smallholder farmers' capacity to increase food production. Increased population is one such complexity since, by 2050 the global population is estimated to increase to 9 billion people, with associated demands for food globally (FAO, 2008b). Dube and Sigauke (2015) mentioned climate change as one complexity that has a direct hindrance on food security in most developing countries including Zimbabwe. Swaminathan and Kesavan (2012) further noted that climate change exacerbates food insecurity by reducing crop yields and increasing production variability. Ringler, Zha, Kok and Wang (2010) point out that climate change reduces cereal production by 3.2 percent in Sub-Saharan Africa and the region is one of the most vulnerable to climate change related food insecurity (IPCC, 2014).

Another critical multidimensional complex issue is access to agricultural water. This issue was extensively dealt with by Hussain, Giordano and Hanjra (2002) in Sri Lanka and Pakistan. They identified five key interrelated dimensions of the relationship between accesses to good agricultural water, socioeconomic upliftment in rural communities and poverty reduction. The five key dimensions are production, income/consumption, employment, vulnerability/food security, and overall welfare. They also noted that land and water resources are important determinants of rural poverty and there was a significant inequity in the distribution of water across the irrigation system. The outcome worsens when land distribution is unequal by gender. The raised issues could also be visible in Nyanyadzi irrigation scheme hence the above-mentioned insights are critical to this study.

Hussain, Giordano and Hanjra (2002) further identified poverty as complex, multidimensional and described it as the result of myriad interactions between resources, technologies, institutions, strategies and actions which in this study can be better understood through analysis of interacting activity systems (see Chapter 4 and 5). Poverty has been widely reflected on in an array of papers and policies (World Bank, 2000). Land ownership was also identified as another complex issue in irrigation schemes (Hussain, Giordano & Hanjra, 2002) which can even be witnessed in Nyanyadzi communal area where not everyone is dependent on crop production and not all farmers are plot holders. The issue of access to farming land and ownership is quite a complex and problematic issue. Hussain *et al.* (2002) noted a direct relationship between input benefits and the proportion to the size of plot holding. The larger the land the more benefiting and vice versa (see Chapter 4

and 5).

Other complex issues have been noted in the following, lack of markets, institutional structures (organization and management), lack of capital, water pricing, lack of transport and theft of crops, low levels of education among extension officers, lack of ownership of land by smallholder farmers and lack of proper sanitation (clean water, sewerage and toilets) to farmhouses (Acha, 2014). The above findings are widespread in most irrigation schemes in Sub-Saharan Africa (Baloi, 2016).

1.7 THE POTENTIAL EXPANSIVE LEARNING PROCESSES IN IRRIGATION SCHEMES

As discussed above, humans depend on irrigation to improve food security, reduce volatility in production, add crop seasons and allow a diverse range of higher-value crops to be grown. But what has been forgotten in the history of irrigation schemes as discussed earlier on is the diverse knowledge the community has and the knowledge sharing and learning practices the farmers engage in crop production and marketing to achieve household food security. There is little known on the complexities in the challenges the smallholder farmers are faced with in learning crop production within the irrigation schemes. Therefore, this study argues that irrigation schemes are both a stimulant for learning and provide a space (object) for collective learning, as was also shown by Baloi (2016) who studied expansive learning in community-based irrigation scheme management in Mozambique.

This study therefore argues that of the 8000 years of evolution, irrigation schemes have been providing the space for collective learning and farmers have continuously engaged in learning in their own farming activity systems and by interacting with other involved stakeholders' activity systems. In essence, the assumed learning process that happens in the farmers' activity systems and other interacting activity systems in these irrigation schemes is what Engeström and Sannino (2010) referred to as an Expansive Learning Process (ELP). This expansive learning process has transformative power and is an ongoing process that can also be mediated to strengthen collective learning and transformative agency (Baloi, 2016; Mukute, 2010; Lotz-Sisitka *et al.*, 2017).

Relating the above understanding to Nyanyadzi irrigation scheme, this study argues that Nyanyadzi irrigation scheme is not a mere developmental project but must be understood and appreciated as a learning arena. I investigated this learning arena, both from the perspective of historical and existing learning and the perspective of mediated expansive learning that engages with the multidimensional complexity of the object of irrigation-based food security provisioning. I aimed to understand in more depth the collective learning processes that are currently underway as farmers are practicing household food production and marketing as well as interacting with other key stakeholders in the management of the scheme towards improving their crop production. I aimed to understand in more depth how the farmers may expand this learning to deal with the range of complex challenges associated with the multi-dimensional complexity of their shared object.

This study assumed that the multidimensional complexities faced by the farmers can either enable or constrain learning of household food production for food security provisioning. Hence, there was a need to understand these multidimensional complexities enabling or constraining smallholder farmers' learning of food production and marketing in more depth. I have only started to scope them out; but this understanding needs to be more contextually developed and situated for a deeper understanding to emerge, as will follow in the proceeding chapters.

1.8 STRUCTURE OF THE STUDY

This study was aimed at examining and mediating expansive learning in the context of multidimensional complexities in the farmers activity systems. The study was structured in seven chapters. The general outlook of the study is shown in Figure 1.6 and the chapters shall be described in detail:

Ch 1	Ch 2	Ch 3	Ch 4	Ch 5
Introduce yourself Research Interest Context Questions History of pre-ind. post ind. early 1980s later 1980s 2000 2016	Theoretical Frameworks Literature Review ↓ What is already known	Methodology	Description of activity Systems + Object of Activity Multi-dimensional complexities influencing the object of activity. History of the Object Interviews Focus groups historical documents History of the Object Describing Cultural-Ecological-Historical the AS.	Surfacing the Contradictions secondary contradictions → MT. Contradiction between cost and output productivity objectives manifests as Failure to farm consistently across seasons DATA

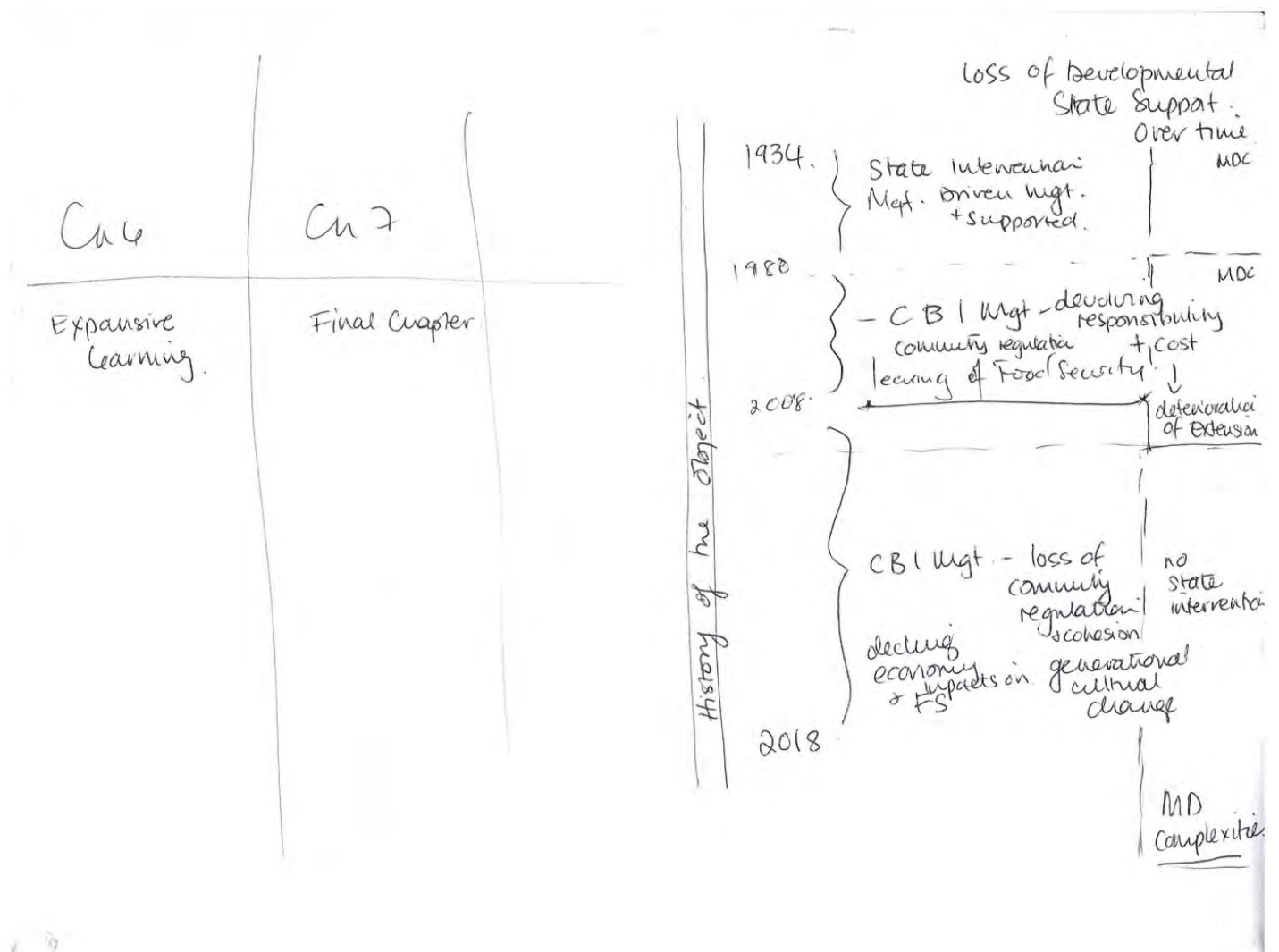


Figure 1.6: The outline of the study

Source: Author

1.8.1 Chapter one

This chapter provides background information to the study via a thorough description of the contextual study area. The chapter describes the role of the researcher and further explicitly, outlines the main research objective, the specific research objectives as well as the two main research questions and the subsequent specific research questions. The chapter highlights the policy history of irrigation schemes in Zimbabwe, offering both a pre-independence colonial and

post-independence perspective. The chapter acknowledges the importance of irrigation schemes as a livelihood strategy. It also acknowledges the collective learning that occurs and is required to establish and make such irrigation schemes work in practice. This chapter argues that there has been little said about this collective learning and given the dearth of detail on such learning, it seems that this learning is either going unnoticed or is ignored. I propose Nyanyadzi irrigation scheme is not a mere developmental project but must be understood and appreciated as a learning arena where multi-dimensional complexities can be engaged and confronted.

1.8.2 Chapter two

This chapter offers the theoretical framing and literature review. It describes and explains Cultural Historical Activity Theory (CHAT) (Engeström, 1987) used in this study, together with the Expansive Learning Process (ELP) which characterises the third generation CHAT. The chapter also includes review on literature related to collective learning in CHAT namely, Zone of Proximal Development, Expansive learning and Transformative agency. The chapter includes a review on food security from its broader context to the local context and lastly, the multidimensional complexities in the learning of household food production in small holder irrigation farming is also reviewed. In essence, this chapter brings a deeper understanding of the food security concept, irrigation farming and lastly, the multidimensional complexities involved in the learning of household food security in irrigation farming. This helped to develop my understanding of the likely complexities being experienced by farmers and helped to provide a wider cultural-historical backdrop to the empirical study.

1.8.3 Chapter three

This chapter discusses the methods and instruments adopted and used for data generation. The chapter further discusses data management, analysis and presentation in this study. The qualitative research orientation under-laboured by the insider formative interventionist approach were also discussed and a description as well as a justification of the choice of the case study design adopted in this study is given. The chapter further discusses the procedures that were followed in

conducting the 15 in-depth face to face interviews with three generations of farmers, the three focus group discussions with the farmers and the change laboratory workshops. Lastly, the chapter gives an account of how data was collected, managed, analysed and details the ethical considerations.

1.8.4 Chapter four

This chapter presents, describes and explains the key activity systems in the Nyanyadzi irrigation scheme and gives an account on the history of the object. In line with the CHAT, identification of the activity systems was critical to an understanding of the object. Understanding of the object of activity is based on historical analysis which I undertook with three generations of irrigation farmers. This was crucial for the surfacing of the contradictions that are described and explained in chapter five as catalysts for expansive learning.

1.8.5 Chapter five

This chapter presents, describes and explains the contradictions faced by the farmers and other key stakeholders in Nyanyadzi irrigation scheme. The chapter begins by discussing the concept of contradiction that was adopted as a data analytical tool in the study. The contradictions are categorised as primary, secondary, tertiary and quaternary and are presented in this sequence. The chapter further discusses the concept of discursive manifestation of contradictions as used in the data analysis process. Four types of discursive manifestations of contradictions namely, dilemma, conflict, critical conflict and double bind are discussed and later applied in this chapter. The chapter also discusses the concept of linguistic cues for discursive manifestations of contradictions which I used in the preliminary data analysis phase. Lastly, the chapter presents, describes and explains the five levels of contradictions that were surfaced in Nyanyadzi irrigation scheme.

1.8.6 Chapter six

This chapter reports on the learning processes that happens in the change laboratory workshop. The chapter begins by explaining the Expansive Learning Process (ELP) that took place along all

the three contradictions prioritised by the farmers and other key stakeholders in the change laboratory workshop via the expansive learning process. The chapter described the expansive learning process associated with the resolution of each contradiction prioritized and explains the learning processes as they unfolded via the *insider formative* interventionist research process. The chapter also describes and outlines the solution models adopted and implemented in the study site. Secondly, the chapter describes and explains the Transformative Agency pathways emerging in response to each contradiction by the farmers and the other key stakeholders. Particular attention was paid to transformative agency expressions and these were used to formulate the transformative agency pathways reported in this chapter. Particular transformative agency expressions such as resisting, criticising, explicating, envisioning, committing, taking consequential actions and lastly, confronting were in focus. Lastly, the chapter explained how the farmers and other key stakeholders expanded their Zonal of Proximal Development and envisioned the future expansion of the object of their activity.

1.8.7 Chapter seven

This chapter concludes the study by giving a comprehensive summary of the findings. The chapter describes how key activity systems interact and a quick summary on the five contradictions identified in this study is offered. The chapter summarises key findings of the learning processes and what it means to the study site. Lastly, the chapter recommended strategies to move Nyanyadzi farmers' activity forward and to further resolve the current contradictions and multidimensional complexities the farmers are faced with. The chapter also recommends future areas of study including expanding aspects of this study. Lastly, it summarises the study's contribution to knowledge.

CHAPTER TWO: THEORETICAL FRAMING AND LITERATURE REVIEW

2.0 INTRODUCTION

This chapter presents the theoretical framing and literature review. It describes and explains Cultural Historical Activity Theory (CHAT) (Engeström, 1987) as used in this study, together with the Expansive Learning Process (ELP) that characterises third generation CHAT. The chapter further reviews literature related to multidimensional complexities in the learning of household food production in smallholder irrigation farming. The chapter discusses the food security concept, irrigation farming and lastly, the multidimensional complexities involved in the learning of household food security in irrigation farming. It offers insider contextual nuance to empirical historical data from the actual study site.

2.1 CULTURAL HISTORICAL ACTIVITY THEORY (CHAT)

Cultural Historical Activity Theory (CHAT) is a product of Activity Theory which came from the works of Lev Vygotsky (1896-1934), Alexei N. Leon'tev (1904-1979) and Alexander R. Luria (1902-1977) in the 1920s and early 1930s on cultural-historical psychology (Luria, 1981; Verenikina, 2001). Activity Theory as described by Morf and Weber (2000: 81) is “*a conceptual framework based on the idea that activity is primary, that doing precedes thinking, that goals, images, cognitive models, intentions, and abstract notions like “definition” and “determinant” grow out of people doing things*”. Hasan (1998) further posits that Activity Theory emerges from a first generation of CHAT that emerges from the mediation triangle of Vygotsky (see Figure 2.1), whole work activity as the unit of analysis, where the activity is broken into the analytical components of subject, tool and object, in which the subject is the person being studied, the object is the intended activity, and the tool is the mediating device by which the action is executed (see Figure 2.1).

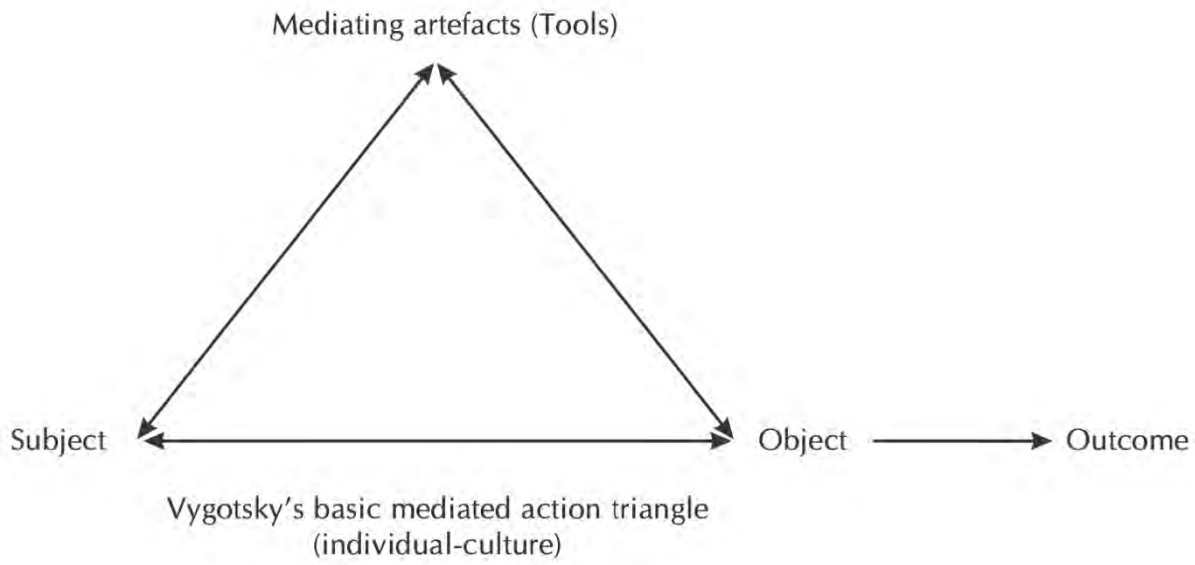


Figure 2.1: First generation CHAT- Vygotsky

Source: Engeström and Engeström, (1984: 17)

Fundamentally, the CHAT developed by Yrjö Engeström in 1987, built on the first generation of cultural historical activity theory developed by Vygotsky and his colleagues as mentioned and shown above in Figure 2.1 (Engeström, 1999a). Engeström (2006) suggests four epistemic threads as a guiding framework for presenting and examining formative interventions using the CHAT: (1) unit of analysis, (2) causality and agency, (3) change and development, and (4) generalization.

Engeström (2001) posits that, we can discern three generations in the evolution of the prime unit of analysis within cultural-historical activity theory. The first generation, based on Vygotsky's work, centred around mediated action as unit of analysis (Zinchenko, 1985, see Figure 2.1 above). The second generation, based on Leont'ev's (1978, 1981) work, took the collective activity system as its molar unit of analysis (see Figure 2.5). Lastly, the third-generation unit of analysis focuses on interactions among two or more activity systems which have a partially shared object (Figure 2. 2).

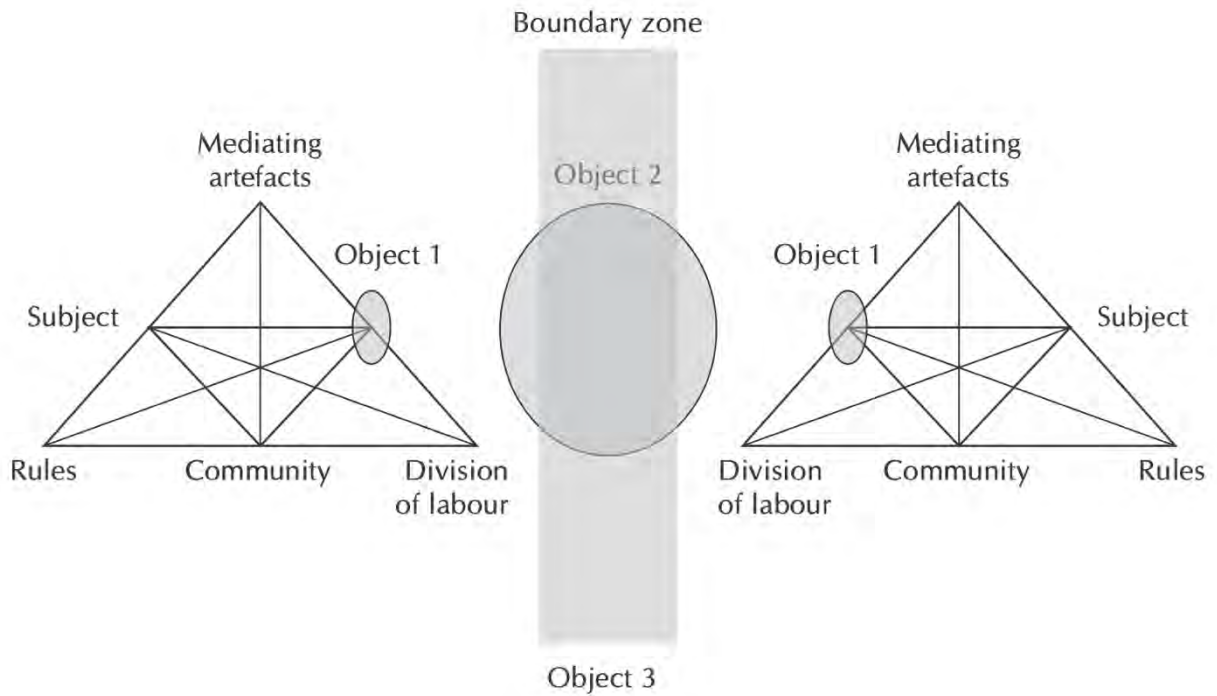


Figure 2.2. Third generation activity theory

Source: Engeström (2006: 8)

As pointed out by Engeström (2006), the mediated action in the 1st generation may be recognized as the tip of the iceberg in the 2nd and 3rd generation models. Hence, the unit of analysis may require multiple levels of analysis (Leont'ev, 1978). In other words, the unit of analysis can only gain explanatory power if visible transitions and boundaries between the activity system and the actions it generates on the one hand, and between the activity system and the field of interconnected activity systems in which it is located are made on the other hand. Furthermore, the activity theory sees the object as the crucial factor that gives durable direction, purpose and identity to an activity and once an activity-system has become fragmented by the inner contradictions, the object of activity tends to get blurred or lost. Hence, the formative interventionist methodology becomes effective in rediscovering and expansive reforming of the object of activity (Engeström, 2006). The first-generation unit introduces the concepts of subject, object and mediating artefact as constituents of action. The second-generation model proposes an anatomy of collective activity, adding the concepts of community, rules, and division of labour, as well as the sub-processes of production, distribution, exchange, and consumption (*ibid*, 2006). Lastly, the third-generation

model goes beyond the interplay between action and activity to encompass the concepts of multi-activity field or terrain and boundary zone, which are aimed at capturing crucial features of units in which two or more activity systems are connected by a partially shared object (*ibid*, 2006).

Recently the fourth generation of CHAT was developed. Like other precedent CHAT projects, the fourth generation CHAT acknowledges mediaton work action as in the first-generation unit of analysis (Engeström & Engeström, 1984: 17), builds on finding contradictions and expansive possibilities in systems of activity as in second generation (Engeström, Haavisto & Pihlaja, 1992: 154), utilise the expansive spearheads in the zone of proximal development to foward understanding and generating collective resolutions (Haavisto, 2002: 298) lastly, enegages in negotiated knotworking among multiple activity systems as is in the third generation CHAT. Spinuzzi (2019) argues that the kind of work in the fourth generation CHAT is “*unstable, fluid and poorly bounded arrangements, an interventionist approach of third generation activity theory may not succeed to unite different stakeholders or even to identify and stabilize one set of stakeholders.*” Engeström, and Sannino (2017) argues that a fourth generation activity theory is more ideal where there is “*radical and fateful transformation in the objects of human activity in the anthropocene on critical societal challenges of equity, sustainability and common good.*” However, Engeström, and Sannino (2017) urge that,

a unit of analysis appropriate for the fourth generation cannot be constructed simply by adding more activity systems to the third generation unit. The unit needs to be built around fateful objects that affect lives across boundaries; we also need to move from an emphasis on structural relations to an emphasis on interrelated processes of expansive learning and generation of transformative agency.

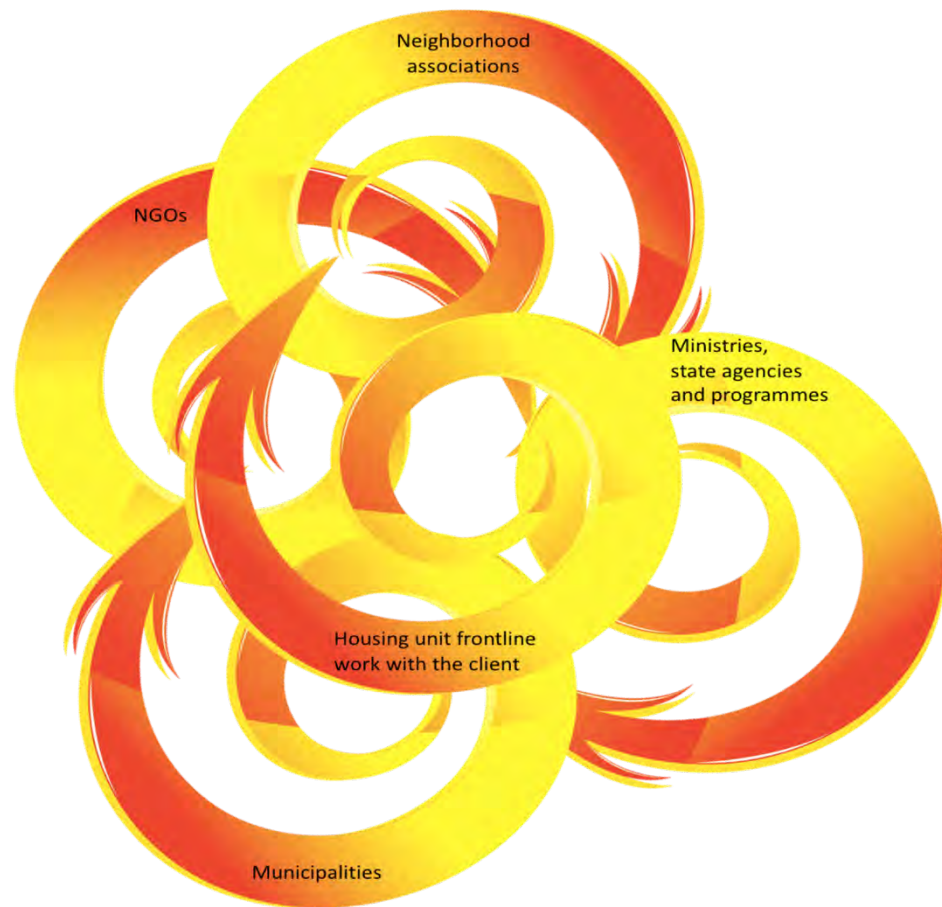


Figure 2.3: A Fourth-Generation Unit of Analysis: Coalescing Cycles of Expansive Learning

Source: Sannino (2017)

As shown in Figure 2.3 above, fourth-generation CHAT builds on ideas and instruments developed by the preceding generations (first, second and third generations of CHAT). Added to, the fourth generation has intertwined learning cycles that are intimately connected to the third generation interacting activity systems, and the analyst needs to move between the two. However, my study was guided and limited to the third generation CHAT because of the partially shared objects in Nyanyadzi irrigation scheme and context.

2.1.1 The concept of activity systems as used in CHAT.

It is of great importance to understand the key concepts as used in the CHAT, namely activity, action, subject and object. According to Leont'ev as cited in Kaptelinin and Nardi, (2006: 31) an **activity** is a “*purposeful and developing interaction of the subject with the world, a process in which mutual transformations between the poles of “subject-object” are accomplished.*” Object-oriented activity is also referred to as practice (Miettinen, 2005). Following Leont'ev (1978/2009)'s perspective, human activities and actions differ in that human activities are constituted by basic components that realise them, in this case the actions. Action is a process which obeys a conscious goal. Essentially, action is the process by which the results of goals are achieved. A better way to understand “*is from the correlative manner of the concept of motive and the concept of activity, so as the concept of goal is correlative with that of action*” (ibid., 2009: 6). Borrowing from Leont'ev's words, the above-described relationship between activities and actions can be illustrated from a person's food procurement activity:

Let us assume that a person's activity is stimulated by food, this is its motive. However, in order to satisfy the need for food he must perform actions that are not directly aimed at obtaining food. For example, one of his goals may be the making of trapping gear. Whether he himself will later use the gear he makes or pass it on to other participants in the hunt and receive part of the common catch or kill, in either case his motive and goal do not directly coincide, except in particular cases. (Leont'ev, 1978/2009: 7)

The **object** of an activity becomes the prime reason for individuals and/or groups of people partake in the activity. In essence, the object of an activity system holds together the other elements, and has a complex and contradictory nature (Kaptelinin, 2005; Hyysalo, 2005; Miettinen, 2005). According, to Leont'ev (1978: 62) “the object of an activity is its true motive” rather than the organic needs of an individual as traditionally conceptualised in psychology. **Mediating artefacts** are the material tools and cognitive instruments, or signs and these include “social others and artefacts that can act as resources for the subject in the activity” (Yamagata-Lynch, 2010: 2). Lastly, ‘**artefact**’ (or **artefacts**) are objects shaped by human workmanship, typically those with historical or archaeological interest. In this study, the terms ‘artifact’ and ‘artefact’ were used interchangeably as the spellings occur in these two variations in the literature. Using activity theory, an activity

system, such as Nyanyadzi irrigation farming activity, becomes the unit of analysis in studying human mediated activity among a community of irrigation farmers or actors who have a common object of activity (crop production and marketing).

2.1.2. The concept of Mediation as used in CHAT.

Wertsch (2007), agreed with Vygotsky that the centrality of mediation in human activity leads to human consciousness. Such mediation is linked to “*psychological tools*” or “*signs*” which could be used to direct the mind and behaviour. An understanding that our contact with the world is indirect or mediated by signs emerged and we do not normally act in a direct and unmediated way in the social and physical world. This understanding meant that, “*the emergence and definition of higher mental processes must be grounded in the notion of mediation*” (*Ibid.*, 2007: 178). This way Wertsch foregrounded mediation in the learning processes such that, co-construction of knowledge in social interactions lead to appropriation and internalisation of the cultural tools required for performing a new or more advanced task in a new activity. Wertsch (2007) also made a distinction between explicit (overt and intentional stimulation) and implicit mediation. In the latter, mediating signs are understood as part of pre-existing, independent stream of communicative action that has become integrated with other forms of goal-directed behaviour (*ibid.*, 2007).

Therefore, in a real setup like Nyanyadzi irrigation scheme, the mediating role can be performed by each of the interacting subjects during their activity, and that it can also be expanded by formative interaction with more knowledgeable peers (*insider-formative* interventionist Researcher, Extension officers among others). This also means mediation can also be planned as expansive learning interactions, on one hand, and can also be catalytic along emergent, everyday expansive learning cycles. These two forms of mediation (implicit and explicit) can also co-exist and intersect in expansive learning (Pesanayi, 2018). In the case of Nyanyadzi irrigation’s learning context, the concept and processes of mediation were applied to the interaction among irrigation farmers and other participants as co-mediators in the change laboratory workshops and out of these settings. In the process, the cultural contexts in the irrigation farmers’ historicised practices were treated as the reference point, while all the other neighbouring activity systems were considered important.

In support to the use of mediation, John-Steiner and Mahn (1996: 191), argued that sociocultural approaches are “...based on the concept that human activities take place in cultural contexts, are mediated by language and other symbol systems, and can best be understood when they are investigated in their historical development.” In addition, Daniels (2015: 9), also found out that, *the concept of mediation makes it possible for humans to transform their world with external cultural tools as they act upon or are acted on by socio-cultural and historical factors, rather than being subjugated by or within cultural systems.*

Similarly, Elkonin (2014: 2058) argued that mediated activity thus involves “*the valuation of your own behaviour through cultural forms or signs*” whereby “*the social and the individual mutually shape each other*” (Daniels, 2015: 34). Therefore, CHAT is relevant and useful to my study where irrigation farming can be viewed as a mediated activity, where farmers constantly transform their world with cultural tools as they act upon or are being acted upon by socio-cultural and historical factors. In other words, the farmers as human agents can master themselves through external symbolic, cultural systems rather than being subjugated by and in them (Vygotsky, 1981 as cited in Daniels, 2008: 9). Meaning that an individual (farmer) has the agentic power to transform his/her surrounding environment, for his/her self-development (Elhammoum, 2002: 96). It is this agentic power Elhammoum, (2002) talks about that is of great importance to Nyanyadzi irrigation scheme where complexities have halted the progress of the scheme and food insecurity is feared.

2.2 THE THREE GENERATIONAL DEVELOPMENTS IN CHAT

As briefly indicated above, there have been three distinctive developments in CHAT theory (with a fourth generation emerging) and these shall be discussed next in detail;

2.2.1 First Generation of CHAT

As discussed earlier, the role of mediating artefacts was the central focus in Vygotsky’s psychological research work (Engeström, 1987; Daniels, 2008). Vygotsky viewed organisms and the environment as inseparable “*parts of the complex system that co-created consciousness in humans through participation in the activities*” and he was interested in methods that objectively studied and explain human activities (Yamagata-Lynch, 2010: 15). In essence, the concept of

mediated action became vital to the relationship between the individual's mental processes and his/her interaction with socio-cultural, historical and institutional contexts (Yamagata-Lynch, 2010). In addition, Vygotsky's focus was also on symbolic mediation of culture and the relationships between human actions (object), the human subjects (individuals), and their cultural artefacts (tools) (Engeström, 1987). The Vygotsky's original mediated action triangle is presented in Figure 2.4 below (Vygotsky, 1931/ 1978; Cole & Engeström, 1993).

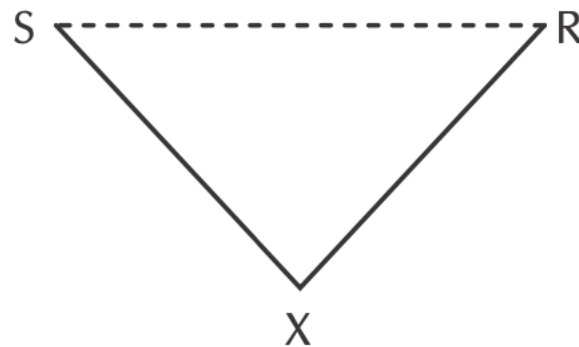


Figure 2.4: Vygotsky's original formulation of mediated action (after Vygotsky, 1931/ 1978, p. 40)

Vygotsky proposed that human activity is represented by a more complex association between the stimulus (S) and the response (R) and is (also) culturally- mediated by a cultural sign (X). He then formulated this association into what he called the cultural-historical psychology. Of interest in cultural-historical psychology is the significance of mediation tools in the subject-object interaction, which shifted the focus from a behaviourist psychology to an activity. Luria and Leont'ev further elaborated cultural-historical psychology by integrating the social, cultural, and historical aspects in explaining how the human mind functions (Stetsenko, 2003). Hence, Luria and Leont'ev, together with Vygotsky, were co-founders of cultural-historical psychology whose basic principles are cultural mediation, historical development and practical activity, in a socio-genesis of learning that leads development (Pesanayi, 2018:117).

2.2.2 Second generation activity theory

According to Engeström (1987) the developmental psychology work of Leont'ev (1978, 2009),

managed to connect the subject, object and mediating tools to the rules, community and division of labour, although he never demonstrates how these connections worked. Fundamentally, Leont'ev managed to create an activity triangle by distinguishing collective activity from individual actions and re-modelled the emergence of division of labour as a central historical process using his famous “primeval collective hunt” example (Leont'ev, 1981: 210-213). Engeström (1987) further developed Leont'ev's ideas into the second-generation activity theory (see Figure 2.5 below).

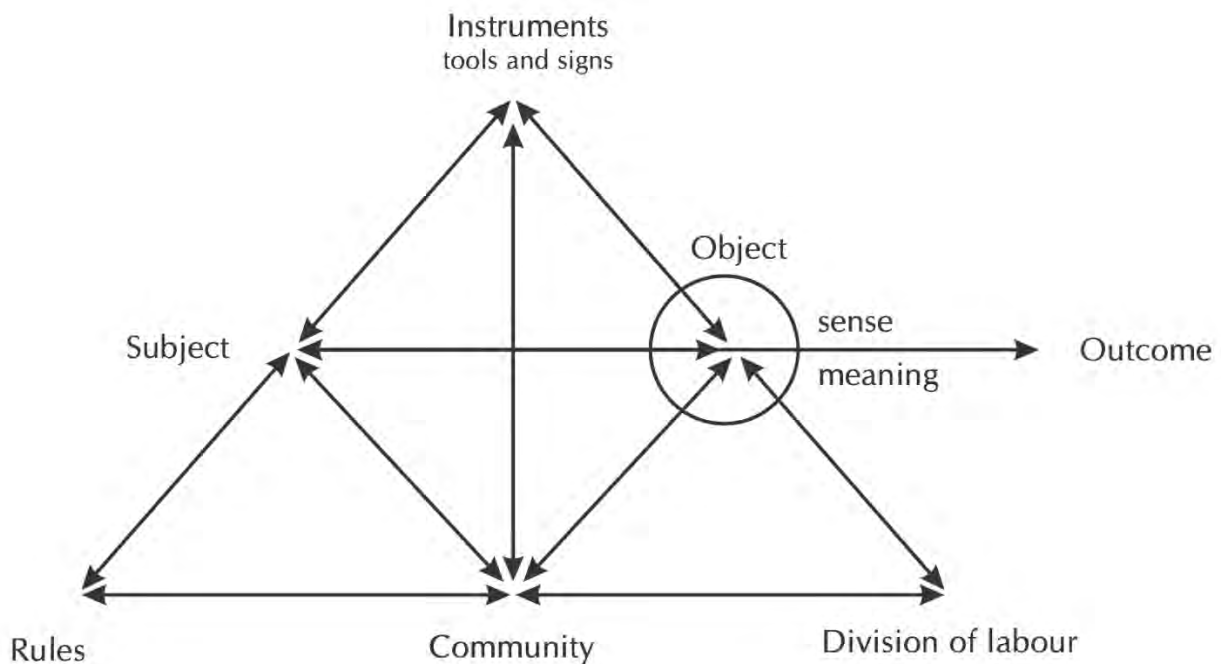


Figure 2.5: Second-generation activity theory

Source: Engeström (1987: 78)

In the second-generation activity system presented above in Figure 2.5, the unit of analysis shifts from an individual activity to a more collective activity and is defined as “*object oriented, collective and culturally mediated human activity*” (Kaptelinin, 2005 :10). The initial focus is on the interrelations between the individual subject and his/her community (Engeström, 2001) by incorporating social or collective elements of community, rules, and division of labour. The second focus is on the interaction between the elements in the activity system (Daniels, 2008: 122). According to Engeström (1993) the central relationship is between the subject and the object of

the activity system, and it is mediated by rules for acceptable interactions and communities fulfil the activity system's purpose and outcomes through division of labour.

It is important to realise that, when Engeström (1987) further developed Leont'ev's ideas into the second-generation activity theory there was an addition of the lower triangle which includes three more elements, namely the **rules**, the **community** and **division of labour** (Leont'ev, 1978/2009; Yamagata-Lynch, 2010) (see Figure 2.5). In this case the **community** was defined as the social cluster, of which the **subject** is part, in his/her engagement in a particular activity. The **subjects** in the **community** share tasks among its members in a manner referred to as **division of labour** (Pesanayi, 2018). These elements interact in an activity governed by formal and/or informal principles legitimizing their conduct of work, known as the **rules**. The **outcome** is the result of an activity towards which an organisation, a group, a network or a society is working towards (*ibid*, 2018:120). Therefore, for an activity system to be, there must be a shared purpose or motive of some sort which defines the nature or **object** of the activity. For instance, when the farmers use mediating tools in their practices in the irrigation scheme guided by various rules including the constitution, aimed at food production and marketing to achieve household food security; it can be described as an activity system. As shown in Figure 2.5 the **object** of the activity system is illustrated as an oval, meaning that object-oriented actions are sometimes explicitly, or implicitly characterised by uncertainty, surprise, interpretation, sense making, transformative potential and have the potential for meaningful change (Engeström, 2001: 134).

In the study, second-generation activity theory was applied in the identification of key interacting activity systems involved in Nyanyadzi irrigation scheme and to deepen my understanding of the individual activity systems. An understanding and analysis of the historicity of the individual activity systems (see Chapter 4) helped in surfacing contradictions within and between the activity systems (see Chapter 5). The shift in the unit of analysis from individual activity to collective activity in second-generation activity theory is also culturally relevant for African smallholder farming systems where the culture of traditional collective farming *humwe/mushandira pamwe* (ChiShona) is active, as was found by Pesanayi (2018:120). So, it was in my case, where I dealt with communal irrigation farming systems bound by communal traditional farming principles and where collective activity is central to the survival and progress of the irrigation scheme.

2.2.3 The third generation of activity theory

As a response to positive critiques by Cole (1988) and others regarding the role of cultural diversity and dialogue between different perspectives, and extending Luria's ideas about multiculturalism, Engeström (1987) developed third generation activity theory. The third-generation activity theory was developed together with its conceptual tools to understand “*dialogue, multiple perspectives and voices, and networks of interacting activity systems*” (ibid., 1987: 6). In essence, the third-generation activity theory takes joint activity as the unit of analysis rather than individual activity (Daniels, 2008). It is interested in the interaction between at least two activity systems to networks of activities through a jointly negotiated object.

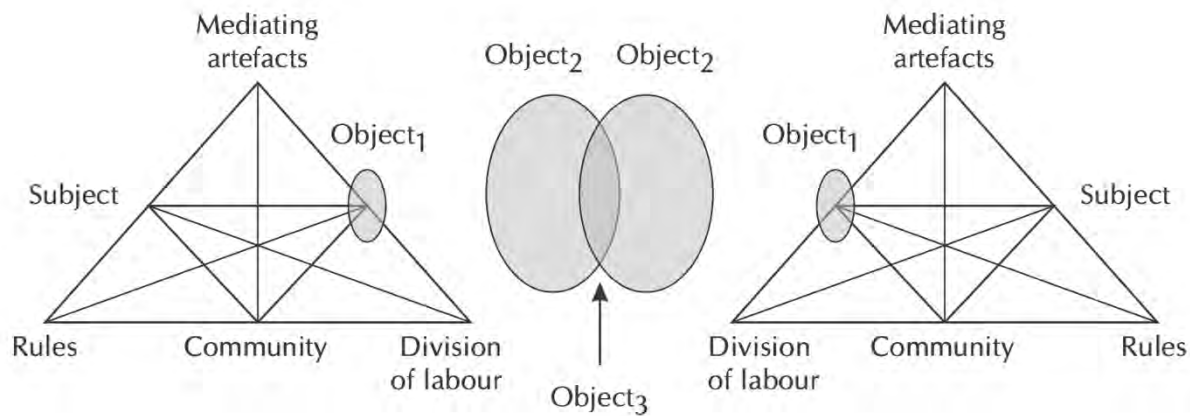


Figure 2.6: Third generation activity theory: Two interacting activity systems as minimal unit of analysis and a potentially shared [boundary] object₃

Source: Adapted from Engeström (2001: 136)

The Figure 2.6 above shows two interacting activity systems as minimal unit of analysis and a potentially shared object (Object₃) in the third generation of activity. The object of an activity system is not static but, constantly changes as elements within and between the activity systems intersect and this is what Engeström (2001: 136) meant by a “*moving target, not reducible to conscious short-term goals.*” In the example Engeström (2001: 136) described the patient as a ‘raw material state’ (object₁) and after diagnosing the same patient was classified as a collectively

constructed meaningful object (object2) and eventually there was “*a collaboratively constructed understanding of the patient’s life situation and care plan*” (*ibid.*, 2001: 136), and later referred to as a potentially shared object (object3). It can then be understood the object is dynamic and constantly shaped by interacting activity systems from object 1 to a potentially shared object (object 3) (also see Figure 2.2). Notably, the interacting activity systems may be more than two depending on the nature and complexity of the study. Hence, the third-generation activity theory endorses the Marxist idea that “*all activity systems are part of/forms a network of activity systems that in its totality constitutes human society*” (Marx, 1867/1976 as cited in Daniels, 2008: 123). The diverse activity systems involved are a result of “*continuous historical process of progressive job diversification and collective division of labour at the societal level*” (*ibid.*, 2008: 200).

This study was interested in mediating potential collective expansive learning and transformative agency in farmers’ activity system as well as in the other interacting activity systems namely, the AGRITEX-Agricultural Extension workers, Nyanyadzi Vocational & Training Centre, Non-Governmental Organisations and ZINWA- the Water Authority, ZETDC -power utility among others (see Chapter 4 for detailed descriptions of the activity systems). Building upon Engeström’s (1999b) observations that learning, potential development and changes in human activity and societal activity systems can be identified by the interactions shared among multiple interacting activity systems and formative interventions, Nyanyadzi irrigation case became a potential. In the study I found that CHAT (Engeström, 1987) allowed me to examine and understand the multidimensional complexities faced by farmers and mediate an expansive learning process via double stimulations in a change laboratory workshop. I utilised the concept of contradictions between two or more activity systems to understand the multidimensional complexities (see Section 5.1), how they have come to be and the opposing forces that transform and shape them. I also used the same concept of contradiction to figure out and foster the needed change and development (Roth & Lee, 2007: 203) using the potential for learning (Akkerman & Bakker, 2011) and emancipation through the expansive learning process facilitated by double stimulation in the Change Laboratory Workshops (see Section 3.2.3) following the Expansive Learning Cycle (see Figure 2.7).

2.3 WHY CHAT

Cultural Historical Activity Theory (CHAT) (Engeström, 1987) was chosen as the main theoretical and methodological lens in this study for several reasons. Some of the reasons have been highlighted in the earlier discussions but I shall take this opportunity to further describe and explain the importance of CHAT in this study. Of importance to this study is the relationship between learning and development, in which learning is described as resulting from mediated interactions between culturally and historically produced initial and double stimuli and associated responses that occur via processes of mediation between subject, object and mediation tools. Mediation tools are language, artefacts (1st generation CHAT) and activity (2nd and 3rd generation CHAT).

Secondly, CHAT theory acknowledges that people develop capabilities in collaboration and in interaction with others as well as their immediate surroundings (Blackler *et al.*, 2000) in zones of proximal development (which can be language based, cultural or activity-oriented zones of proximal development). In this context there are rules, other community members and division of labour dimensions that come into play in the mediation processes that occur as people seek to develop their object of activity together (see Section 4.1 for diagrams of 2nd generation CHAT activity systems as applied to this study). In its 2nd and 3rd generation, CHAT is a cultural-historical *object-oriented activity theory*, that also takes materiality (e.g., environmental and economic conditions) into account. 3rd generation CHAT focusses on interacting activity systems that share a common object (see Section 5.2.3, Figure 5.6; Section 5.2.3, Figure 5.11; Section 5.2.4, Figure 5.14 for diagrams of 3rd generation CHAT applied to this study). CHAT provided both theoretical and methodological lenses to understand how individuals/groups (farmers) have interacted and learned, are currently interacting and learning, and how they may (through explicit mediation in the expansive learning process) orient their learning and activity into the future around on the same object in which they have and can continue to jointly develop new knowledge or tools to address their complex challenges (Engeström, 1987, 1999; Daniels, 2008, Mukute, 2009). This shows that the object of activity is historically evolving (Mukute, 2015). In the agricultural context, Mukute (2015) has indicated that the agricultural object of food production has evolved to engage socio-technical innovations (e.g., mechanization) and most recently with climate change challenges it is involving including sustainability principles hence, this methodological approach is worthy applying in irrigation set ups as well where the object is on

food production to meet household food security.

Thirdly, Engeström (1999) quoted in Mukute (2009) explains that, CHAT theory has potential for mobilizing transformative agency via learning processes. This form of learning is referred to as the expansive learning and it encompasses both internalization and externalization. Engeström described externalization as the learning that happens when an individual or a group of people creates new knowledge or solutions (Engeström, 1999). Internalization is the learning that happens when an individual makes sense of available cultural capital in his/her social relations, thinking and actions. The element of transformative agency and expansive learning is important to this study and helped me engage with asking how the multidimensional complexities can enable learning of food production in the irrigation scheme. This means that the CHAT theory empowers the insider interventionist researcher to engage the farmers and other stakeholders and facilitate an expansive learning process towards improved management of the irrigation and household food security. CHAT also includes transformative agency analytical tools that can be used to monitor and assess the emergence of transformative agency emerging from the expansive learning process via a series of ‘transformative agency expressions’ involving resistance, critique, explication of new models, commitments to act, and actual changes in action. Reframing and transgressing of normalized practices are also expressions of agency (Lotz-Sisitka *et al.*, 2017).

The strengths of CHAT theory can be witnessed in its five principles as argued by Engeström (2001) that:

- 1. The prime unit of analysis is a collective, artefact-mediated and object-oriented activity system seen in its network relation to other activity systems;*
- 2. Activity systems are multi-voiced and are a nexus of many points of view, traditions and interests. Multiple layers and strands of history are embedded in the rules and division of labour. The multi-voicedness of the activity systems is a source of both tension and innovation.*
- 3. Activity systems take shape and are developed over long periods of time and should be analysed in terms of their local history, objects, outcomes and genealogy of conceptual tools that have shaped it over time.*
- 4. Contradictions between and within activity systems are potential sources of change and*

development and

5. Activity systems have the potential for expansive transformations, which occur through relatively long cycles of qualitative transformations. (Adopted from Mukute, 2009: 153).

Engeström further argues that, a full cycle of expansive transformation can be understood as a collective journey through the *zone of proximal development* of the activity: “*It is the distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions.*” (Engeström, 1987: 174)

In addition, CHAT has been applied and productively used as a theoretical and methodological approach for seeding and mediating expansive learning, transformation and agency in community projects in southern Africa (Mukute, 2010; Masara, 2010; Lindley, 2014; Kachilonda, 2014, Chisoni, 2016; Baloi, 2016; Lotz-Sisikta *et al.*, 2017, Pesanayi, 2019). Furthermore, CHAT (Engeström, 1987) proved useful in working across boundaries of activity systems as was in the case of Pesanayi (2019) where he succeeded in surfacing ambivalences, tensions and contradictions with a formative interventionist goal to resolve them. My work therefore contributes to a growing body of knowledge in the field of environmental education oriented towards these processes and interests. Furthermore, CHAT provided the premises and tools to work with intersectional activity systems in the study area namely, the smallholder irrigation farmers, Irrigation Management Committee (IMC), Agricultural, Technical and Extension Services (AGRITEX), Zimbabwe Electricity Transmission and Distribution Company (ZETDC), Zimbabwe National Water Authority (ZINWA) and Non-Government Organizations (NGOs) such as Southern Alliance for Indigenous Resources (SAFIRE) and Tsuru DzeChimanmani Trust. The intersectional activity systems are presented in Section 5.2.3; 5.2.4; 5.2.5.

CHAT further provided the space and contours to deal with the primary and secondary contradictions that emanated within and across the activity systems highlighted in Figure 5.2. According, to Engeström (2006) no terrain of activity, no matter how stable and resistant, is free on inner contradictions. In essence, contradictions are different from problems or conflicts but are historically accumulating structural tensions within and between activity systems. Activity

system(s) in Nyanyadzi irrigation scheme are not immune to contradictions instead they constantly work through tensions and contradictions within and between its elements (see Section 5.2). Engeström and Saninno (2010) explain that primary contradictions tend to focus on the use value against the exchange value. Secondary contradictions are more concerned with the collisions in the old elements of an activity system like the rules or the division of labour with the new one. Secondary contradictions generate disturbances, conflicts and innovative attempts to change the activity thereby, making the zone of proximal development an invisible battleground (see Chapter 5 for detailed descriptions and practical applications in this study). Ilyenkov (1977: 330) further explains that, contradictions are not just inevitable features of the activity system(s) but, they are “*the principle of its self-movement and ...the form in which the development is cast.*” Meaning that, the new qualitative stages and forms of activity emerge as solutions to the contradictions of the preceding stage of form. This is what this study looked for, an opportunity to transform the contradictions into change and agency as well as expand the farmers and stakeholders’ zonal of proximal development.

In essence, the CHAT theoretical framework was useful in mobilizing collective agency in response to the multidimensional complexities in these interactive activity systems listed above. The third generation of CHAT was preferred because it provided a methodological framework that was compatible with the *insider formative* interventionist approach used in this study. Furthermore, as suggested by Engeström and Sannino (2010) it offered the Expansive Learning Process (ELP) (see Figure 2.7) which is a critical tool to engage the farmers and other stakeholders into collective formulation and implementation of new radical, wider and more complex object/concept, thereby providing solutions or strategies to cope with the current complexities towards improved household food security.

2.3.1 Conceptualization of learning

In this section I shall dwell on explaining different forms of learning as conceptualised in different fields and in environmental education mostly. Since this study focused on mediating and

examining expansive learning in the context of multidimensional complexities affecting household food security of irrigation farmers, I shall describe and explain the forms of learning that happen in expansive learning processes. I shall begin by describing and explaining the Zone of Proximal Development (ZPD) as a form of learning that happens in expansive setup, then I shall discuss Agency as both a form of learning and outcome of learning, but I shall focus mostly on transformative agency and lastly, I shall discuss the concept of Expansive Learning Process (ELP). All the above-mentioned forms and outcomes of learning are of importance to this study, since the study was aimed at examining and understanding the collective learning that happens within and between the farmers and other interacting key stakeholders (activity systems) with the intention to mediate an expansive learning process (ELP) via double stimulation process in the change laboratory workshop (CLW).

2.3.1.1 Zone of proximal development

According to Vygotsky (1978) collective work that involve teacher-student or tutor-tutee interactions is one example of learning that allows new forms of actions, that can be referred to as occurring in a Zone of Proximal Development (ZPD) which is the difference between individuals existing and potential levels of development. Another form of ZPD happens in small setups such as the dyads (parent-child) to larger groupings such as classrooms where scaffolded teaching and learning situations happens (Kozulin, Gindis, Ageyev, & Miller, 2003; Shayer, 2003). However, ZPD constitutes a possible misrepresentation of Vygotsky (Gillen, 2000; Leont'ev, 1981: 57) and a tough concept to implement (Daniels, 2001; DeVries, 2000), furthermore, the ZPD sometimes invokes a problematic internalization-externalization dichotomy.

For an individual, there are two forms of learning possible in the ZPD, and only one of which is normally made thematic. For instance, the first form of learning can happen in a collaboration situation, where the less experienced person observes a form of action and, by means of emulation (*mimesis*), learn to act in a more or less imitative ways. Another form of learning can happen when two or more individuals collaborate, entirely new actions unfold by dividing the work for example, two or more children are enabled to measure the width of a raging creek and thereby learn “*to measure the width of a creek*,” which was impossible if they were working alone. The possibility

of entirely new or more sophisticated actions in collective activity explains why individuals can learn even if they collaborate with peers at the same developmental level rather than with more advanced others (teachers, parents) (Roth & Lee, 2007; 2005), such as the learning that occurs in computer clubs (Collins, Brown, & Newman, 1989).

The second dimension is closely related to a reformulated definition of ZPD as the distance between the actions of an individual and the historically new forms of societal activity created in collaboration (Engeström, 1987 cited in Roth & Lee, 2007: 2005). Roth and Lee, further argue that, the collective activity increases the learning opportunities for students and also leads to learning to teach through implicit ways such as emulation of actions and practice of new forms of actions available in collective activity. The ZPD foregrounds the socially contested nature of learning and has been explicitly used to set up advanced forms of teacher training through co-teaching, a form of teaching in which two or more individuals teach together simultaneously, enacting full responsibility for all parts of the curriculum (Roth & Tobin, 2002; Roth *et al.*, 2005), thereby opening up many learning opportunities to all the other individuals from the community, those participating in teacher roles, the regular teachers (Roth & Tobin, 2002, chap. 1), teaching interns (Roth, Masciotra, & Boyd, 1999), environmentalists (Lee & Roth, 2003b), students (Roth & Lee, 2004), and the parents (Lee & Roth, 2003c).

According to Roth and Lee (2007) the collectivist interpretation of the ZPD has been fruitfully explored to bridge issues of diversity in learning setups and a strong commitment to dialog and the production of hybrid spaces that foster mutual understanding were identified as the ground of common learning and action (Cole, 1998), while the focus on the intersection of teachers' and students' cultural, discursive, and knowledge resources was realised opportunities for shared learning. The commitment to dialog and the hybrid spaces together with the intersectionality described above are of interest to this study that involves collective learning of crop production in informal setups by farmers of diverse backgrounds. ZPD learning involving co-learning of activity is of interest to this study and may help to understand and describe the learning that takes place in the irrigation scheme setup. Understanding such learning can open space for future mediated learning processes that are necessary in building and sustaining practise and activities in crop production in irrigation schemes.

2.3.1.2 Agency

Agency can be viewed and conceptualized as an inherent feature of human action, embedded in and interacting with historically developing activities (Sannino, 2017). Agency has been conceptualized in Social-Cognitive Theories for example in Bandura's Theory of Agency (1989, 2001), where he described human agency within four core features namely, intentionality, forethought, self-reactiveness and self-reflectiveness. In this case, **intention** is understood both as a representation of and a commitment to an action plan while, **forethought** is the cognitive function by which human beings anticipate outcomes, operating in conjunction with personal standard which ensure continuity and coherence of direction (**self-reactiveness**) and **self-reactiveness** is the metacognitive capability to shape the course of action by monitoring, evaluating and possibly correcting it and reflect upon and examining one's own functioning as well. Developmental theorists are of the view that CHAT as a developmental theory deals with agency since it seeks to explain and to influence qualitative changes in human praxis (Engeström, 1999c). Activity theorists believe that human beings are not merely at the mercy of extant institutional contexts but that they are endowed with the power to act (agency) (*ibid.*, 87).

Activity theorists like Haapasaari, Engeström, and Kerosuo (2016) further talked about proactive or transformative agency, as those acts that steers individual and societal change(s) in expansive learning processes. Virkkunen, as cited in Haapasaari *et al.* (2016: 233) further described transformative agency as a "*breaking away from the given frame of action and taking the initiative to transform it.*" Therefore, transformative agency is different from other conventional notions of agency because "*it stems from encounters with, and examination of disturbances, conflicts and contradictions in the collective activity*" (Haapasaari *et al.*, 2016: 233). In other words, transformative agency is an emergent or outcome of an activity. Hence, it has power to develop participants' "*joint activity by explicating and envisioning new possibilities*" (*ibid.*, 233). Haapasaari *et al.* (2014: 26) further described transformative agency as "*a dynamic, long lasting process of learning and development, which evolves in interaction.*" Sannino (2015b: 1) found out that, transformative agency encompasses "*a cluster of volition actions*", which "*involve questioning, and searching for new possibilities*" needed to change the "*circumstances*" we live in and "*shaping uncertain futures.*" The volitional actions emerge out of conflict of motives and

second stimulus (*ibid.*). Vygotsky (1997) cited in Sannino (2015a) described the emergent volitional actions with double stimulation as a two-apparatus process independent of each other but correspondent to the two stages in the evolution of will that is **decision forming** and **decision implementation** (*ibid.*). The emergence of volitional action is dealt with in Chapter 6, decision forming and desire for decision implementation are described and explained as well.

However, understanding from the likes of Haapasaari et al., (2016); Chisoni, (2018: 98), I also came to realize that “*the concept of transformative agency is close to the concept of relational agency in that it goes beyond the individual as it seeks possibilities for collective change efforts*”. Although, transformative agency has shown not to be limited to the relations of an individual expert since it underlines the crucial importance of expansive transitions from individual initiatives displayed through volitional actions and expands toward collective actions to accomplish systemic change through collaboration and collective agency (Sannino, 2015b; Haapasaari et al., 2016). Furthermore, transformative agency also goes beyond situational here-and-now actions as it emerges and evolves over time, often through complex debates and stepwise crystallisations of a vision to be implemented and, in this sense, transformative agency resembles a notion of expansive agency (Haapasaari et al., 2014: 2).

In this study, transformative agency concept was employed to examine the expansive learning in farmers’ activity system in the context of multidimensional complexities. I was more interested in understanding how the farmers’ actions towards and commitment to transform emerged in responding to the tensions, conflicts and contradictions identified (Haapasaari et al., 2014), through the expansive learning process (ELP). To add on, I was much interested in the concept of transformative agency expressions which I drew on in this study as an analytical tool for analysing participants’ agentic expressions (see Table 2.1; Table 6.4 and Section 6.2) and tracking expansive transformative learning processes from the Change laboratory workshop deliberations (also see Chapter 6.2). I focused on both individual and collective agency, by paying particular attention on how individual agency turned to collective agency through tracking speech turns. In order to achieve the above, I utilized the typology of transformative agency expressions defined by Engeström (2011) and with elaboration from Haapasaari et al. (2016) and Kachilonda (2015) cited in Chisoni (2018: 99). Most important, to understand the transformative agency in the study, I also

applied the concept of layer of causality to interpret and understand the insights drawn from the observations in the change laboratory workshops. This was done in line with the insider formative interventionist role, that is to record and analyse the participants' agentic actions as an important outcome (Engeström, 2011: 611). The three layers of casualty used are diagrammatically presented in Table 3.1. The typology of transformative expressions is presented in Table 2.1.

Table 2.1 Types of Transformative Agency Expressions

1. <i>Resisting</i> change, new suggestions or initiatives directed at the management, co-workers or interventionist
2. <i>Criticising</i> the current activity and most often highlighting the need for change in the activity
3. <i>Explicating</i> new possibilities or potentials in the activity; relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges
4. <i>Envisioning</i> new patterns or models of the activity, which can range from preliminary suggestions to the presentation of comprehensive models for the future
5. <i>Committing</i> to concrete actions aimed at changing the activity, which is typically manifested in the use of commissive speech acts
6. <i>Taking consequential actions</i> to change the activity where participants of the interventions may perform consequential change actions within, between and after laboratory sessions
7. <i>Confronting and navigating power relations</i> participants recognise, navigate power relations, and voice out the power they have which can be significant in mediating new ways of doing things in the activity. Taking consequential actions (outlined above) or being able to commit to actions is often dependent on the transformative agentic capacity to navigate or negotiate power relations (Kachilonda, 2015)

Source: (Engeström, 2011; Haapasaari *et al.*, 2016; Kachilonda, 2015; Chisoni, 2018: 99)

2.3.1.3 Expansive Learning Process (ELP)

Borrowing from Sannino *et al.* (2009), expansion relates to the transitional process from individual action(s) to new collective activity(ies). If these transitions happen with an objective

transformation intent in the actions/activities and the subjects become aware of and respond to the contradictions in their current activity(ies) in respect to the new form of activity, then it is expansive learning. Engeström (1999: 90) argues that in the process of expansive learning activity systems undergo movement through zones of proximal development which he further described as “...a terrain of constant ambivalence, struggle and surprise... the space for expansive transition from actions to activity” (Engeström, 2000).

The interplay between an individual and society give rise to two manifestations of expansive learning. First and foremost, learning becomes expansive when it contributes to an enlarged room to manoeuvre for the individual whereby new learning possibilities are formed. Lastly, when it is mediated by a division of labour in collaboration, which inherently leads to learning outcomes and forms of societal activity (Donato, 2004; Guberman & Saxe, 2000; Tolman, 1999). In essence, learning occurs whenever a novel practice, artefact, tool, or division of labour at the level of the individual or group within an activity system constitutes a new possibility for others leading to an increase in generalized action possibilities and therefore to collective (organizational, societal, cultural) learning (Putney, Green, Dixon, Durán, & Yeager, 2000; Raeithel, 1996; Roth, 2003b). Therefore, individual and collective learning are linked by

“transgressing the boundaries of individual subjectivity through immediate cooperation toward the realization of common interests of collective self-determination against dominant partial interests, intersubjective relations in a definite sense reflect collective or rather societal subjectivity” (Holzkamp, 1983: 373).

In this study, the ELP (see Figure 2.7) was used as both a methodological and analytical tool to surface (Learning Action 1-2) and engage with (Learning Action 3-7 in the ELP model) the multidimensional complexities faced by the farmers’ activity systems towards household food security. According to Engeström (2009a) the core idea of expansive learning lies in the fact that learners collectively learn something that is not yet there, model and experiment with the new practice. The expansive learning process was employed using change laboratory workshops which broadly follow Engeström and Sannino’s Expansive Learning Cycle presented in Figure 2.7. One advantage of the change laboratories as noted by Sannino, Engeström, and Lemos (2016) is the idea of productive deviations from the interventionist anticipations which yields both significant

practical and theoretical outcomes.

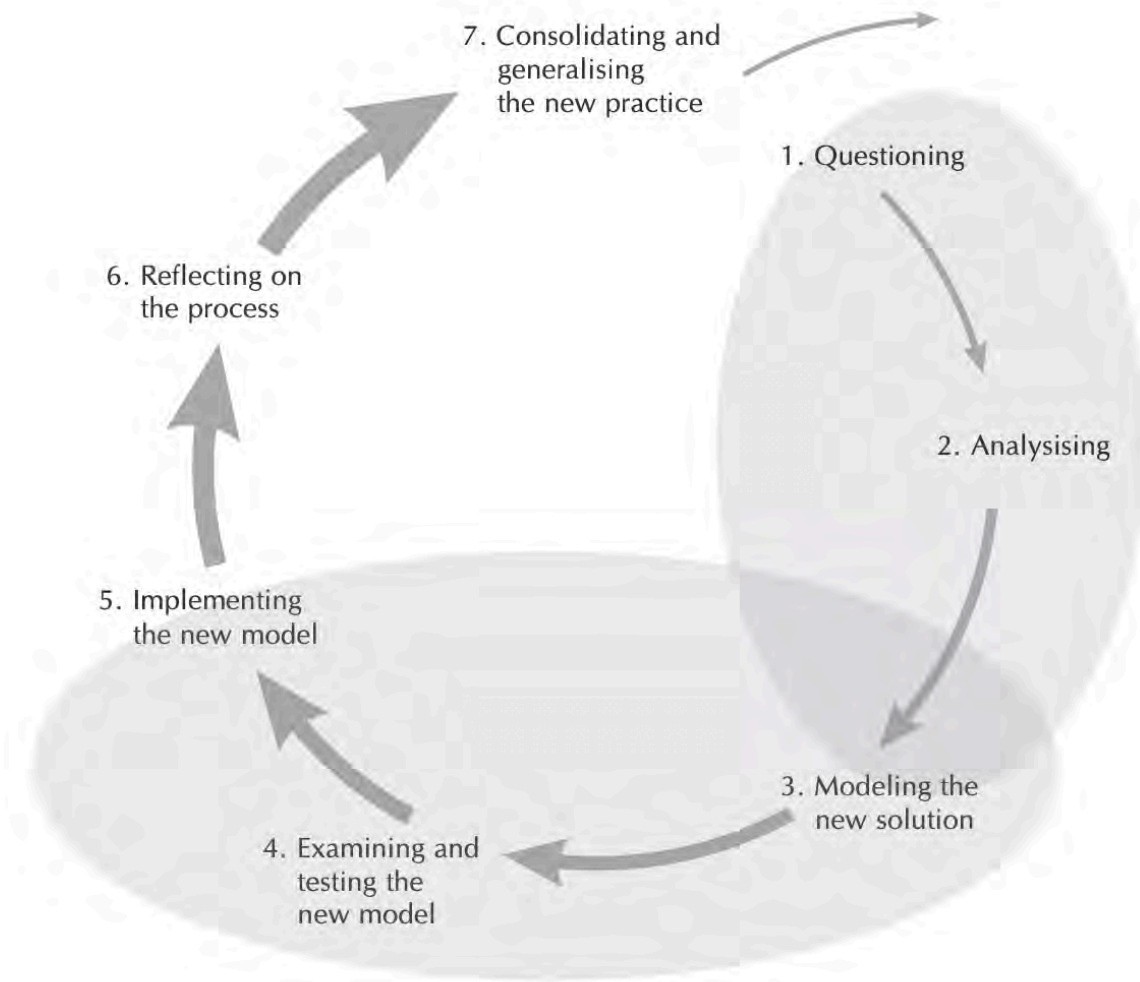


Figure. 2.7: Expansive Learning Process

Source: Adopted from Engeström and Sannino (2010: 2)

As shown in Figure 2.7, Expansive Learning Process (ELP) is a cycle and as highlighted in the grey shade, the cycle is not linear but repetitively move forth and back until a common understanding and collective action is achieved. Engeström (2010: 7) explains that,

“the process of expansive learning should be understood as construction and resolution of successively evolving contradictions....The cycle of expansive learning is not a universal formula of phases or stages. In fact, one probably never finds a concrete collective learning process which would cleanly follow the ideal-typical model. The model is a heuristic conceptual device derived from the logic of ascending from the abstract to the concrete.”

As such, ELP is concerned with the learning of new forms of activity as they are created, rather than the mastery of putative stable, well-defined, existing knowledge and skill (Engeström (1987). In essence, in ELP there is no competent teacher, transformations of individual and collective lives and organizational practices are created and new forms of activity are learned as they are being created (Engeström, 2001: 137-138). Henceforth, there is a strong notion of discovery and implementation of novel solutions (Engeström, 2000b: 526). The derived understanding here is that, learning is not limited to processes of acquisition of skills, knowledge, and behaviours but rather open to the collective finding and implementing future-oriented novel solutions to pressing societal problems. In this study, a historically new form of learning, namely *expansive learning* of cultural patterns of irrigation that were not yet there, was important (Engeström, 1987: 526).

Secondly, ELP is concerned with collective transformation and transformation itself manifest as a change in the collective system. The object of expansive learning activity is the entire activity system (irrigation system) in which the participants are engaged. Therefore, expansive learning in such collective activity systems such as irrigation schemes happens through relatively long cycles of qualitative transformations as reflected by the grey shading in Figure 2.7. As the inner contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms. This may escalate into “*collaborative envisioning and a deliberate collective change effort from below*” (Engeström, 2000b: 526).

Thirdly, ELP collective activities reformulates Vygotsky’s conception of zone of proximal development (Engeström, 1987: 27). Vygotsky (1978: 86) defined the zone of proximal development as “*the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.*” In essence, “*it is the distance between the present everyday actions of the individuals and the historically new*

form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions.” (Engeström, 1987: 174). In essence, ELP focuses on horizontal development rather than vertical development which normally aims at elevating humans upward, to higher levels of competence and commonly understood as learning and development. Engeström (2000b: 533) denounces vertical development as “*an outdated relic of enlightenment,*” and suggested “*constructing a complementary perspective, that of horizontal or sideways learning and development.*”

The impetus for change or expansion in the zone of proximal development in the ELP is attributed to inner contradictions from within an activity or between two activities. Here, contradictions are not just inevitable features of activity rather “*the principle of its self-movement and (...) the form in which the development is cast*” (Ilyenkov 1977: 330). This means that new qualitative stages and forms of activity emerge as solutions to the contradictions of the preceding stage of form in what Engeström (1987: 45) term “*invisible breakthroughs*”. Engeström described four levels of contradictions as follows:

Level 1: Primary inner contradiction (double nature) *within* each constituent component of the central activity.

Level 2: Secondary contradictions *between* the constituents of the central activity.

Level 3: Tertiary contradiction *between* the objective/motive of the dominant form of the central activity and the object/motive of a culturally more advanced form of the central activity.

Level 4: Quaternary contradictions *between* the central activity and its neighbour activities (Engeström, 1987: 43-45).

Engeström (1987) explains that redefining of the zone of proximal development occurs in long cycles of qualitative transformations, driven by the above-mentioned inner contradictions of the activity system, which causes individual participants to question established norms as they collectively generate solutions to the double bind. Furthermore, as the

“collective activity systems move through relatively long cycles of qualitative transformations, the inner contradictions of an activity system are aggravated, some individual participants may begin to question and deviate from its established norms and this can escalate into collaborative envisioning and a deliberate collective change effort from below” (Engeström, 2000b: 526).

The derived understanding is that, repeated iterations of the seven steps (see Figure. 2.7: Expansive Learning Process) form an “expansive cycle or spiral” (Engeström, 2000b: 7), and facilitate the ascension of the activity patterns from the abstract to the concrete. According to Engeström (2010: 5) this *“method of grasping the essence of an object by tracing and reproducing theoretically the logic of its development, of its historical formation through the emergence and resolution of its inner contradictions”* is abstraction by nature and the *“abstraction is step-by-step enriched and transformed into a concrete system of multiple, constantly developing manifestations.”*

For instance, in this case of irrigation farmers learning to produce crops, the initial simple idea is then transformed into a complex object, into a new form of practice and via the Expansive Learning Cycle, the object and motive of the activity are reconceptualized to allow for greater possibility and flexibility than in the previous pattern of activity. As the expansive transformation is being accomplished the *“object and motive of the activity are reconceptualized to embrace a radically wider horizon of possibilities”* (Engeström, 2000b: 526). Engeström (2001: 137) suggests that, the full cycle of expansive transformation must be understood as a *“collective journey through the zone of proximal development of the activity”*.

2.4 EXPLICATING THE MULTI-DIMENSIONAL NATURE OF FOOD SECURITY AND IRRIGATION CONTOURS OF THE CONCEPT OF FOOD SECURITY.

According to De Muro and Mazziota (2011) the concept of food security was developed in 1943 and there are diverse conceptualizations and definitions of food security. Food security is multi-dimensional in nature and there is no unanimous definition of food security. Food security is a result of an interaction of multiple agro-physical, socio-economic and biological factors (Riely, *et al.*, 2009). The United Nations (1975: 10) defined food security as *“accessibility at all times of*

sufficient supplies of basic food-items.” The United States Department of Agriculture (1995) further defined food security to include aspects of the physical or economic enablement to access sufficient food dietary items to support the productive and healthy well-being of the people.

The FAO (1996) provided a more comprehensive definition that acknowledged food security at individual, household, national and global level. They defined food security as a state when all the people at all the times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and the food preferences for an active and healthy life. This definition was more comprehensive, holistic and acceptable in nature because it incorporated the aspects of physical and economic access to available food.

In the State of Food Insecurity Report (2001) further refined the World Food Summit (1996) definition to include sound access to food security. In their explanation, they described food security as a phenomenon relating to individuals that focus on the nutritional status of the household member. In essence, this motion describes food security in terms of both the consumption and production of food as governed by social values that are just and equitable as well as moral and ethical. This therefore means that food itself must be nutritionally adequate, personally and culturally acceptable and should be obtained in a manner that upholds human dignity (FAO, 2002). In addition, the FAO (1996) further defined food security as the state that exists when people, at all times have a physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and preferences and have an active and healthy life. Mitsch and Gosselink (2000) further refined the definition of food security to incorporate both physical and economic access to basic household food need. The above definitions entail and include all aspects associated with food availability, accessibility and utilization.

Recent literature has defined food security as a state whereby societies experience social, economic, political and technological capability to have sufficient, nutritive food items at all instances of their well-being (Hendriks & Msaki, 2009). The DoA (2012) defined food security as food self-sufficiency in which people should be able to have food to eat in order to support their human well-being regardless of their age and race. Acha (2014) notes that food security is multidimensional, it has interrelationships with a range of other systems, sectors and issues which

cannot be captured from either a single or a specific indicator alone. In order to understand food security from Acha (2014)'s point of view, there is need to identify and understand the fundamentals that underpin food security namely, availability, accessibility, utilization and stability. These four components of food security are defined in further detail below to scope out the multi-dimensionality of food security concerns:

- **Availability:** According to the World Food Programme (2009) availability is the existence of food from national and external sources at country level to support domestic use. In essence, this refers to the availability of sufficient capacities of food with suitable qualities from either national production or importations not excluding food aid. Food availability also includes livestock and aquaculture products (Maxwell & Slatter, 2003). In this case, it can be strongly argued that irrigation farming not only increases food availability but also widens the variety of food.
- **Accessibility:** Food accessibility refers to the capability of families and individuals to acquire food from either their own production or purchases from other sources among them being gifts and aid (Maxwell & Slatter, 2003). The above definition was also adopted and accepted by the World Food Programme (WFP, 2009: 23). Therefore, unlike food availability, food accessibility refers to the process of acquisition of any food items by an individual or family in order to adequately support individuals' or family's nutritional requirement for a considerable period of time. In this case better irrigation development can enable a community to have access to food.
- **Utilization:** The World Bank (2007) together with the FAO (2012) concurs that food utilization refers to food use by an individual or a family to reach a state of nutritional well-being for which all biological requirements are met. In this case when an individual's digestion and nutrient intake are undermined, and poor health conditions are evident there is lack of food utilization. However, in relation to irrigation farming not all elements of utilization may be directly linked but some are due to other factors such as improper sanitary conditions and inadequate safety net for the community.
- **Stability:** Frayne *et al.* (2012) defines food stability as continued food supply and access. In this case it is important to note that stability is when individuals and households are able to attain food sufficiency despite seasonality, climate variations, price instabilities, political

and economic stresses (Frayne *et al.*, 2012). From the above definition food stability relates to both food availability and accessibility to achieve food self-sufficiency also referred to as household food security (Maxwell & Frankenberger, 1992). In addition, to the on-going discussion on food security definitions, Turton (2000) and Bennett (2001) concur that food security encompasses more than aspects of food availability, access and utilization but goes as far as incorporating aspects of asset creation. Turton (2000) explains that asset creation allows systems to be put in place that ensure sustainability during periods of environmental shocks such as climate change and seasonal shortages that undermines food access.

Regardless of the aforesaid definitional diversity there is consensus that food security is multidimensional in nature. Literature is in consensus that food security can only be achieved, when all people, at all times, have physical and economic access to sufficient safe and nutritious food to meet dietary needs, food preferences for an active and healthy life (FAO, 2008a). For the purpose of this study food security entails acquiring safe and nutritious foods at all time in order to meet the dietary and food preferences for an active and healthy life without resorting to emergency food supplies, scavenging and stealing (DoA, 2002: 15).

2.4.1 Global perspectives on the issue of food security

Food security remains a global problem despite the efforts of governments, international organizations, Non-Governmental Organizations and Community-Based Organizations. By 2009, an estimated one billion people in the world suffered from hunger (FAO, 2012). Over the last decades, the total has been increased following the sudden sharp increase in food prices all around the world in 2007 and 2008 and following the subsequent economic crisis of 2008-2009 (FAO, 2012). However, according to the USDA (2012) and Shapouri *et al.* (2010) by early 2010, the estimated food insecure people decreased to 882 million. The food insecure population includes approximately 15 million people in developed countries, some 42 million Near East and North Africa, 643 million people in the Latin America and Caribbean countries, Asia and the Pacific and lastly, some 215 million people in Sub-Saharan Africa. The FAO (2012) supported by Shapouri, *et al.*, (2010) argue that food insecurity remains a major global concern since one billion people suffer from starvation and malnutrition, an issue which has also been taken up in the Sustainable

Development Goals (Goal 2). Recently, the numbers of starvation, malnutrition and household food insecurity across the globe have been exacerbated by the COVID 19 pandemic.

However, according to the FAO, ECA & AUC (2018) report, the trends of food insecurity and undernourished seem to have risen to 821 million people in the world being affected, 36.4 million more than in 2015. Of these 257 million are in Africa, of whom 237 million in sub-Saharan Africa and 20 million in Northern Africa. Comparing to 2015 there are now 34.5 million more undernourished in Africa, 32.6 million more in sub-Saharan Africa, and 1.9 million more in Northern Africa (*ibid*, 2018: xii). The FAO, ECA & AUC (2020) highlight that there are now approximately, 426 million people experiencing moderate food insecurity, who typically eat low-quality diets and might have been forced at times during the year to also reduce the quantity of food they would normally eat. In 2019, approximately 73 million people, that is approximately 6 million more comparing to year 2018, in 36 countries in Africa, faced acute food insecurity or hunger and required urgent food assistance. Of which 37 million have been succumbed into this food insecurity and hunger situation due to conflicts, while, 26 million were due to climate shocks, and 10 million were due to economic shocks (FAO, ECA & AUC, 2020: xii)

According to the Global Food Security Index (GFSI) (2020) index, the North America region has been leading the world in food security for the third consecutive year and Europe is second, accounting for eight of the top 10 countries. Applying the new methodology that underscores the importance of climate-risk management and its link to food security, Finland tops the list while last year's leader, Singapore, drops down to 19th place and Ireland retains its second rank position, while the United States moves to 11th place. Overall, the GFSI 2020 shows that rising temperatures and global warming have affected the agricultural sector and food system. Highly volatile agriculture production in countries like Australia, Norway and Sweden demonstrates the risk that climate change poses to agriculture and food production. The GFSI further finds out that agricultural production in 49 countries has become more vulnerable comparing to the previous index period. Worse with the current COVID-19 pandemic, the global food system has become more vulnerable (*ibid*, 2021). Although various stakeholders have responded quickly to lockdown restrictions, the resulting economic fallout has a disproportionate impact on population living below the poverty datum line, who have limited, if any, social protections. In the agricultural

sector, smallholder farmers, the majority of whom reside in rural areas, have suffered significant income losses due to the lockdown restrictions that have prevented them access to markets and interrupted the planting season.

The GFSI argue that even before the COVID-19 began to spread the global food systems were under strain, with many countries struggling to increase productivity, adapt to a worsening climate and reduce environmental harm. In 2020, both Australia and the U.S. were impacted by high levels of land degradation, ranking 81st and 63rd respectively on the land degradation indicator. While, Latin America suffered from irregular rainfall and above-average temperatures between June and July 2019 leading to a second consecutive year of crop failure in the 'Dry Corridor' spanning Guatemala, Honduras, El Salvador and Nicaragua (*ibid*, 2021).

2.4.2 Sub-Saharan African perspectives

According to the FAO, ECA & AUC (2018) Africa is unlikely to meet SDG 2 because of the continued prevalence of undernourishment and increasing food insecurity that now affects more than 20 percent of the population on the continent, more than in any other region. Sub-Saharan Africa (SSA) remains one of the world's most food insecure regions. The FAO, ECA & AUC (2018) note that in sub-Saharan Africa, the upward trend of food insecurity appears to be accelerating, and approximately 23 percent of the population is undernourished. In 2010, the World Food Programme (WFP) and the FAO declared that approximately 269 million people were food insecure and on the verge of starvation in sub-Saharan Africa compared to 357 million people in 2012 (FAO, 2012). In 2011 there was a 4.3 percent decline food insecure people in Sub-Saharan Africa. This was because the region's grain output in 2011 fell below the bumper crop compared to 2010 as several countries including Angola, Burkina Faso, Chad, Madagascar, Mali, Niger, and Sudan saw below average production in 2011. But the number of food insecure people in Sub-Saharan Africa is expected to increase by 15.1 percent over the next decade, to reach 411 million by 2022.

2.4.3 Food security in Southern Africa

Southern Africa is more vulnerable to food insecurity, largely due to climatic variations, the general scarcity of water and recurring droughts in most countries in the region and also because of the recurring civil conflicts in Angola and the Democratic Republic of the Congo (DRC) and of lately the political and economic crisis that took place in Zimbabwe (Acha, 2014). According to SADC FANR (2006) Southern Africa has the highest prevalence of HIV and AIDS in the world and this poses a serious long-term threat to food security in the region. However, Drimie *et al.* (2008) classifies food insecurity in this region as chronic but also highlighted on areas of transitory food insecurity in which food insecurity occurs on a frequent or seasonal basis like in the countries in the Horn of Africa. According to National Vulnerability Assessment Committees (NVACs) in 2012/13 there were about six million people in the region who were at the risk of food insecurity (NVACs, 2012). And the numbers of food insecurity households increased drastically in 2012 due to the severity of crop failures in many Southern African countries than has been the case in the past three to four years. The FAO (2012) posited that 10 percent of the population of each country in the Southern Africa are food insecure for a period ranging from three to eight months each year.

In 2012, about two million people were declared to be in a food insecurity state by the USAID (2012) in Zimbabwe. This translated to 80 percent of the households and all districts were faced with food insecurity, which blamed on the 33 percent drop in cereal production in the 2012 cropping season as well as the country's high inflation rate which saw the food prices soar (USAID, 2012). The situation was far from over with the year 2014 declared a national disaster and most rural people were threatened by food insecurity. According to Christopher (2014) in that year (2014) Zimbabwe imported 150 000 tons of maize from South Africa to feed approximately 2 200 000 people in rural areas who were faced with hunger and food insecurity.

2.5 HOUSEHOLD FOOD SECURITY

In order to fully understand the concept of household food security there is need to review the work of Sassi (2015). He postulated the Household Food Security Conceptual Framework, in 2015 to explain household food security and at individual level. He identified three crucial blocks to household food security namely, the food economy, the household context and the confounding

factors. The framework suggested that food economy includes the household's assets.

2.6 SMALLHOLDER IRRIGATION FARMING AND HOUSEHOLD FOOD SECURITY IN AFRICA

Irrigation farming is a cornerstone of agriculture, food security and poverty reduction in Africa since it is important for improving access, stability and availability of food, and through this it provides an important stimulant to economic growth and rural development (Hagos, Makombe, Regassa & Awulachew, 2009; UNDP, 2009). In this study, smallholder farming refers to the size of landholding and the nature of farming that ranges from subsistence to semi-commercial crop and livestock production (Murphy, 2012). While irrigation farming remains as defined earlier on by Uphoff (1986: 13). Globally, smallholder irrigation farming plays a critical role in household food security. Currently, about seven billion people are sustained through irrigated agriculture. There is no doubt that irrigated land has been far more productive than rain fed land over the past four decades and that irrigation farming has contributed to an increase in global crop yield, allowing global food production to keep pace with population growth (Shah, 2008, FAO, 2009). Irrigation farming has contributed to sufficient domestic food production in the event of global supply disruptions, and has increased stability, reducing risk of supply shocks that may occur (Tekana & Oladele, 2011) (see Chapter one).

In Sub-Saharan Africa smallholder farmers provide 30-40% of GDP in sub-Saharan Africa economy (Rockström, Barron & Fox, 2007). Nhundu and Mushunje (2010) further indicated that irrigation farming is a critical industry that increases per unit area food production leading to improvement in food availability and accessibility. Irrigation farming also improves sustainable household economic performance and the broad spectrum of crop production. In Zimbabwe irrigation farming is seen as an important mechanism for creating jobs, poverty reduction and improving rural livelihoods and food security (Acha, 2014). Haile (2008) points out four interrelated mechanisms by which irrigation farming can reduce poverty and improve livelihoods:

(i) increasing production and income, and reduction of food prices, helping extremely poor households to meet the basic needs associated with improvements in household overall economic wellbeing,

- (ii) protecting against risks of crop loss due to erratic, unreliable or insufficient rainwater supplies,*
- (iii) promoting greater use of yield enhancing farm inputs, and*
- (iv) the creation of additional employment, which together enables people to move out of the poverty cycle (ibid: 67).*

Kundlande *et al.* (1994) (in Chazovachii, 2012) further argued that, food production from irrigated farms is a major source of wealth creation and is an important basis for economic growth in Africa. Furthermore, irrigation empowers women and emancipates them socially. This is because women play a leading role in irrigation farming thereby, participating in development initiatives and poverty alleviation in rural areas (Mutsvangwa, 2006: 221). This observation has been supported by Manzungu (2004) cited in (Moll, 2004: 220) who also noted that, irrigation farming has enabled women in rural areas to generate income creating balance of power within households. In essence, women's participation towards household income initiatives has increased their confidence in community decision making and debates. From an educational perspective Chazzovachii (2012) argues that irrigation farming has enabled agricultural households to generate income to educate their children. Education is an especially important emancipation tool since it implies more opportunities in income generating, as well as better understanding of new and improved farming technologies and lastly, it enables children to be self-reliant.

2.7 CONCLUSION

This chapter has discussed the conceptual and theoretical concepts that informed and guided this study. CHAT was discussed, as both the main theoretical and conceptual framework to the study. In this closing section for the chapter, there are few issues I want to emphasise. Firstly, is the importance of CHAT to this study as both the main theoretical and conceptual framework. As explained CHAT mostly the 3rd generation, was especially useful especially the five turning points namely the prime unit of analysis that is anchored on collective, artefact-mediated and object-oriented activity system which has made Nyanyadzi irrigation scheme a suitable case study. The acknowledgement of multi-voicedness, many points of views, traditions, interests and the multiple layers and strands of history embedded in the activity system(s) which have made it possible to

argue irrigation systems as conducive learning arena. The analysis of activity systems in their local history, objects, outcomes and genealogy of conceptual tools not only made it possible to build a comprehensive historicity of Nyanyadzi irrigation scheme (see Chapter 4), but also enabled a fair critique and understanding towards the surfacing of the contradictions (see Chapter 5). Lastly, the potential of contradictions between and within activity systems as sources of change, development and expansive transformations has been enabling of the mediation towards an expanded learning activity, transformative agency and expanded zonal of proximal development of the farmers and other key stakeholders via the double stimulation processes in the change laboratory workshop (see Chapter 6).

The CHAT theoretical framework has provided guidance for the insider formative interventionist methodology adopted in this study. The relationship between learning and development, is also of great interest to this study and has been well developed and contextualised in CHAT in which learning is described as resulting from mediated interactions between culturally and historically produced initial and double stimuli and associated responses that occur via processes of mediation between subject, object and mediation tools in activity systems. This way people can develop capabilities in collaboration, and in interaction with others as well as their immediate surroundings in zones of proximal development. Hence, there is a movement between learning and action or development and this was critical to this study which examined learning in a communal developmental project (informal setup) with interest in mediating transformative agency and change.

Secondly, the chapter has managed to conceptualise learning in three most important tenants, the Zonal of Proximal Development (ZPD), Transformative Agency (TA) and Expansive Learning Process (ELP). These three tenants have made it possible to examine collective learning that happens in irrigation schemes, understand it, describe it, explain it and most importantly, mediate transformative agency and change. The ELP cycle and the concept of contradiction was explained taking into account how a group as a collective move from the abstract to the concrete. The ELP cycle further reciprocate and explain the learning process endured via expansive learning and this was important in enlightening and accounting on how learning pathways in the change laboratory workshops will be understood. Lastly, the chapter has offered an overview of food security

discourse and contextual elaborations thereof. Of importance, is understanding food security in its wholistic nature namely, Availability; Accessibility; Utilization; and Stability (World Bank, 2007; FAO, 2012;; Frayne *et al.*, 2012). The chapter provided important understandings necessary for the chapters that follow.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 INTRODUCTION

This chapter discusses the methods and instruments used in generating data and how the data was managed, analysed and presented in this study. The chapter shall discuss the qualitative research orientation and the insider formative interventionist approach employed in this study. The chapter further describes and explains the case study design adopted in which Nyanyadzi irrigation scheme in Ward 8, of Chimanimani West constituency in the Manicaland province of Zimbabwe was the case. There is further discussion on the procedures in conducting the 15 in-depth face to face interviews conducted with three generations of farmers, the three focus group discussions with the farmers and the change laboratory workshop conducted. The chapter also discuss the role of two elderly community members invited to monitor my role in the research process to ensure community integrity is maintained, remind me of the socially accepted approaches and addressing of the participants and handling of the most complicated issues and tensions during and after the change laboratory workshops. Lastly, the chapter gives an account on the data collection, management, analysis and the ethical considerations of the study.

3.1 RESEARCH ORIENTATION AND DESIGN

The study was designed and conducted qualitatively using insider formative interventionist research (Sannino, Engeström & Lemos 2016). Mertens (2005) defines qualitative research as a study that captures holistic pictures using words. Ary, Jacobs and Razavieh (2002) concurred stating that the focus of qualitative research is not on numbers but on words, observations, stories, visual portrayals, meaningful characterizations, interpretations and other expressive descriptions. A qualitative research approach was used for its ability to gather in-depth historical and ethnographic perspectives on the multidimensional complexities faced by the farmers and their learning experiences and engagements. It allowed the researcher to participate in and interact with key stakeholders and mediate a process of expansive learning and potentially also collective transformative change in the study site.

3.1.1 Insider-formative Interventionist approach

The study employed the insider-formative interventionist research design to mediate and examine expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi irrigation scheme. The insider formative interventionist research approach was described and explained in Chapter one. The insider formative interventionist research approach was used for its transformational potential, in which the researcher-interventionists' role was to intervene by provoking and supporting the process (Sannino, Engeström & Lemos, 2016). As argued by Engeström (2011) activity systems are fragmented by their inner contradictions and the object of activity tends to get blurred or lost hence, one of the roles played by the insider interventionist is to mediate the rediscovery and described expansive reformatting of the object of activity. Hence, as an insider interventionist formative researcher I was more interested in the responding to and building onto the energy of contradictions as a source of change and development in Nyanyadzi irrigation scheme activity systems. This also required me to conduct a careful historical analysis of the activity system (see Chapter 4), and that empirical manifestations of contradictions in the ongoing activity systems (Engeström & Sannino, 2011) (also see Chapter 5 and 6).

Furthermore, this open process engagement with 'learning what is not yet there' (*ibid*) is compatible with the change laboratory workshops this study employed to mediate collective engagement with the multidimensional complexities faced by farmers in learning crop production for household food security, and in addressing the complexities being experienced in the current situation of the irrigation scheme alluded to above.

3.1.2 Case study design

The study employed a case study design in which Nyanyadzi irrigation scheme was chosen as the case. The case (Nyanyadzi irrigation scheme) was described and a justification in form of research interest was also explained in Section 1.1 and Section 1.2, respectively. As reported by Schipper (2004) the case study design allows for an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence. In this case, the case study design allowed the gathering of empirical and historical data in preparation of and during

the Change Laboratory Workshops (CLW) all of which took place in the study site described in Chapter one. Furthermore, the case study design allows for studying of direct experiences taken at face value and behaviour determined by the phenomena of experience (Hancock, 1998). Therefore, the case study design was ideal to this study since, I was able to use a specific case (Nyanyadzi irrigation scheme) and case materials to analyse elements of the subject matter in this case the shared object of the activity, expansion and complexity (Yin, 2004), to derive some understanding and mediate expansive learning processes and transformative agency. The design further allowed me to provide development thick descriptions of the multidimensional complexities faced by the farmers hence, “*comprehending more detail, richness, completeness and variance that is of depth from...*” (Flyvbjerg, 2001: 30) Nyanyadzi irrigation scheme under study.

It is important to mention that I as researcher, was aware of the critiques related to reliability of this design as noted by Hall and Hall (1996), as well as the specific context boundness of the design (Yin, 2004) which discourage generalisation of the findings and insights. Hence, this study never intended to generalise the findings or to make generalised interpretations of the study findings. But, as posited by Mertens (2005) the case study design is powerful in understanding and meaning making from specific phenomenon(s) whose insights and findings can be used to inform transformative change, expansive learning process, policy formulation, implementation and monitoring. Therefore, this study findings may be transferred to other contexts for meaning making and generating expansive learning and transformative agency purposes in similar contexts.

3.2 RESEARCH PROCESS AND DATA COLLECTION PLAN

Data was generated in three phases namely, fifteen face to face interviews, three focus group discussions and eight change laboratories. It is important to mention that prior to data collection research clearance and other ethical consideration protocols were done, I was cleared by the Rhodes University (Ethical clearance number **2017.12.08.05**) (see Appendix A) and I was also cleared by the Chimanimani Rural District Council (CRDC) (see Appendix B) and Agricultural Extension Services (AGRITEX) to conduct the study in Nyanyadzi irrigation scheme see Appendix C). These data collection processes shall be discussed in detail below:

3.2.1 Interviews

The first phase of data generation encompasses a total of fifteen (15) in-depth face to face interviews with key respondents purposefully chosen (see ethics form for further details in Appendix D) to generate ethnographic and historical data of the research object (aligned with the broad trajectory outlined in Chapter one). In-depth face to face interviews were chosen for their strength of allowing, “*the researcher to probe deeper, to gain more detailed answers*” (Wimmer *et al.*, 1997: 156)”.

In addition, the face-to-face in-depth interviews gave me an opportunity to interact with the interviewees and be able to read and understand the conversation from facial expressions and body movements as well (Chiromo, 2006). The experience of interviewing face to face was more satisfactory and allowed for a better bonding between the researcher, the interviewee and the study. It brought the lived experiences into view and the interviewees were fascinated by the feeling of telling their stories. In my case, I want to believe that being an insider formative interventionist unlocked many insights and the conversation became live. By live I mean the conversation moves from a mere narration of events, or a question-and-answer session to a more reflective mediation where pictorial developments builds in mind and you feel like telling a story you are living in the now, yet its past experience. It is also important to mention that this kind of data inquiry can be very tense sometimes because not all happy moments are resurrected and bad moments as well. Being an insider formative interventionist, the latter was easy to deal with because of the trust, shared histories we had and the collective understanding we had of the issues at hand. In most cases you would find the interviewees referring to me as their son or giving combining examples with my grandparents or my parents. Hence, the pain of loss was neutralised.

The face-to-face interviews were audio recorded and transcribed in the native language and selected pieces of data were translated for the purpose of reporting this study. Shona language provided a familiar environment to both the interviewer and interviewee during the interviews. My first (five) interviewees from the first generations of farmers were approximately more than 70 years old. A familiar language made them comfortable, ready to share information in detail, ready to engage in deeper discussions. Using Shona language in conducting the interviews in this study

was more than an instrument, it allowed me to achieve more as an insider formative interventionist researcher in the study. The video recordings were mainly for analysis and provided stimuli for reflection (Engeström & Sannino, 2010) and allowed for further insight and understanding in the CLW. It is also important to mention that I carefully explained the study, its objectives and the interviewee's role before the interview proceedings. I also took time to introduce the audio and video recorder I used to the interviewees before the actual interview. Permission to involve, audio and video record, take photographs and use the information together with other data sources available for the purpose of the study was also negotiated with individual interviewees and all the fifteen interviewees granted permission and showed their consent by signing the ethics consent forms (see Appendix D).

3.2.1.1 First Generation Interviews

In-depth face to face interviews were conducted as follows; five (5) with key respondents of my grandfather's generation (born before 1900-1920) who took part in the establishment of the irrigation scheme and were still involved in the irrigation scheme to-date. Why this specific age group? I was much interested in the persons who were already head of a household or mature enough to be actively involved in household food security concerns for a long period of time. Hence, the upper ceiling age group takes cognisance of the early marriages where young men and women become socially responsible for their own or extended families. Hence, in the study I was not concerned much about gender but rather a balanced inquiry and I was much more concerned with the lived experiences. Because of the age groups involved most of these people have either passed away or retired home hence, I employed a snowball rolling sampling technique in order to locate them. My first entry point was through the AGRITEX Irrigation Manager. On the 20th of January 2018, the Irrigation Manager at Nyanyadzi AGRITEX office, helped me with his records to locate my first potential interviewee in the first generation of farmers' category whom I called FGI 1 in the study.

On the 21st of January 2018, I began my interview journey in the mid-morning by visiting my first potential interviewee whom I stayed with in the same neighbourhood in Alvord avenue and he happened to be my nephew. Permission seeking wasn't difficult and the trust to open up was

concrete. We discussed the study and his role which he accepted without any fear. We did our interview seated under a big Mango tree at his homestead. The interview was audio and video recorded for further analysis and mirror data in the CLW. After a thrilling interview with Interviewee FGI 1, I asked for a lead to locate the second interviewee. He recommended me to the wife of one of the pioneers and intellectuals whom he said was very much involved from the beginning since he was a builder, and he was brought to Nyanyadzi by Rev. Alvord himself after they had worked together in Mt. Selinda irrigation scheme. The wife became my second interviewee, and I called her Interviewee FGI 2. She also stays close to our homestead; literary we are neighbours. So, after my first successful interview I just crossed over to my second potential interviewee's house.

The woman was a friend of my grandmother's and we grew up calling her granny. She was not shocked to see me after a long period, she expressed so much happiness. As usual she was worried about what gift she could give me from her nearby orchard. When I told her that today I had come for a different purpose she became very curious. I explained the study to her and went through all ethical procedures which she accepted and signed all the relevant documents. It was almost late in the afternoon, so we sat under her Mango tree where we did our interview. The interview was also audio and video recorded for further analysis and mirror data in the CLW. After another thrilling interview with her I also asked for my third lead and she led me to my potential third interviewee whom she said she was the widow to one of the late pioneers and more senior farmers in Nyanyadzi irrigation scheme.

Unfortunately, on the 22nd of January 2018 I went to her house in the morning and she was said to have travelled and could only be available the next day. I was patient and I returned the following morning on the 23rd of January 2018. When I arrived, I was invited to sit in the veranda and there came a lady of approximately 94 years of age. When I introduced myself, we could not hear each other. Furthermore, she was short sighted thus unable to sign the consent form. After I informed her my mission, she was honest and told me that she is now too old, couldn't hear properly nor see properly and she is now forgetful, and said I have to look for another person. I asked her for a potential lead, and she directed me to a potential third interviewee. She recommended another gentleman whom she said was highly active during the time of the irrigation establishment because

he was a teacher in the Missionary school and was later invited to join the irrigation scheme as it started in the 1930s. I proceeded with the lead to my third Interviewee and it was approximately 3km away.

When I arrived, I met the gentlemen at his kraal, and he welcomed me. He recognised me as I approached, and he just laughed and asked me what I wanted. To my surprise it was my first encounter with him, but he said he recognised me through my similarities to my father and grandfather. Before I fully introduced myself and my research study, he was already narrating his involvement and the historical background of the irrigation scheme. I just found myself trailing behind and I just had to tape record on my recorder and guide the conversation as premediated in the interview guide (see Appendix E). We conducted the interview standing at the cattle kraal hence, audio recording was the major data acquisition instrument used and I would also here and there jot some notes but honestly there were very few things to jot. By the time we finished the interview that is when the wife came out of the house to meet and greet me as well. Then we completed the ethics paperwork afterwards drinking tea at the veranda, and he became my third interviewee whom I called FGI 3 in the study. I also asked for a lead to my potential fourth interviewee. He said *“since I talked about the possession of the demonstration plots at the Training Centre (Nyanyadzi Vocational and Training Centre), I want you to meet and interview one of the beneficiaries. He joined the irrigation at an early age with his father and in 1967 he benefited his own plot from the plots that were repossessed by the community from the Training Centre.*

The next day (24th of January 2018) I visited my potential fourth interviewee, who stays approximately 2.5 km from my homestead. I was lucky to find him at home, when I said to him, I was lucky to find you home, he responded by saying *“iya sekuru mwaguma uno kwakanaka here? hamuziyi kuti ndaka retire here muma Acre ndaakutoswera hangu ndakarara pasi pemucha unoyu”* (uncle what brought you here? Don't you know that I retired from the plots, I am now spending my time sleeping under this Mucha tree). So ideally, we were related and I only came to know of it on that day. Hence, my introduction wasn't that long, and I ended explaining about my study but he was already prepared to give me the narrations I wanted. He was very open and much interested in politics of the irrigation scheme and at several times he would also ask my political affiliation or positionality which I avoided and redirected the conversation to our foci and in line

with the interviewee objectives and guide (see Appendix B, Interview guide for First Generation of farmers). He became my fourth interviewee and I called him FGI 4 and as courtesy I also asked for a lead to my potential last interviewee in their category. He recommended a gentleman he said he is older than him but much of the time he spent in town at work but later retired into full time irrigation farming. He said he might have lost the initial part of the establishment of the irrigation scheme but because he was an agriculture teacher in one of the Agricultural colleges, he had vast understanding of irrigation farming and the fact that when he came back, he went straight into the IMC and served for several decades means he was more knowledgeable. The fact that he was from C block he will give another dimension of understanding that differs from other blocks.

I took the challenge to Block C on the 25th of January 2018, which is approximately, 4.5 km from my homestead. When I arrived at his homestead I was welcomed and invited to seat at the veranda. When I introduced myself and my study, he called his wife who was in the house and they were extremely excited to meet me. He said, “*uya uonemuzukuru wedu asi zvakanganisika takabva kumuroorera hanzvadzi yake*” (come and meet our nephew but now it is complicated because we recently marry his sister). Again, another relationship was successfully forged, and hence, the proceedings were never complicated. He opened up and later offered me the book I have been looking for, I once used that book in 2008 during my undergrad research on the Nyanyadzi irrigation scheme as well. He became my last and fifth interviewee in the first generation of farmers category and I named him FGI 5.

3.2.1.2 Second Generation Interviews

The second five (5) in-depth interviews were conducted with key respondents from the second generation of farmers. In essence, these are assumable the generation of the farmers who were the heirs to the first generation of farmers except for the few who were said to have benefited from the redistributed demonstration plots in 1965. Therefore, in this category of farmers I was interested in those farmers born between 1921-1970 and I referred to them as the second generation of farmers. Ideally, this is the age group of my father.

Snowball sampling was then applied to the selection of the second five interviewees. Just like in

the interviews with the first generation of farmers, I approached the AGRITEX Irrigation Manager for advice on the first participant because of the same reason that he has the records on the plot holders, and he was in a better position to know those who inherited plots from the first generation of farmers. He referred me to a fantastic second-generation farmer, whom he said had vast understanding of the transition from colonial to post-colonial irrigation farming and he had been involved in many farming training workshops and courses and he is a successful farmer of his generation. Lastly, he had been also involved as an IMC member and he is current the water bailiff of his block, which makes him more understandable to the call of my study. I was lucky on the next morning (26th of January 2019) to meet my first potential interviewee from the second-generation category of farmers. I met him on the main canal gate to Block A where he was performing his duty as the water bailiff, allocating water. By the virtue of being our neighbouring plot holder in in Block A in Nyanyadzi irrigation scheme it was easy to negotiate his involvement in the study as my Interviewee FG2 6. We did the interview in our native language at the main water gate in Block A. The interview lasted 34:51 minutes and it was audio recorded for further analysis and for mirror data in the CLW. The interview was later transcribed and only the quoted parts were translated into English for the purpose of reporting in this study.

After the interview I asked him of a lead to my potential second interviewee from the second generation of farmers. He referred to me to nice gentlemen he described as the former IMC vice chairperson meaning he had vast knowledge of the irrigation scheme from a managerial point of view. He was also said to have been born and raised in the irrigation scheme and he has been practising irrigation farming until he inherited the plot. Now he is the rightful owner to the plot, and he was also said to be one of the best farmers in the irrigation scheme and has also sublet several pieces of plots in the irrigation under short term lease agreements. After my first interview with FG2 6, I proceeded to the house of my potential interviewee number two in the second generation of farmers group. His house was close from the Block A main gate, so he was very much in the proximity and this meant he belonged to the Block A north.

When I arrived at his house I was greeted by the wife of my potential interviewee and she referred to me as uncle. This meant that we were related, and I was not able to even explain how we were related but I was sure my negotiations for his involvement and the trust had already been built. I

refer to him as FG2 7 in the study. We had our interview seated under the Mango tree at his homestead. We had a very productive interview which lasted for almost 37:59. This interview was an eye opener. The interview was audio recorded for further analysis and mirror data in the CLW yet to come. His explanations and examples during the interview were very practical as he was referring to the plot we were looking at, the Block we were looking at and the canal network we were looking at from his homestead. So, his narrations became more than just a historical story tell but were alive to the present. As usual after the concluding of the interview I kindly asked for a lead to my potential next interviewee. He said, *“ngekuti tambobhuya ngenyaya dzenhaka ndoda kukunongedzerai kune Shirikadzi iri mu Block B umo, inogona kurima chaizvo”* (because we have discussed a lot about inheritance issues, I want to refer you to a Widow in Block B, she is exceptionally good at farming).

The next day morning (27th of January 2019), I went to meet my potential third interviewee from the second generation of farmers category. I was lucky to meet her at the Block B main gate where they were being allocated watering turns. I waited until they finished organising their day's watering roster. From the look of things, she is one of the respected female farmers and she was very vocal as well contributing towards the watering roster arrangements. After their process I approached her and told her of my study and intention to involve her as my interviewee. She said,

“iiii amunai mwese mwese zvomongouya kwandari zvambonyanya kudii, chimboendaiwo kunemamwe madzimai vanhu havazozvinzisisi. Ndakabva futi kuitwe interview neve UNDP ndikazoburitswa picture yangu pafront page vanhu vakuti vakataura taura. Anyway, zvamwatouya hambai pamunda pangu tonatse kutaura tiri ipapo tichionesana ipapo” (aaah why is everyone coming to me, what have I done, why don't you choose other women in the irrigation scheme, they (women) won't understand. Recently I was interviewed by the UNDP and they put my photograph on front of the report and people gossip. Anyway, since you have come, let's go to my plot and we can discuss at my plot showing you all you want to understand at the plot).

This confirmed to what FG2 7 had said about her as one of the good female farmers in the irrigation scheme and I called her FG2 8.

When we arrived at her plot, we sat on the water canal since it was dry. We had a particularly good

interview, she never hesitated to speak out her mind and the interview lasted for approximately 21:05 minutes. She shared with me her husband loss and how the loss motivated her to be strong and focused beyond many people's expectations. In most of the discussions she would give her life and family's experiences as examples and she was extremely comfortable about it. I would feel for her and had empathy for her. As a result, I decided to instead invite her to the female focus group discussion that would follow as well as the CLW that would follow as well. I also decided not to pull her life story examples into the study for anonymity and empathy reasons hence, I only audio recorded the interview and never transcribed for the purpose of the study feedback. I then asked her for a lead to my potential fourth interviewee in the second generation of the farmers' category. She never hesitated to refer me to whom she called one of the senior farmers in Block B south. She said he was the first person to be in the fields every day and the last person to leave the fields after making sure all the gates are closed. He was also said to have inherited the plot together with his younger brother but since the younger brother is resident in Harare he is in total charge of the whole plot. He was also said to have been in and out of the IMC several times hence he is knowledgeable on both spheres managerial and farming.

Since she said he is always at his plot I knew if I go there afternoon, I was still going to meet up with him. So, I paid him a visit late in the afternoon and for sure I met him, and he was a gentleman I knew from my childhood. He was also happy to meet me and be involved in the study, I called him FG2 9. When we were in the middle of the interview, we were joined with another two gentlemen who were passing by and were curious of the discussion going on and I also thought they became curious seeing me jotting some notes and the audio recorder I was holding on the other hand. So, they came to the water canal where we were seated and they joined the conversation. There was a bit of discord but as we progressed the gentlemen learnt to be systematic, giving a chance to one another when speaking. The interview lasted 36:57 minutes, it was audio recorded and transcribed in the native language. After the interview I politely asked for a lead towards my fifth interviewee in the second-generation category. He pointed to me a gentleman in the C Block, whom he said has been successful both as a farmer and as a leader in the IMC. He described the gentleman as a leader and was said to have been seated in three consecutive IMC and he also heads a few community projects including the one that was funded by the SAFIRE in maintaining the water networks. He was also described as a class 1 builder meaning he has been

involved in most of the irrigation canal and other water related infrastructure construction in Nyanyadzi irrigation scheme. *“This man could be very vital and knowledgeable in many spheres”*, so he said. However, my potential 5th interviewee in the second-generation category was approximately 6km from where I was and since I was walking it means I had to call it a day.

Considering that the next day was a Sunday I decided to go on Monday the 29th of January 2019, because normally people go to church. I headed to Block C to meet my potential last interviewee in the second generation of farmers’ category. I was lucky to meet him at his plot where he was transplanting his tomato plants. I self-introduced the study and I politely asked for his permission to involve him in the study which he agreed. After all the ethical procedures we sat under the baobab tree where we conducted our interview and I named him FG2 10. When we were in the middle of the interview a certain man whom he referred to as his brother was passing by and greeted him and he later extended the interview invite to his brother who then came over and joined the interview. I never wanted to be distracted so I redirected the interviewee to where we had left off as outlined in the interview guide (see Appendix F, Interview guide for Second Generation of farmers). The interview lasted for approximately 31:51minutes and it was audio recorded and transcribed in the native language for further analysis and mirror data in the CLW. This marked the end of my interviews with the second generation of the farmers.

3.2.1.3 Third Generation Interviews

Following successful first and second generation of farmers’ interviews I turned back to the Irrigation Manager’s office in the late afternoon of the 29th of January 2018 for my first lead for the third generation of the farmers in Nyanyadzi irrigation scheme. As previously argued, I sought his advice because he is knowledgeable of the young plot holders who inherited from their parents (second generation of farmers). I belong to this category of farmers; hence, I was mostly looking at plot holders born around 1980-1990. Why 1990, I assumed that most of the persons born 1990 would be assumable 18 years by the end of 2018 hence, they were regarded as adults and even though inheritance is not age bound but it is only at 18 years an individual can claim rightful ownership in Zimbabwe.

These generation categories were important in my study because, they maintained a clear cut and because each generations' experiences differ, and this was one of the critical aspects in my study (three generations of farmers working on the same object). Without a delay the Irrigation Manager recommended one of the youth farmers whom he said was highly active in irrigation farming and is also a current water bailiff in Block B South. He was also reported to have been actively involved in many of the farmers' training courses and workshops sponsored by NGOs. He was deemed suited to my interest. I was given his contact details and I called him, set a meeting for the following morning at 8 am at his plot.

On the 30th of January 2018, I went to meet my potential first interviewee from the third generation of farmers' category at his plot. As mentioned, he is a beneficiary of a one Acre plot and he was very welcoming. He felt honoured and motivated to be identified with such research studies. We did the interview under the big Mango tree at his plot and I named him FG3 11 in my study. The interview lasted for 21:23 minutes and it was audio recorded for further analysis and mirror data purposes in the CLW. After the meeting I also kindly asked him for a lead to my potential second interview, which he provided. He recommended another young man who owns another one Acre plot in Block B which he inherited from his late mother. The young man was described to be doing quite well in terms of horticulture farming and he is newly married. I asked for his contacts and I called him to set up a meeting the same day late in the afternoon. The appointment went through, and I was going to meet him at his plot late in the afternoon.

Around 3pm I went to meet my potential second interviewee in the third generation of farmers category. We discussed all the ethical procedures and he agreed to be involved in the study and I called him FG3 12 in the study. We did our interview seated on the water canal underneath the paw paw tree at his plot. We had a very educative interview which lasted for approximately 14:07 minutes. This was one of the shortest interviews I did in the study but fully knowledgeable. I was mostly interested in understanding issues of plot holding, generational gaps and how they are affecting or promote learning of irrigation farming and I was also interested in understanding how they are learning as the third generation in the irrigation scheme. Hence, these were more focused interviews and they again align with the interview guide for the third-generation farmers (see Appendix G). As usual after the meeting I politely asked for a lead to my potential third interviewee

in the third-generation farmers' category. He referred me to another young lady whom he said inherited the 2Acre plot in Block D from her late father and she was also much into horticulture farming. Unfortunately, he did not have her contacts, so I had to go and search for her the next morning.

On the 31st of January 2018, early in the morning I headed to Block D which is some 7km away from my homestead. When I arrived at Block D, I asked for leads to her homestead and when I got there, I was further referred to her plot where she was busy selling tomatoes. I went to the plot and for sure I found her busy, so I had to wait until she finished her business. I self-introduced the study, and she was happy to be involved in the study. I called her FG3 13 in this study, and we went through all the ethical considerations protocols before the actual interview. We sat on the canal and conducted the interview in our native language. The interview was audio recorded and it lasted approximately 42:08 minutes of recording. The interview was later transcribed for further analysis and mirror data in the CLW. Likewise, after the interview I asked for a lead to my potential fourth interviewee in the third generation of farmers' category. She quickly recommended a young single mother whom she said was a divorced and came back to inherit her mother's plot together with her young brother meaning she owned two Acre plot. She was also reported to be doing exceptionally good in horticulture farming as well. Her plot was said to be approximately a kilometre away in the Block D, South.

I headed towards the south being hopeful that I might find her at her plot since it was still mid-morning. Luckily as I wished I found her on her plot, and she was very welcoming. I self-introduced my study and invited her to be part of the study which she said she was more than happy. I named her FG3 14 in the study for anonymity purposes. We did all the ethical consideration protocols seated under the red ivory tree close to her plot. We did the interview in our native language and followed the interview guide mentioned earlier on (see Appendix G) and the interview was audio recorded as well. The interview lasted for approximately 34:06 minutes and it was later transcribed for later analysis and mirror data in the CLW. Likewise, at the end of our interview I politely asked for a lead to my fifth potential interviewee. She recommended a gentleman whom she said must be at least a year of two older than me but has been doing extraordinary work in Block B North. The gentleman was said to have held influential positions in the

community including being a political councillor for the ward. Hence, he may be of great value to the study and might be more knowledgeable of managerial issues as well, since he sits in IMC meeting as a councillor, so she said. She also gave me his contact which I used to call him and set up a meeting on the same very day. Unfortunately, he said he was not available that day but could only be available the next day mid-morning.

The next morning on the 1st of February 2018, I went to meet up with my potential fifth interviewee at Nyanyadzi shopping centre. He said he was busy and can just drive and we meet at Chinguno & Sons General Dealers a popular shopping complex. We sat in the shade underneath the big *Mucha* tree where most community short meetings are held. I self-introduced the study and invited him to be my fifth interviewee under the third generation of farmers category which he agreed, and I named him FG3 15 and he became my last in-depth interviewee in the study. After all the ethical consideration proceedings we went straight into the interview. The interview went on very well and we conducted it in our native language (*Shona*) and it was audio recorded for further analysis and mirror data in the CLW. The interview was approximately 28:26 minutes long and it was transcribed for the same reasons mentioned above. After the interview I thanked him and extended my invitation to him to the next upcoming data collection meetings like the focus group discussions and the CLW.

In essence, the face-to-face in-depth interviews were done to establish a historical, and contextual evolvement of the multidimensional complexities the smallholder farmers were faced with in their farming activity system and as well as in interacting with other activity systems in the irrigation scheme. The main purpose of the interviews was also to understand, learn about the object in the past and present, with the intention to build historical-ethnographic and empirical understanding of the contradictions in the farmers' and other neighbouring or interacting activity systems towards irrigation food production and marketing in Nyanyadzi irrigation scheme. As argued by Engeström and Sannino (2011), the formative interventionist design is driven by historically formed contradictions in the subjects' activities, hence this historical analysis was needed. To probe further and seek clarity into the initial insights gained from the fifteen interviews I then engaged in Focus group discussions in the month of March 2018 and the procedures are discussed below:

3.2.2 Focus Group Discussions

The second phase of data collection was comprised of three focus group discussions which generated more contemporary ethnographic data of the current situation and learning experiences. Morgan (1996: 130) defines focus group discussions as “*a research technique that collects data through group interaction on a topic determined by the researcher*”. According to Morgan (1996) focus group discussion has three essential components namely, it is a research method devoted to data collection secondly, it locates the interaction in a group discussion as the source of data and lastly, it acknowledges the active role of the researcher in leading the discussion for data collection purposes. While Dimitriadis and Kamberelis (2005; 558), view focus groups as “*collective conversations or group interviews which can be small or large, direct or non-direct*”. It is the collective voice that was important to this study for two reasons, data triangulation and clarity. Hence, the focus group discussions served as my yardstick to test reliability and validity of the issues raised in the in-depth interviews. I also used the focus group discussion for data verification process. Because multiple voice is one way of ensuring reliability and validity, I was also careful of the undermined and the oppressed voices (Yin, 2004). So, I selected my focus groups purposefully being mindful of later reason. In essence, I conducted a focus group discussion with female and male farmers separately and then with the combined incoming and outgoing Irrigation Management Committee (IMC). As suggested by Greenbaum (1988, 1993) and McQuarrie (1996), focus group discussions should be a structured discussion of 6 to 10 homogeneous strangers in a formal setting. The initial plan was to be conscious of gender issues and power relations. Hence, the decision to have two separate farmers’ groups and separate from the IMC to maintain power balance within the focus groups. The focus group discussions were conducted on two consecutive days (12-13 March 2018), starting with the two farmers’ discussions on the first day and the IMC on the next day.

Because of the ongoing preliminary analysis of the fifteen interviews and reflection on literature that was going on, I had an emerging sense of the possible contradictions emerging. Hence, as said before this became a conducive space to also verify, seek clarity and deeper understanding of the issues at play. I then had four themes that I pre-conceptualised from engaging with the ethnographic work I did, and literature analysis as well. I posted these themes as questions which

we used in all the three focus group discussions as discussion points to gain a deeper understanding and a multiple voiced perspective on the issues. The themes are as follows:

Theme 1.

Is the real challenge of the irrigation schemes the “Management crisis” in the irrigation scheme?

Theme 2.

Is the real challenge of the irrigation scheme due to family issues i.e., inheritance?

Theme 3.

Is water shortage the real challenge in Nyanyadzi irrigation scheme?

Theme 4.

Is the real challenge of the irrigation scheme generational gaps in farmers?

1st generation of farmers- pioneer

2nd generation of farmers- current elders

3rd generation of farmers- born free.

In each focus group discussion participants were grouped into four clusters to deepen the discussions by critically reflecting on one of the above themed questions. The different Focus group discussion proceedings are described and discussed below:

3.2.2.1 Female plot holders’ Focus Group Discussion

In this study, the first focus group discussion was conducted on the 12th of March 2018 mid-morning at the AGRITEX office with twenty female plot holders. This was a mixed group from young to elderly women who own a plot in Nyanyadzi irrigation scheme. This group was purposefully chosen from all the four blocks of the irrigation scheme. The ideal group members were discussed with the Assistant Irrigation Manager who was tasked to coordinate the process. Hence, the desire to have a mixed group of young and old women was stressed, secondly a numerical balance per Block and lastly, only plot holders were clearly articulated to the Assistant Irrigation Manager. Hence, a purposeful sampling procedure was adopted in the focus group discussion. The task for selection and inviting the group members was left to the Assistant Irrigation Manager since he had the plot holder data base and he knew the rightful people through his interactions with them.

On that very morning I was joined by my assistant researcher whom I had also trained on photo and video shooting using our two camera we had. In addition to the Assistant Irrigation Manager, I was assigned another two Extension officers to help me with the catering facilities as well as the general site setting. In this event the Assistant Irrigation Manager helped me in facilitating the focus group discussion and he helped by introducing me and the study foci to the participants. It was easy to seek ethical clearance from the people since some of the members invited, I realised were my interviewees in the first round of interviews I conducted. Secondly, the turnout was excellent because the Assistant Irrigation Manager used his portfolio and I also wanted to believe that it was also because of the purposeful sampling hence, he chose the people he was sure would turn up. Lastly, the venue was familiar to them since they happen to host most if not all their meetings at the AGRITEX office hence, the venue holds a symbolic stature in the society.

After the introductions and the ethical considerations protocols as described earlier on, I led the discussion particularly following the focus group discussion guide (see Appendix H). The focus group discussion was audio and video recorded. Three audio recorders and a cell phone were used simultaneously at least to capture all the details during the four discussion breakaway clusters. To save time we were fed during the four breakaway discussion tasks and each cluster discussed one of the above four listed themes. They were asked to audio record the discussions and present their insights in the focus group discussion for a further discussion. In the main focus group discussion, the representatives of each cluster presented and after every presentation we had a critical discussion, reflecting on the real issues affecting the irrigation scheme. Again, this was a verification and clarity seeking process as mentioned earlier on. In addition, the focus discussion was video recorded for further analysis and mirror data in the CLW. The first focus group discussion lasted approximately 2 hours and 45 minutes. At the end of the focus group discussions the participants were asked to sign the attendance register and were further invited to participate in the CLW whose dates were still yet to be announced. We agreed that for continuity sake in these discussions we should follow up these issues in the CLW. We then broke away and everyone was wished a safe travel back to their respective homesteads. As I finished with the female participants the males were already trickling in for the 2pm meeting. We barely had a 30-minute rest before we got into the next focus group discussion.

3.2.2.2 Male plot holders' Focus Group Discussion

The second focus group discussion was conducted the 12th of March 2018 afternoon at the AGRITEX office with twenty male plot holders. As explained above the selection and invitation of the male farmers was purposeful and the task was left to the Assistant Irrigation Manager. The focus group discussion was scheduled at 2pm but because of the unforeseen delay in start in the morning and the lateness of some male farmers we decided to begin at 2:30pm. In the meantime, we shared food with the participants as we were waiting for some to come and this was done to avoid disturbance in the proceedings of the focus group discussions once we started and secondly, it gave us ample time to charge our data collection instruments.

At 2:30pm all the intended participants had arrived, and we started the focus group discussion with a prayer from one of the group members. Afterwards, the Assistant Irrigation Manager introduced us and the foci of the study. I was then given the floor to expand more on the study which I did, and I also sought the participants' consent using the ethical form (see Appendix D). All the participants accepted and the audio as well as the video recording of the focus group discussion were started. We had deeper discussions following the outline in the male plot holder's Focus Group Discussion guide (see Appendix i) and as we were nearing the end of the discussions the farmers were clustered into four small groups. Each group was tasked with one of the themes listed in Section 3.2.2. They were allocated 15 minutes to critically discuss them, record their discussion and one person was asked to present when we broke back into the main group.

We had extremely critical discussions after every presentation and the participants were also delighted by the process and how much they had learnt as a group. The focus group discussion lasted for approximately 2 hours 28 minutes. At the closing stage of the discussion an invite to the next event that will be a CLW was extended to the participants and the date was said to be announced soon. The participants were also asked to fill in the attendance register.

3.2.2.3 Irrigation Management Committee (IMC) Focus Group discussion

The third and the fourth focus group discussions were combined because most of the IMC were continuing into the second term. The focus group discussion was conducted on the 13th of March

2018 at Nyanyadzi AGRITEX offices. The focus group discussion was conducted with ten outgoing and ten current sitting management committee members who were purposefully chosen by the Assistant Irrigation Manager. As previously argued the Assistant Irrigation Manager was also given the mandate to purposefully select and invite the current and out-going Irrigation Management Committee (IMC) members. Unlike the other groups the IMC members were punctual, and I suspect they thought they had been called in for those Tuesday important meetings. When I was discussing with the Assistant Irrigation Manager the previous day and I was worried so I even asked him that do you think they will all turn up like what others have done. The Assistant Irrigation Manager responded by stating that remember tomorrow it is a Tuesday and we normally have our Tuesday meetings with them here so it is a matter of a phone call they will be here.

They were punctual, and they all came as expected. Just like in the previous focus group discussion one of the IMC member opened the session with a prayer and the Assistant Irrigation Manager introduced us and the study foci. He left the floor open for me to expand on the study foci and we went straight into the discussion guided by the Focus Group Discussion guide for IMC (see Appendix J). Towards the end of the discussion, we broke away into four small clusters and each cluster was tasked with a theme to critically discuss. After some 15 minutes of critical discussions, we came back together in one big group and we engaged in critical reflections of the tasks. One cluster would present, and we discuss what it means for the irrigation scheme. This way I was able to verify and build deeper understanding of the multidimension complexities the farmers were faced by in their irrigation crop production and marketing activities. The focus group discussions lasted for approximately 4 hours 30 minutes and this shows the intensity of the discussions.

Overall, through these focus group discussions I was close to surfacing and understanding the contradictions faced by the farmers activity and through interacting with other critical activity systems. A further reconciliation and building from the ethnographic data generated from the in-depth interviews with the three generations of farmers I was able to get stronger insights to some issues like, irrigation management styles, the inheritance system and plot holder system, farmer education and training as well as issues on water management and crop market management. In essence, the focus group discussions were relevant to provide perspective on current complex multi-dimensional issues, and the learning processes.

After these focus group discussions, I also undertook site observations throughout the four Blocks of Nyanyadzi irrigation scheme to observe structures, practices and actors engagements in the irrigation scheme. This was also one way to ground truth some of the issues raised in the interviews and in the focus group discussions.

3.2.3 Site observations

During and in between the interview visits to specific interviewees, I did site observations in the fields. The pictorial evidence provided in Figure 3.1 show earth canals connecting the overnight storage and fields in Block B south and Block D. It is worrying to realise the poor state in which the earth canals are and how prone they are to siltation and water damage. As shown in the three pictures in Figure 3.1, the bridges crossing over these earth canals are dangerous and time bombs to traffic, livestock and people (see Figure 3.1, Main earth canal to Block B north). The earth canals lack proper management and infrastructural designing as evidenced by the poor water gates, lack of silt weirs to divert and offload the sand/silt being eroded from the upper catchment. Consequently, the earth canal walls become vulnerable to siltation and wall collapse especially during the rain seasons thereby, limiting the water capacity of the canals. These main earth canals stretched for over 3kms from the overnight reservoir towards Block D and it is interesting to estimate water loss in these earth canals as explained in Chapter 5. Surprisingly, the larger part of Block D (*Makangani* area) canal network is largely earth and it was not clear whether these plots were part of the main Irrigation scheme or were part of the illegal plots mentioned in Chapter 1 and 4. The earth canals in Block D, are not only wasteful, but also unorganised in terms of the networking. There were evidence of mud and pools of water in the roads flagging some serious water misuse, wasteful practices and poor water management in the area. Some of the pictorial evidence drawn from the observation tours are presented in Figure 3.1.



Figure 3.1: Earth silted canals and leaking, broken canals.

Source: Primary

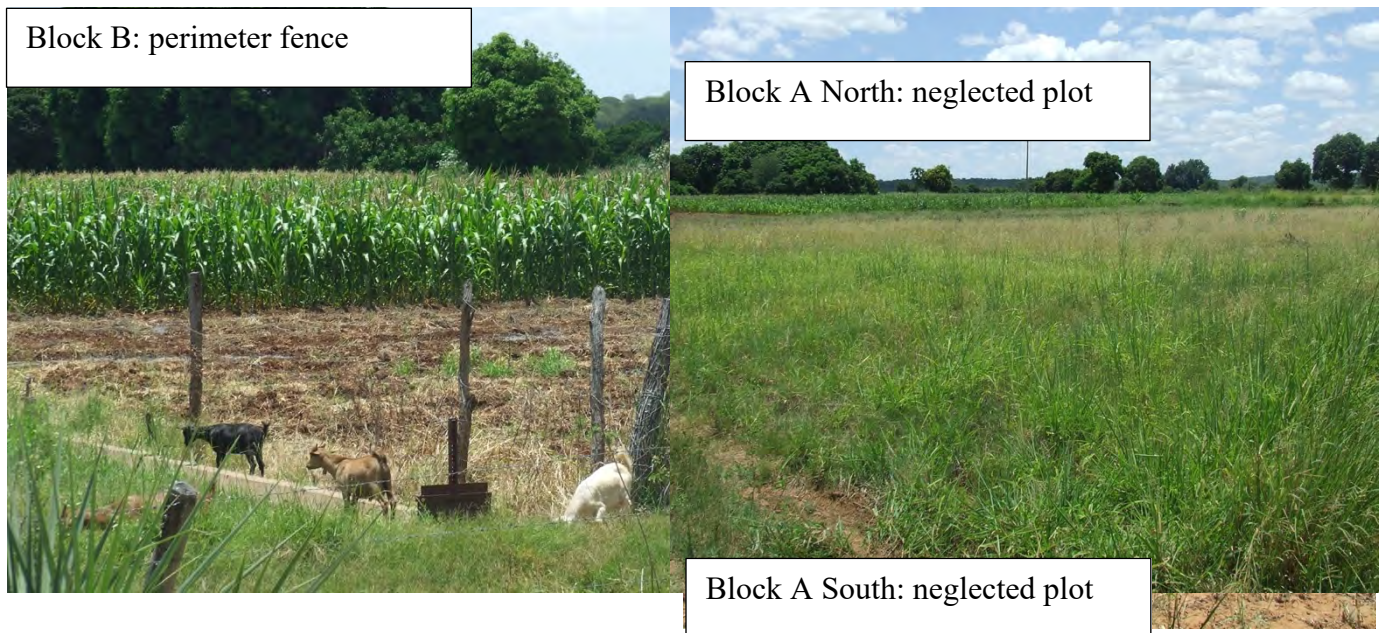


Figure 3.2: Poor perimeter fence and neglected plots

During the observation tours, I also came across neglected plots as shown in Figure 3.2 above. It was interesting to realise that most of the plots were under maize crops. It was worrying to realise few patches of fertile plots neglected and were growing grasses instead of maize. These plots could be some of the contested or non-productive as discussed in chapter 4 and 5. There was also evidence of poor management evident by absent perimeter fence and stray livestock in the fields see Figure 3.2 above. However, these pictures were important to this study, some of the pictures provided stimuli for learning and double stimulus in the change laboratory workshops with the farmers. Site observations provided ground truthing opportunities. It served purposes of data verification especially on some issues emerged in interviews and in focus group discussions held with the participants in this study.

3.2.4 Change Laboratory Workshops

The third phase of data collection was done using change laboratory workshops using the Expansive Learning Cycle (see Figure 2.7). Change Laboratory Workshops (CLWs) have been widely used as both a data generation and analytical tool (Engeström, 1999; Engeström & Sannino, 2010; Mukute, 2010; Masara, 2010; Lindley, 2014; Kachilonda, 2014). Engeström (2016; 30)

explains change laboratories as follows, “*the Change Laboratory process consists of a series of sessions in which practitioners of an organization (or several collaborating organizations) analyse the history, contradictions and zone of proximal development of their activity system, design a new model for it and take steps toward the implementation of the model.*” This CLW’s sessions were videotaped and audio recorded and later transcribed to secure rich and comprehensive data for further analysis.

A three-day Change Laboratory Workshop (CLW) was conducted from the 20-22 August 2019. In total eight plenary sessions were conducted during the 3-day CLW (see the detailed CLW plan in Appendix K). A total of ten key stakeholders including the farmers and the IMC were invited to the 3-day CLW. Out of the ten seven key stakeholders managed to attend at least one day of the 3 days or all the 3-day CLW. The invited stakeholder list included the Farmers and the IMC (see Appendix L); the Chimanimani District Administrator (DA) (see Appendix M), he apologised for not making it on the first day of the CLW, but managed to send two representative for the last two days. The Zimbabwe National Water Authority (ZINWA) Manicaland province (see Appendix N), this is a government commercial parastatal agency that provides water services on a cost recovery basis. In the case of ZINWA, they invited me to a brief up meeting at their Provincial office in Mutare some 100km away from Nyanyadzi irrigation scheme. I attended the brief up meeting on the 19th of August 2019. I met up with the Chief Water engineer Manicaland and their Extension Water engineer. The main objective of the meeting was to brief them on the intended 3-day workshop and how they complement the guest list. For me it was also an opportunity to call them for a collective action, to enhance collaborative work between the ZINWA and the farmers which they appreciated and sent their two Extension officers to the 3 day-CLW.

The next on the guest list was the International Fund for Agricultural Development (IFAD) (see Appendix O), which is an NGO that supports irrigation farmers, and it has been also actively involved in financing irrigation project in the eastern dry areas of Zimbabwe. In 2016 the IFAD was also involved in some Smallholder Irrigation Revitalization Programme (SIRP) which was aimed at revitalizing 6,100 hectares in 152 existing smallholder irrigations schemes in the semi-arid zones of four provinces of Zimbabwe namely, Manicaland, Masvingo, Matabeleland South and Midlands. Nyanyadzi was also a beneficiary hence, coming back was tempting, but because

of their other commitments they were not able to attend, but insisted on being involved in the other following programmes. They also insisted I should share with them the full research findings including the study.

Another key stakeholder invited was the Southern Alliance for Indigenous Resources (SAFIRE) (see Appendix P). SAFIRE is an NGO that has been lately involved in Nyanyadzi irrigation in restoring and maintaining its water network infrastructures. The NGO was invited but because of commitments elsewhere they could not attend. But they expressed an interest on the insights in the final report and future involvements. I also invited the Zimbabwe Electricity and Transmission Distribution Company (ZETDC) which is an electricity generation and distribution organ of the Zimbabwe Electricity Supply Authority (ZESA) another government parastatal (see Appendix Q). After receiving the invitation, they called me for a prior meeting in which they sought to understand the study, the methodology and the level of their importance to the workshop.

I met with the Manicaland General Director and other two gentlemen referred to as the Eastern Regional Manager and the Eastern Regional Engineer. The gentlemen showed much interest in the study and methodology and decided to extend the invite to their university student attaches for composure. In the meeting they emphasised a few issues, one being the reporting protocols in the parastatals and government departments. They said they were not allowed to make any legal and binding arrangements and they are not allowed to speak on behalf of the employer unless if it is the ZETDC spokesperson. Secondly, they also mentioned concerns related to official records and indicated they are not allowed to review any documents in case that the farmers requested any form of records or official figures. So, they described their involvement as ceremonial and they would just be there to appreciate the event. Lastly, they mentioned shortage of fuel which I promised to pay them in form of a fuel, but they made a special request of a car hire in the case that ZETDC vehicles are busy. They needed a vehicle to ferry their people to Nyanyadzi and back. On the latter, I honestly told them that I did not have budget for that only fuel reimbursement at the rate of government AA rate/km. Eventually, they did not manage to come to the CLW.

Another key stakeholder group invited was the Tsuru DzeChimanimani Trust (see Appendix R), which is an NGO that promotes sustainable utilization resources including local forest products.

They haven't been very much involved directly with the farmers, but I envisioned their involvement as helpful to the farmers. The other two important government departments are the Agricultural Extension Services (AGRITEX) (see Appendix S) and the Nyanyadzi vocational and training centre (NVTC) (see Appendix T). Both departments provide farmer education and training services to the irrigation farmers. The above invited key stakeholders are from the key activity systems involved in, and influential to Nyanyadzi irrigation scheme. A more detailed description of these key activity systems shall be done in Chapter four and their role in the activity system configuration.

In line with the Expansive Learning Process presented on Figure 2.7, the first plenary sessions were to gather ethnographic data from the farmers' activity system and the neighbouring activity systems in a questioning process that helped to surface contradictions (multidimensional complexities) in the intersectional activity systems in the scheme. Hence, day one of the CLW was much on the questioning of the activities in different activity systems and how they create tensions, dissonance and contradict with one or many aspects of the activity systems or neighbouring activity systems. Hence, much work was done in surfacing the multidimensional contradictions farmers were faced with and other neighbouring stakeholders were faced with. The second day was much in the examining of the contradictions identified. This was much to do with the historical and actual-empirical analysis of the contradictions. In this case double stimulation process was used to deepen and critically analyse the contradictions examining how they have been and how they have become to be? These were critical questions asked in this phase. With the help of double stimulation and historical mirror data a deeper understanding was collectively reached.

The third day was focused more on envisioning the new models of solutions and the actual modelling process. The CLW process ended up in the designing of the new models. I never had the chance to see implementation of the solutions. It is also the nature of preparatory work that needs to be done to ensure a smooth process of change that I felt I could end here. Much of this process has been discussed in Chapter five and six. However, it is important to mention that during this change laboratory workshop, double stimulation was done with 'mirror' data generated from the fifteen (15) in-depth face to face interviews, three focus group discussions and the three plenary sessions in this CLW. There would be a need for at least another three CLW to experiment on the

ideal mitigation strategies as well as to reflect on the process, consolidate and generalize the new practices that participants agreed to and there could be a need to remodel and test problematic models. Thus, in this study the change laboratory workshops were mainly catalytic of solutions, and the full cycle of Expansive Learning was not completed in the time of the study. However, there is interest in the study findings which could catalyse further activity development.

3.3 DATA MANAGEMENT AND ANALYSIS PLAN

According to Jackson (2009) data management involves the capturing, storage of all data sets from the cases. A systematic approach to data management was applied in this study. This involved data source indexing, folder labelling and interview transcriptions, focus group discussion transcriptions, e-labelling and storage. All folders of the research instruments were kept safely, and pseudonyms were used to ensure anonymity (Bogdan & Biklan, 2007).

Lastly, data generated was stored in the form of hard copies and e-format. Backup systems in the form of USB memory sticks, Google drive, iCloud account and Gmail account were used. Data in the study was analysed by inductive and abductive means. Data generated from the interviews, and the Focus Group Discussions (FGD) was transcribed, coded and analysed in relation to the major themes and categories developed from the research questions and by reading the data itself. Data generated from the Change Laboratory Workshop (CLW) was audio and video recorded was then inductively and deductively analysed (see Analytical Memo 1 in Appendix V).

Engeström's (2011) idea of argumentative grammar was used in the analysis of the data from the fifteen interviews, three focus group discussions and change laboratory workshop in this study. This idea was originally developed by Kelly (2004) and posits the understanding that, an argumentative grammar is the logic that guides the use of a method and that supports reasoning about its data. It supplies the logos (reason, rationale) in the methodology (method + logos) and is the basis for the warrant for the claims that arise (p. 118). In essence, argumentative grammar can be viewed as *“a set of basic epistemic ideas or threads that run through and connect theory, methodology, and empirical research. These epistemic ideas are both substantive assumptions about the nature of the objects of research and heuristic meta-level tools for the practical conduct*

of intervention, data collection, and analysis” (Engeström, 2011: 607). Therefore, in this study the four epistemic threads or tenets as elements of an argumentative grammar were applied to the data analysis process and these formed the thrust categories and themes in data analysis. These threads or tenets are: (a) activity system as a unit of analysis (see Section 4.1), (b) contradictions as a source of change and development (see Section 5.2), (c) transformation of practice as a form of expansive concept formation (see Section 6.1) and (d) agency as a layer of causality (see Section 6.2), (Engeström, 2011). In essence, data triangulation was done, and a thick descriptive design was used to present study findings and insights (see Chapter Five and Six).

Agency as a layer of causality was also applied in the interpretations and insights drawn from the observations of the change laboratory workshops. This was done in line with the role of the insider formative interventionist, that is to record and analyse the participants’ agentic actions as an important outcome (Engeström, 2011: 611). The three layers of casualty are diagrammatically presented in Table 3.1.

Table 3.1: Three layers of causality in human action

INTERPRETIVE LAYER	In activity the actor	Takes into account, according to this or that logic, that	If X, then Y Law, rule
CONTRADICTIONARY LAYER	As participant in collective activities	Is driven by contradictory motives	Searching resolution by often unpredictable actions
AGENTIVE LAYER	As potential individual and collective agent	Takes intentional transformative actions	Inventing and using artifacts to control the action from the outside

Source: (Engeström, 2011: 610).

Secondly, the concept of Transformative Agency Expressions (TAP) was also used in analysing agency in the CLW (Engeström, 2011; Haapasaari *et al.*, 2016; Kachilonda, 2015, Chisoni 2018:99) (see Table 2.1 in Chapter two). The concept of discursive manifestation of contradictions utilising the four aspects namely, a) dilemma; b) conflict; c) critical conflict; and d) double bind (see Section 5.1.1 and Table 5.1). Lastly, the idea of using rudimentary cues was also employed in the analysis of change laboratory workshop data (see Table 5.2). Table 3.2 that follows summarises

the data analysis phases and processes that I undertook in this study:

Table, 3.2: Data Analysis Procedure

Phase of Data Analysis	Approach to analysis	Purpose of analysis	Data sources to be analysed
Phase 1: History of the Object (<i>Addressing Research Objective 1</i>)	Inductive analysis tracing the history of the object.	To develop insight into how the object has changed over time, and the types of complex multidimensional issues farmers have faced; as well as insights into their learning experiences	• 15 interviews with the 3 generations of farmers • Document analysis • 3 Focus group discussions
Phase 2: Current perspective on the object (Addressing Research Objective 2 and 3)	Abductive analysis using activity systems (2 nd generation and 3 rd generation) Inductive analysis.	To scope the dynamics of the activity systems and their interactions in order to surface contradictions. To identify complex multidimensional aspects of the research object and current learning approaches, processes and preferences.	• 3 Focus group discussions • Site observations • Document analysis
Phase 3: Transformation of the object (<i>Addressing Research objective 3 and 4</i>)	Abductive analysis using activity systems (3 rd generation), contradictions, double stimulation tools, zone of proximal development and expansive learning actions sequence and transformative agency analysis.	To map the expansive learning process; changes to the object of activity that emerged via the ELP, and transformative agency expressions emerging from the ELP process. Advancing Zonal of Proximal development in farmers' activity	• Change Laboratories (3-day Farmers' workshop 20-22 August 2019) • Reflexive Journal of the researcher (to take account of the internal interventionist role that I played)

Source: Author (2018)

3.4 Ethics, validity and trustworthiness

On the 19th of November 2017, I applied for permission to conduct the study at Nyanyadzi irrigation scheme through Chimanimani Rural District Council, which they approved (see Appendix B). I then went on to apply for permission to conduct a study and involve the farmers at Nyanyadzi irrigation scheme from Nyanyadzi AGRITEX office (see Appendix C). Nyanyadzi

AGRITEX, agreed to be involved and involve farmers as well into the study as shown in Appendix C., I then went on to seek individual farmers' consent to be involved and fully participate in the study (see the Ethics form used Appendix D). Every participant was approached individually, I would describe and explain the study expectations and what every participant was expected of. I would also introduce the audio and video recorders I would use in the data generation process. After seeking permission and consent from all the important stakeholders and participants I then applied for permission to conduct the study from the Environmental Learning and Research Centre (ELRC) in the Education Department of Rhodes University, which was granted as **Ethical clearance number 2017.12.08.05** (see Appendix A).

As outlined in the ethics form (see Appendix D), I developed a strongly and carefully constituted ethical research project in which I acted as a 'responsible participant' (McGarry, 2016) always. One of the challenges that I had was to manage my role as insider interventionist researcher. In the ethics application form attached (see Appendix U) I have explained that I see this as a positive opportunity to develop in-depth and culturally informed research. However, I had to manage potential bias, and for this reason I maintained a research journal in which I constantly reflected on my role in the research process. This process kept me reminded of my insider formative interventionist researcher role in which I had to work with the community, as part of the community member to collectively come with solutions to the multidimensional complexities faced by the farmers. I also invited two elderly community members to monitor my role in the research process to ensure community integrity is maintained. The elderly persons reminded me of socially accepted approaches and addressing of the participants. They also helped in handling the most complicated issues and tensions during and after the change laboratory workshops.

Additionally, I kept a careful record of all of the research proceedings and ensured that I had a rigorous 'data trail' and case record. I also member checked the data via focus group discussions and the change laboratory workshops. I used data triangulation to verify data sources, for member checking so as to develop a fuller picture, and to identify anomalies in the narrations and data itself. Data triangulation process allowed me an opportunity for in-depth engagement with certain themes that would have not been fully developed or understood in previous data acquisition process and to rectify misleading information. It also allowed me to follow up and revisit certain

issues across the data acquisition process. Lastly, I used my reflectivity as part of the data double stimulation processes in the change laboratory workshops. This did not only provide for the necessary data checking and verification but kept my personal reflections on check as well. This way I was able to maintain data reliability, validity and kept my role as insider formative interventionist researcher on check.

3.5 CONCLUSION

In conclusion, the insider interventionist approach and the case study design adopted in this study were compatible. I was able to build careful historical data through the ethnographic and empirical data acquisition procedures described in this chapter. The careful historicity was critical and influential in surfacing the contradictions which I earlier on argue that they were necessary and important for enabling expansive learning processes via double stimulation in a change laboratory. The insider interventionist approach adopted had many advantages in this study which all added up in producing the results presented in chapter 4, 5 and 6. In my personal reflexivity and being mindful of own role as an insider interventionist I mentioned that trust was the major asset I managed to turn into openness in the study. Because the community trusted me and identified me as their own, it was possible to mediate productive discussions, tackle sensitive issues in the study (such as financial abuses, political interferences among others). In addition, since the community knew my background, my family and we shared part of the history they never expected anything in return from this process besides sincerity and honest need for change. As a result, I had nothing to bribe, or hide but truthiness and I think this is what I can take away from the methodological approach employed in this study. One last thing, because we shared the same dialect, language was never a barrier, instead it became one of the important mediating artefacts in the study and it enabled a greater understanding between, and among the respondents. Despite being an insider, the data acquisition process was never smooth. I encountered several challenges including subjectivity and potential bias threats especially interviewing participants that you are somehow related to, as well as logistic issues. I had to walk long distances to reach out to the interviewees and at some point in time I had to walk 4.5km on foot to reach interviewee FGI 5 and in one incident I was turned down by a potential interviewee because she was old, short sighted and forgetful and such was my journey. But, as argued earlier on among others, personal reflexivity

and being mindful of own role as an insider formative interventionist researcher was core in overcoming all sort of threats the research process was subjected to.

CHAPTER FOUR- DESCRIPTION OF THE ACTIVITY SYSTEMS AND OBJECT OF ACTIVITY

4.0 INTRODUCTION

This chapter presents, describes and explains the key activity systems in Nyanyadzi irrigation scheme and gives an account of the history of the object. In line with the CHAT, identification of the activity systems is critical as is understanding the object of activity. Data was generated from the fifteen (15) face to face interviews with three generations of farmers, three (3) focus group discussions with male and female smallholder farmers in Nyanyadzi irrigation scheme, a three (3) Day-Change laboratory workshop, site observations, and literature review.

4.1 INTERSECTING ACTIVITY SYSTEMS IN NYANYADZI IRRIGATION SCHEME.

Nyanyadzi irrigation scheme is one of the oldest community owned irrigation schemes which is believed to have been conceived as a dream by Rev. Emory D. Alvord and was later established in 1931. Furthermore, Rev. Alvord was believed to be the godfather of irrigation engineering in Zimbabwe (Bolding, 2004) and designed Nyanyadzi irrigation scheme. Historical accounts of Nyanyadzi irrigation scheme also relate that, Rev. Emory D. Alvord passed through Nyanyadzi area on the 26th of September 1926 and saw the dryness of the region but saw the potential of the river and the rest is history, the oldest irrigation in Zimbabwe (Bolding, 2004: 125). The primary motive of establishing Nyanyadzi irrigation scheme was to promote household food production in the dry region where cropping was continuously failing. It was also to utilise Nyanyadzi river water Rev. Alvord termed “a waste” since it just flowed downstream. However, how the dream became a scheme is also subject to various interpretations and narratives, some of which are presented in this chapter.

In 1983 the Nyanyadzi irrigation scheme was officially handed over to the community and the management shifted from the Government-oriented to the Kraalhead Committee management approach commonly referred to as Community Irrigation Management (Manzungu & Van der Zaag, 1994). Nyanyadzi irrigation scheme has endured transitional governance and the test of time,

having been in existence for nearly a century now. The uniqueness of this research context does not only lie in its length of historicity but also the inter-generational knowledge that accompanies the object of the activity. The irrigation scheme has passed through three distinctive generations of farmers which had influence on the practice and some elements of these three generations of farmers still exist. It now has a wide audience, which also interact with several other key neighbouring activity systems.

A critical analysis of key activity systems in this study was necessary to start this study, as it informed more in-depth exploration of the interactions and the transformative learning processes that happened within the farmers and the other interacting key stakeholders. An in-depth understanding of the key activity systems and their interactions with each other was also helpful in illustrating and enhancing a better understanding of the multidimensional complexities experienced within and between the key activity systems as they collaborate towards a shared object. With the help of the CHAT methodological and analytical lenses the key stakeholders in this study were identified and defined by their positionality and role played towards the fully shared or partially shared object with the farmers in the irrigation scheme (see Section 2.2.3; Section 2.3 and Section 3.2.3). Identifying and defining activity systems was critical to the understanding of the historicity of the object and illuminated a better understanding of the multidimensional complexities and the transformative learning processes that accompanied each activity system. Hence, a deeper and distinctive understanding of the different activity systems at interplay in Nyanyadzi irrigation scheme helped in the mediation of the expansive learning and transformative agency pathways with the farmers and other stakeholders in the Change Laboratory Workshop (CLW).

In this study six activity systems were identified and described in this chapter. The participants in each activity system are referred to as the **subjects**. For instance, in the farmers' activity system the **subjects** are those farmers who dedicate their time, power and knowledge towards household crop production and income generation through marketing to meet household food security, which in this case is the **object**. Through irrigation cropping they intend to meet their household food

security and income needs which can be therefore referred to as their intended **outcome(s)**. These key **subjects** engage and use some **artefacts or mediation tools** which mediate the interactions towards meeting their **object** (food production and marketing under irrigation farming). Examples of such **artefacts** and **mediation tools** include the ploughs, hoes, water, siphons and pesticides manuals together with food processing, sustainable farming and marketing concepts and understandings of irrigation farming. It is important to note that, the farmers' activity(ies) is/are also guided and informed by some **rules**. In this case the dominant **rules** to mention just a few are the Irrigation Management Constitution (1983); Department of Water Development policy; Zimbabwe Water Authority Act (Water Act, 1998; 2002); Communal Lands Act 13/2002; Traditional Leaders Act [Chapter 29:17] and the government policy among others. Some of the rules are specifically instituted by the farmers and some are as a result of an interplay between the farmers' activity system and other neighbouring key stakeholders' activity systems who could have predefined rules. For example, Government departments like the Agricultural Technical and Extension Services (AGRITEX) have a mandate to provide extension services in the form of farmer education and training and other technical services to the farmers working in the irrigation scheme hence, in the process they have their own governing rules that also bind the farmers in a way.

It is therefore safe to say the irrigation system is constituted by many participants from multiple activity systems, interacting towards a common object or partially shared object who therefore becomes the **community**. In essence, these participants play critical roles in shaping and guiding the processes and activities towards household food production and income generation (**object**). These participants are the **community** in the activity system and include the plot owners, lease agreement holders, the business people, government officers and the Non-governmental organizations working together with the farmers on various issues and aspects of farming. Therefore, for proper functioning of the irrigation scheme there is a complex **division of labour** in which distinctive explicit and implicit roles are spelt out within and across the activity systems. In other words, each relevant stakeholder in the Nyanyadzi irrigation activity system has a distinctive role and part to play and knows what to do, when, how and where as well as the shared roles and responsibilities within and across the activity systems.

It is important to note and acknowledge that the multiple activity systems in Nyanyadzi irrigation scheme as described above are likely to be sources of multidimensional complexities which are ideal for **expansive learning**. The interaction between these six activity systems can produce complex dynamics which manifest into conflicts, misunderstandings, different stand points within the elements of these activity systems which can be **primary contradictions** or for example, there could be a collision in the old rules and a new rule which can be referred to as **secondary contradiction** and sometimes when the irrigation's object clashes with a historically more advanced activity systems, these are referred to as **tertiary contradictions** and lastly, when the irrigation scheme's activity system elements clash with neighbouring activity systems like the conservation fish farming activity system **quaternary contradictions emerge**. It is these forms of contradictions that people with a common **object** may be concerned with, may debate and deliberate with the possibility that they may develop some tools and understandings that can allow them to collectively develop new practices or activity. In this case, the use of the insider formative intervention approach together with Engeström's work on expansive learning can be useful in the **mediation using double stimulation**, thereby allowing for new knowledge creation in which all the stakeholders involved/concerned may become part of the process. However, the above-described process remains generic and it calls for specific insights into this process in order to develop in-depth insights into the possible expansive learning processes and examining how learning is and can be mediated to expand human activity.

4.1.1 Farmers' Activity Systems

Since 1935 when the first 90 people flocked to the irrigation adding to the existing 29 plot holders that were there first, the irrigation scheme has seen an influx of different people adding to the diversity amongst the farmers. The irrigation scheme as community, is constituted by farmers of diverse socio-cultural backgrounds. In chapter one, the history of Nyanyadzi irrigation scheme showed that of the 29 plot holders present by 1935, eight of them were tax defaulters and added to them were another 90 people mentioned above who were believed to have come from the areas around the Savi-Limpopo valley. Notably, the irrigation scheme was always open to new farmers and the diversity of the farmers also grew with time as the irrigation scheme grew and sphere of influence. One thing that has remained stable is that the irrigation farmers had one object in their

activity that is **crop production and marketing under irrigation**, to meet household food security needs. The irrigation farmers make the biggest activity system that also interacts with several other activity systems in the irrigation scheme. In the farmers' (subjects) activity system, the farmers directly interact with the **mediation tools and instruments** like water, farming inputs the land; are guiding by **rules** such as the Irrigation scheme constitution, 99 year lease agreement, the Water Act; and they engage in some sort of **division of labour** within their activity so as to achieve their **object (crop production and marketing under irrigation)** and achieve their outcomes (**household food security and income**) (see the Farmers' activity system diagram in Figure 4.1).

As much as irrigation farming is an activity system made up of various actions (goals) it is also a learning space guided or directed by certain norms, rules, regulations and/or values. The learning that happens is mediated by extension material, demonstrations and by traditional conceptual tools or artefacts such as seeds (maize, beans and tomatoes), farm inputs (fertilizers), water and draught power. It is also an activity system facing policy crises including climate variability and change (nature's rules) and poor political-economic environments (McIntyre *et al.*, 2019). This is the primary activity system in focus in this study because this is where the outcomes of farming education, research and extension work play out in the lives of people dependent on the irrigation scheme for livelihoods and food security per se.

Nyanyadzi Smallholder Irrigation Farmer's Activity System

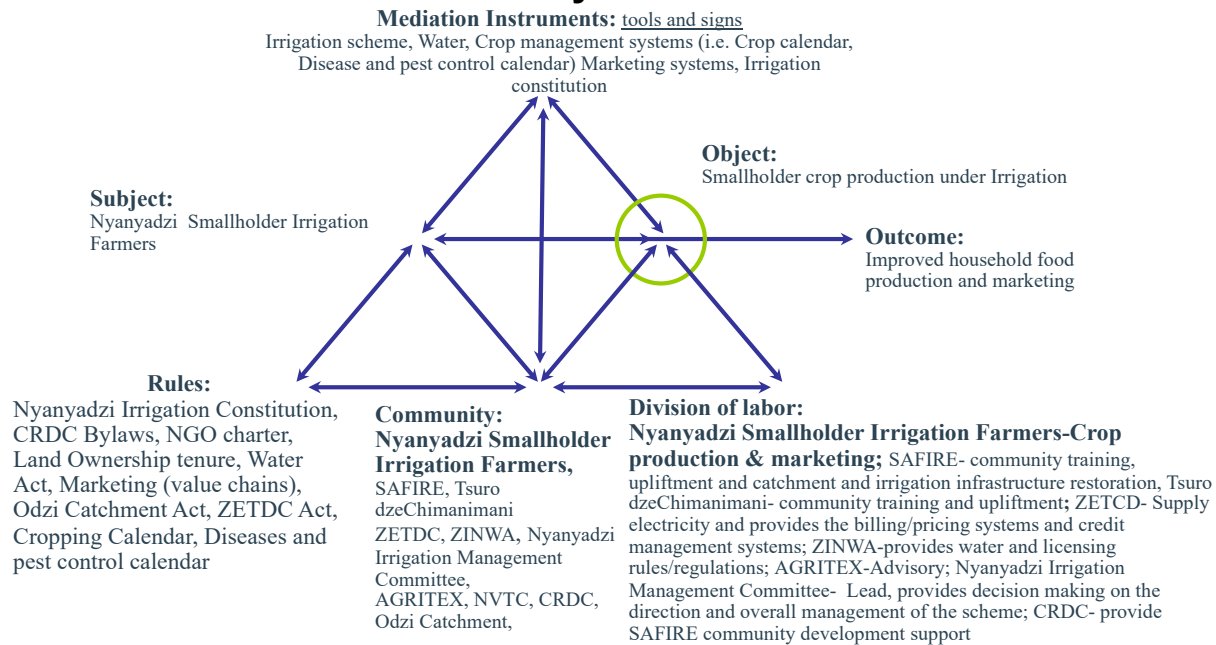


Fig 4.1: Nyanyadzi Smallholder Irrigation Farmers' Activity Systems

Source: Author

The farmers' activity system has a long history of existence (1931- to date). It is not a secret to mention that the farmers' activity system is composed of **subjects** (farmers) and the subjects were categorically described as three distinctive groups of farmers. In this study the subjects were characterised and described as the first generation (born before 1900-1964) who were the first farmers in the irrigation as explained in chapter one and by birth they were born before 1920 (see Section 3.2.1.1). The second generation of farming was basically defined as those farmers born between 1921-1970 (see Section 3.2.1.2). These farmers are the offspring of the first generation of farmers. By the period described they were actively integrated into the irrigation farming activity system. Lastly, the third generation of farming, which is loosely described as the farmers who became actively involved in the irrigation scheme post-independence era (post 1970-1990). The assumption here is that a rightful age of a plot holder by inheritance is 18 years and above. Meaning those people born 1970 onwards could only be actively and rightfully be plot holders by 1980 onwards, hence they belong to the third generation (see Chapter 3).

Nyanyadzi irrigation scheme's subjects are of diverse socio-cultural backgrounds. Historically, it is said only 26 women and 3 old grandfathers were present when Rev. Alvord arrived in Nyanyadzi in 1934 and these were the first people to work on the northern bank irrigation (Bolding, 2003). In 1936 another 90 people moved into Nyanyadzi including the returning husbands who had gone to scavenge for food and that influx of farmers to date it is still witnessed in Nyanyadzi irrigation scheme. Notable, during the beginning of the furrow construction there were some 230 Africans in total, including those who were in tax arrears with the government after having taken famine relief grain. This diversity is what makes Nyanyadzi irrigation scheme unique and an equally important space for expansive learning and transformative agency. Diversity in the subjects is one facet of interest to this study. It is because of the diverse knowledge, experiences, values and norms that the farmers have developed over time that made the mediation of the expansive learning and the use of the insider formative interventionist approach possible in this study.

Historically Nyanyadzi subjects have been described as difficult to work with. As narrated in Bolding (2003: 126),

In July 1935 the resident supervisor Sigauke requested the Native Council (NC) of eight workers with food rations to finish work on the lateral furrows,... Sigauke required these workers, since he was of the opinion that the local people often ducked their responsibility... Sigauke was tired of talking to these lazy people.

Ethnographic data drawn from the in-depth interviews with the three generations of the farmers is in support to the claim that Nyanyadzi farmers are difficult to work with. Interviewee FGI 3 posit that,

... farmers were fighting. The day before yesterday farmers fought a lot because of water... it's like the younger generation of farmers, most of them didn't go to school, they don't have respect... these younger farmers are problematic...

Responding to the current system of management, Interviewee FGI 5 said nowadays there is much freedom compared to the past (colonial era)

but the freedom is self-defeating... it seems as if the management (IMC) don't have the power and the farmer who is being led is full of laziness, they lease the plots... Sometimes

if you are not clever, they will want to steal from you. After you grow your tomatoes, they would come by moonlight to harvest and sell to get money for drugs...

The above narratives describe the present some of the dynamics amongst subjects in the irrigation scheme. These narratives support what supervisor Sigauke also referred to in 1935 that the subjects were “lazy”. By general description, the subjects are difficult to work with and this observation is repeated throughout the study findings.

As shown in Figure 4.1 the farmers’ activity system draws on **mediation tools and instruments**. The subjects engage with mediation tools such as water, the plot, and farm inputs to achieve the desired object, in this case improved crop production and marketing under irrigation farming. The desired outcome being to achieve household food security and income. However, as the farmers engage with the mediation tools there is some degree of dissonance, conflict and tension as the access and management of such resources does not come easy. The most prominent problematic activity(ies) in the farmers’ activity system is water and farm input management. Historically, before Rev. Alvord established Nyanyadzi irrigation scheme,

the original inhabitants already lived along the fringes of the river, growing early maize in wetland gardens, a practice known as matoro... some people had already transformed this small scale practice of cultivating in wet places, into some form of irrigation, leading water from the river along an extensive network of narrow furrows (or ridges). This form of wetland cultivation was undertaken in complement to, rather than in competition with, dryland cultivation in the rainy season... The only difference that the scheme presented was its sheer span, both physical, social and temporal (extending the growing season), as well as its rectangular shape (square acre plots, straight lateral furrows) and material features (lining and weir structure). The scheme also differed in requiring collective action, for example, the mobilisation of labour for maintenance activities and some form of co-ordinated approach towards water distribution (Bolding, 2003: 128).

It was only after the Policy on community irrigation schemes (1936) that Nyanyadzi became a government scheme and the plot owners were made to pay five shillings per acre annually towards

the upkeep of the scheme, whilst their labour obligations towards the scheme were limited to emergency repairs only (Bolding, 2003:128). The above-mentioned developments were in the first generation of farming but in the third generation of farming it was different. The coordinated approach towards water management and distribution has become a major source of dissonance, tension and conflict in the irrigation scheme compromising the achievement of the shared object. Historically, it is on record that Nyanyadzi river itself has been a menace to the development of the irrigation scheme and that has stayed the same to date. Poor water management is a prominent manifestation in this study, and this shall be elaborated in Chapter five.

The farmers work in a complex activity system which also involves interacting with other various key stakeholders (neighbouring and interacting activity systems) and together they form a **community**. The community members interact with the farmers through defined tasks and services forming part and parcel of the **division of labour** in the irrigation scheme. The following government departments, the Agricultural Technical and Extension Services (AGRITEX) and the Nyanyadzi Vocational and Training Centre (NVTC) contribute enormously to the farmers' activity. Both are mandated with the provision of farmer education and training to Nyanyadzi irrigation farmers. Through their interactions and internal activities dissonance, tensions and conflicts were evident in the study and again these shall be discussed at length in the next chapter (see Chapter 5). The two activity systems shall also be described at length in the following section.

Other important members of the farmers' community are the Zimbabwe National Water Authority (ZINWA) and the Zimbabwe Electricity, Transmission and Distribution Company (ZETDC) working through its subsidiary branch the Zimbabwe Electricity and Transmission Distribution Company (ZETDC) and lastly the Odzi Catchment. The ZETDC supply the farmers with electricity to pump their water from the Odzi river while the ZINWA provides the water abstraction rights for irrigation and the Odzi Catchment provides specific water abstraction rights from the catchment including Nyanyadzi river, Odzi river itself and all other upper catchment rivers. Lastly, the farmers themselves together with the Irrigation Management Committee (IMC) belongs to the community. Lastly, the Non-Governmental Organizations NGOs that may be working with the farmers through various means and support such as the Southern Alliance for Indigenous Resources (SAFIRE) and Tsuro DzeChimanamani concludes the community.

Notably, the farmers' activity system is more than a social unity and it functions within the common forces of community that includes a patriarchal ideology, the ethical codes of conduct, the cultural and historicity functions as well as the ubuntu ideology. In essence, the irrigation scheme functions under societal and cultural forces that have an influence on the activity of the object. As such the irrigation activity system is in adherence to the gender and social roles that defines a family and abides to gender stereotypical roles. As a result, there is a strong household division of labour in the irrigation scheme. In the family, males are expected to do land preparation work including land tillage using the ox-drawn, watering, conducting pre- and post-harvesting work in the fields. While the women are expected to sow seeds in the actual planting processes, weed the plants and partake much of the post-harvesting processing like winnowing and marketing of the produce.

4.1.2 Nyanyadzi Irrigation Management Committee (IMC) activity system

As described above, the farmers do work hand in hand with the Irrigation Management Committee. The IMC forms an important and fluent activity system in the irrigation scheme. The main **object** of the IMC is leadership and management of the irrigation scheme and their main **outcome** is to promote household food security through irrigation farming. In essence, the IMC leads and represents the farmers in decision making processes and all other matters of concern. Hence, the main activity of the IMC is to provide leadership and management skills to the rest of the farmers thereby, leading, guiding, shaping and giving some direction to the farmers' activity system. The IMC's activity system does not compete neither is it divorced from the farmers' activity system, instead it is complimentary. The IMC's activity system is shown in Figure 4.2 below;

Nyanyadzi Irrigation Management Committee (IMC) Activity system

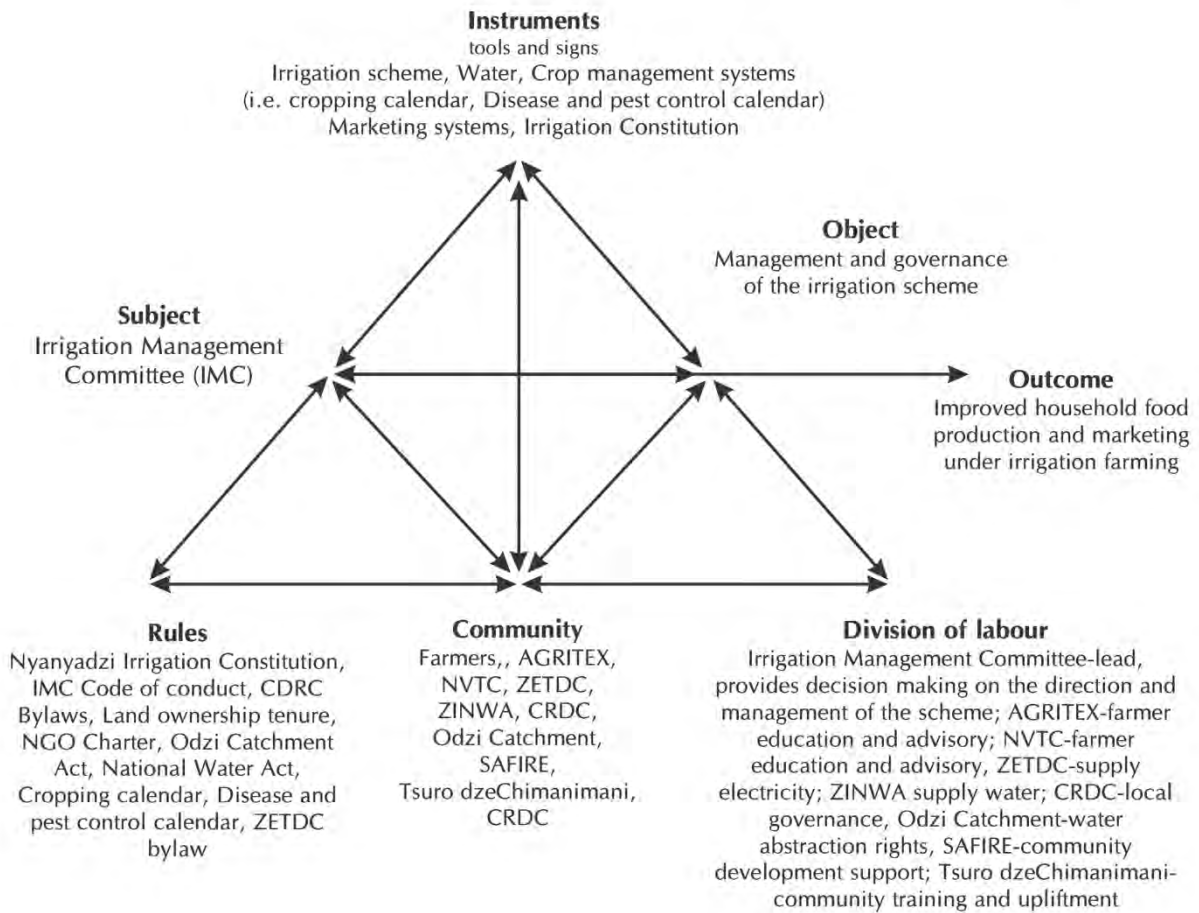


Figure 4.2: Nyanyadzi Irrigation Management Committee’s Activity Systems

Source: Author

As shown in Figure 4.2 above, the IMC’s activity system is made up of the **subjects** whom in this case, are the farmers chosen to represent their other compatriots. Historically, the first plot holder representative committee was put in place in September 1945 allowing the farmers to participate in the management of the scheme (Bolding, 2003: 135). The plot holder representative committee consisted of two plot holders from each block, and the agricultural and community demonstrator as government representatives (*ibid*, 2003: 138). However, after independence things were no longer the same. The spirit of African nationalism and political ploys by incoming members of parliament for Chimanimani district left Nyanyadzi irrigators more rebellious than ever and

resistant to the previous colonial laid policies on water rates. As narrated by Bolding (2003: 200), *The Lancaster House independence negotiations reigned in a new dawn by the end of 1979. The white irrigation manager had allowed Nyanyadzi irrigation scheme to operate on condition that water rates were paid after harvesting the crops. However, when the time of payment was due (April 1980), the kraalhead committee on behalf of Nyanyadzi plot holders refused to pay. Thus, the committee cashed in on promises of free government services after independence, made by freedom fighters during their nightly rallies. This promise had been reiterated by the newly elected Member of Parliament for Chimanimani district during his victory speech, when he suggested that water rate payments should be done away with. The out-going white District Commissioner, however, stood firm and suggested to the new Minister of Local Government to cut off water supplies to the scheme in case the kraalhead committee persisted in its refusal to pay. To resolve the ensuing standoff, a team of government officials visited the scheme in May 1980. Their investigations revealed that the plot holders had a number of grievances regarding enforcement of water rate payment during water scarce years and exploitation by the marketing co-operative.*

Resultantly, the government visiting officers suggested that the existing kraalhead committee must be replaced by a democratically elected farmer committee. This was in line with the new democratic government installed after independence (ZANU-PF), but Ranger (1985) and Kriger (1988) interpreted this move as politically motivated with the intent to facilitate control and strengthen the ruling party over an area that was known for its support to an opposition leader Ndabaningi Sithole. This intent was visible because most of the irrigation committee members came from the local ZANU (PF) party branch in Nyanyadzi.

The newly elected irrigation committee was made of two farmers elected from each block, a chairman, vice-chairman, secretary, vice-secretary, treasurer and three ordinary members. The duties of this Irrigation Management Committee (IMC) were:

- (a) To communicate problems and bring solutions*
- (b) To discuss problems with the irrigation manager*
- (c) To recommend individuals for plot allocation*

(d) To disseminate information among plot holders (Bolding, 2003: 200).

The IMC organogram is shown in Figure 4.3:

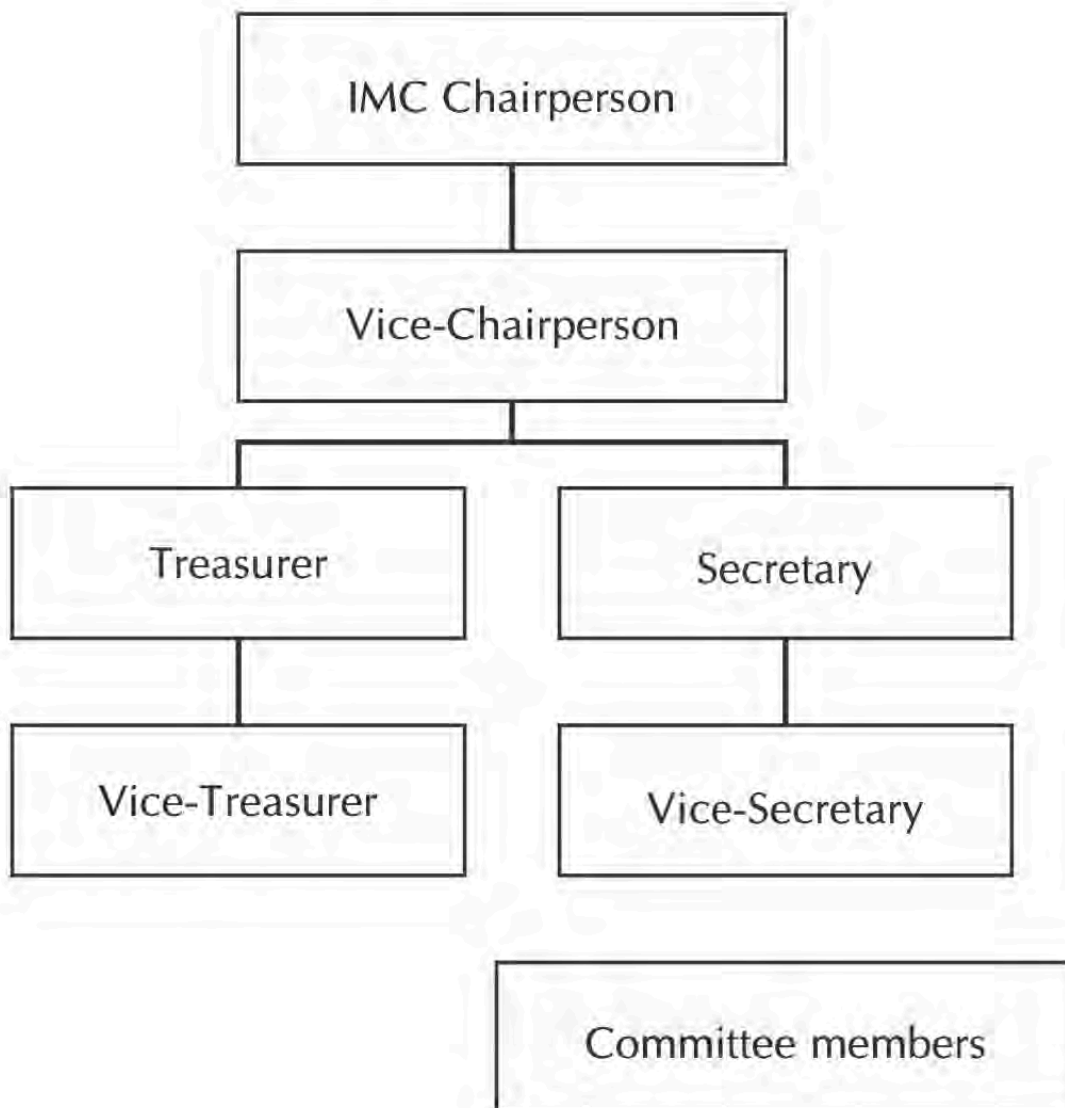


Figure 4.3: Nyanyadzi irrigation's IMC organogram (1980)

Source: AGRITEX Archive Files

It was hoped that the newly elected IMC together with the freshly promoted African irrigation

manager would work together and resolve the outstanding problems in Nyanyadzi irrigation scheme. However, because of the continued resistance and refusal to pay water rates the incoming Irrigation Manager and his extension assistants and water bailiffs were forced to continue the old management style. This left the decisions on cropping programmes, water distribution schedules, maintenance activities and agricultural operations as the prerogative of the Irrigation Manager (Bolding, 2004). In order to instil discipline and maintain order in the irrigation scheme the IMC was asked to draft by-laws that were going to be used. The bylaws were to guide and clearly spell out maintenance of discipline, and the appropriate punishments for violators of the rules. During this period, it was also noted that the IMC were invited into the irrigation scheme meetings only to be told what to do by the Irrigation Manager. This, therefore, means the IMC was just ceremonial and did not have power to influence the management of the scheme. Their involvement and consultations were just a formality, and nothing could change the laid up or predetermined government decisions.

It is also said that the newly elected IMC also did nothing to change the situation and the resistance on water rates continued until the Provincial Agricultural Extension Officer (PAEO) for Manicaland decided to act and he came down to Nyanyadzi irrigation scheme to welcome the new IMC and explain their duties to them. In his speech he laid out the duties as being nothing less than (1) maintaining discipline among plot holders; and (2) encouraging payment of maintenance fees. In his capacity he also reminded the IMC that, *“the committee is meant to assist and never to replace AGRITEX.”* In addition, he also instructed that:

maintenance fees to be paid in full before June 30. All plot holders who have paid in full will be issued with the relevant permits. All defaulters will be given a chance to pay before 31st of August. After that date defaulters will be issued with eviction notices showing Government's intention to act (Bolding, 2003: 203).

To his surprise, when he checked the credential of the new IMC members, all the members owed money to the Government and he instructed them to pay before June 30 or else they were going to be forced to resign and the IMC was going to be dissolved on the basis of indebtedness. In response, just after the PAEO had finished his speech, the IMC told him *“to go home and never visit again”* (Bolding, 2003: 203). In essence, by then Nyanyadzi irrigation scheme was noted to

be the highest defaulter with an outstanding arrears of (Z\$202,521) surpassing any other irrigation scheme in Zimbabwe. Unsurprisingly, to date Nyanyadzi irrigation scheme remains one of the major defaulters owing the ZETDC, the electricity utility company over US\$60 000 and undisclosed amounts to ZINWA and Odzi Catchment, both water utility parastatal companies.

A history of resistance by the IMC and political intervention in favour of the IMC in Nyanyadzi sounds like a fairy tale. It is said on the 11th of July 1989 a meeting was held by all irrigation officers at the AGRITEX provincial headquarters where with concern, they singled out Nyanyadzi irrigation scheme as problematic for defaulting the water rates. In an attempt to resolve this, the PAEO made instructions for a physical exercise which intended to see all the defaulters evicted by force or by withholding the water. The physical exercise went on well in all other smallholder irrigation schemes in the province but at Nyanyadzi it was something else,

at Nyanyadzi the IMC (committee) and farmers refused the physical exercise... The farmers were influenced by the IMC... They uttered bad words against government. That the physical exercise is not government policy. That they are not going to vote in favour of the government in the coming election. That the whole thing is being done by the PAEO and the IM. The whole staff must be removed from the scheme and remain communal. That they will make a follow up to the President. That they have declared war with the oppressors... (AGRITEX Provincial files, Sithole, 1989).

The IMC was said to have sent delegates to meet the provincial chairman of ZANU(PF) and another delegate to the President's office. The ZANU(PF) politicians instructed in the favour of the IMC which saw the Director of AGRITEX bowing down on any operations in Nyanyadzi and the PAEO was forced to repeal his actions (Interviews with AGRITEX Chimanimani district office staff, 1995 cited in Bolding, 2003: 147). Again, this move strengthened the IMC, and it is believed that the government did not want to lose grip on Nyanyadzi community which was heavily aligned to the ZANU-NDONGA, the opposition party led by Ndabaningi Sithole and the Zimbabwe Unity Movement (ZUM) party led by former ZANU(PF) secretary general Edgar Tekere. Hence, this was the best chance to gain and strengthen support from the community. The move by government resulted in disinterest by the PAEO and the Irrigation Manager (IM) while, the IMC became an active farmer body that tried to resolve the scheme's problems by approaching the relevant political

authorities, whilst side-lining the AGRITEX (Bolding, 2003).

Another moment reported was during the 1990-91 season, when the IMC invited the Minister of Agriculture and Governor to force the Irrigation Manager and the AGRITEX into a discussion on the following: “(1) *hand-over of Nyanyadzi irrigation scheme to the farmers; (2) exemption of maintenance fees; (3) construction of a new pumping station to replace the failing old diesel engines*” (AGRITEX Chimanimani District files, 8 February 1991). The IMC successfully managed to influence the local ZANU(PF) MP for Chimanimani district into action and the MP and district (ZANU-PF) party leadership “*repeatedly pressured the AGRITEX to waive payment of maintenance fees and speed up construction of the new electrical pump station on the Odzi river*” (AGRITEX Chimanimani District files, 17 December 1991). This meant that the culture of politicising and indulging political figures in the irrigation scheme’s challenges was incubated successfully. These traits live up to date in the selection and functioning of the IMC in Nyanyadzi irrigation scheme.

It is important to mention that, with the successful roping in of political figures into the management of the irrigation scheme and the continued resistance of the water rates and constant call for payment waivers, the Irrigation Manager together with AGRITEX suffered an internal defeat in the control and management of the scheme. There was never an official handover of the irrigation scheme to communal management but the Irrigation Manager and the AGRITEX staff gave in to the pressure and have little interest in the management of the scheme except on extension work. This made Nyanyadzi IMC stronger and it continues to side-line the IM and the AGRITEX in its functioning.

Moving onwards, the IMC’s roles in the irrigation scheme changed and they became actively in charge of the irrigation management and control. In essence, the IMC roles now include day in and day out engagement with irrigation’s mediation instruments such as water, plots and other mediation tools like the irrigation constitution and other specific committee work descriptions. On a daily basis the IMC are also faced with real situation contradictions that may arise in several connected activities. One of the prominent actions the IMC monitors is the water distribution rosters and these involve daily visits to specific blocks and liaison with the block members and

agreement on the day's watering roster. As Bolding (2003, 148) argued that, "*the story of the making of Nyanyadzi project is one of water. Water has remained the most powerful (f)actor shaping the possibilities and impossibilities for realising the dream. Water acts through its abundance as well as its conspicuous absence.*" Hence, water allocation process becomes one critical action in the activity system and a co-shared responsibility between the IMC, Extension workers and the farmers daily. Due to the prevailing political-economy situation in Zimbabwe and family relationships in Nyanyadzi, accompanied by unscrupulous corruption activities, water as a mediation tool/instrument has been complicated and became a source of high tension, conflict and dissonance in the farmers' activity system. The complication is further complicated by illegal leasing together with complex multiple plot holder arrangements in the irrigation scheme. These manifestations are further described and explained in detail in the sections and chapters to follow.

The IMC's activity system becomes pivotal and important to the survival and progression of the irrigation scheme since it is also the responsible organ that manages the finances of the irrigation scheme. In essence, through the treasurer the IMC manages the finances and are responsible for paying out all the utility bills, flighting and awarding all the tendering systems. Of late this has also been an area of high mistrust, abuse, under reporting and contestation. The IMC's have been constantly shuffled and changed over high allegations of financial misuse, mismanagement and lack of any financial reports, records or accounting. Resultant, the irrigation scheme is reported to be in high debt with the likes of ZESA (in the regions of US\$60 000) and undisclosed amounts of money owed to ZINWA and Odzi Catchment for water abstraction as mentioned above.

The IMC is also responsible for coordinating and managing the government farmer input programmes. Such programmes give farmers planting inputs including seed and fertilisers among others and because the IMC has been running this program having taken the responsibility from AGRITEX, heavy criticism and blame for high level corruption, disappearing of the farming inputs, poor accountability and record keeping is resulting in some farmers over subscribing, and other individual business people receiving the inputs without any reported ownership of a farming plot and most plot holder farmers are failing to receive any of the hand-outs (Pers. Comm, 2019). This has led to the IMC being described as the most corrupt entity influencing the farmers' activity system, hence it has rotated a lot.

The other important thing is that, of recent there has been a deliberate attachment of the IMC to national politics (dominance of ZANU-PF). In essence, there has been a deliberate high political influence in defining the way the IMC members are chosen, how should they be politically aligned and resultantly, there has been high instability in the IMC itself, influencing and interacting with the broader farmer activity system. This has been detrimental to the collective activity and the partially shared object across the activity systems in the irrigation scheme. More deliberations on thus are found in the following sections and in the next chapter.

4.1.3 Government Departments' Activity Systems

Despite the complexities described above, the government has also played a pivotal role in the maintenance and sustenance of the irrigation scheme. It is important to mention that through the Policy on community irrigation schemes (1936) initiated by Alvord the irrigation scheme became government land. By then the farmers were only paying five shillings per annum per Acre as maintenance fee (Bolding, 2004). In essence, the government subsidised all the maintenance work happening in the irrigation scheme. That practice was continued even after independence until recently in the year 2000s when the farmers were urged to take full responsibility. One way the government has been highly active was through the adoption of the Nyanyadzi Vocational and Training Centre (NVTC) and Extension officers providing extension work to most irrigation scheme. Hence, the government has been heavily linked and partakes in the provision of farmer education and training as well as many farmer upliftment programs. In Nyanyadzi irrigation scheme the government has been highly active through its two most important departments namely the AGRITEX and the NVTC. These form two interacting neighbouring activity systems in the irrigation scheme. These two activity systems are described in detail in the below,

4.1.3.1 Agricultural Technical and Extension Services (AGRITEX) activity system

History has it that the agriculturalist (extension services) as they were called then, were part of the irrigation scheme from its onset. Between 1945-1949 it is believed that with the increase in the number of plot holders there was an “*elevation of Alvord's men to a fully-fledged Department of Native Agriculture, seeing a stormy increase in the number of government employed staff at*

Nyanyadzi, as well as a flurry of measures aimed at controlling and synchronising the agricultural operations of a multitude of plot holders” (Bolding, 2004: 140). Notably, in 1947 the staff at Nyanyadzi comprised one European Land Development Officer, one irrigation supervisor, two agricultural demonstrators, one building supervisor, one community demonstrator, and three senior instructors at the school of agriculture (ibid., 2004: 142).

Bolding claims that, *“this heavy presence of the state (nine staffers) at Nyanyadzi (13) reflected the importance of irrigation, and Nyanyadzi scheme in particular, as object of state intervention ” (ibid., 2004:142). His claim was also shared by Interviewee FG1 who also claims that around 1942s “that’s when we started to grow crops... but the government was not much involved because Rev. Alvord was in charge... the government heavily intervened by employing more Extension workers. The government started employing Extension workers around 1947-48 but mostly 1947 that’s when the government became more intervening,”*

The Agricultural Technical and Extension Services (AGRITEX) is a government department established just after independence (1980), its main mandate is to provide farmer education, training and extension services. The Extension workers’ activity system is presented in Figure 4.2,

Nyanyadzi AGRITEX Activity System

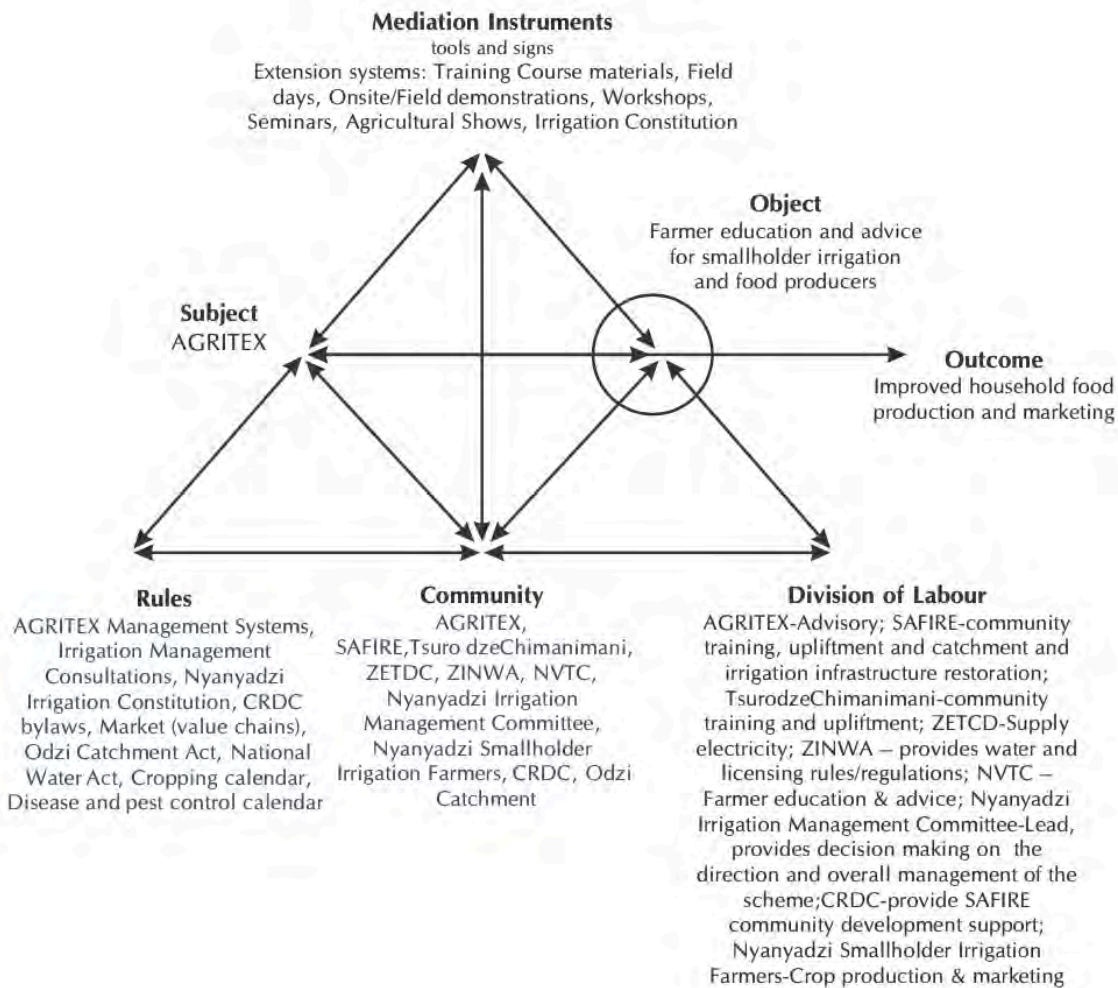


Figure 4.2: AGRITEX management activity system

Source: Author

It's not a secret that the Extension workers' activity system is composed mostly of the Extension officers and the Irrigation Supervisor and together they form the **subjects**. The Extension officers engage with the Extension systems which includes training course materials in the form of the Farmer Education Certificate which was run as early as the 1940s in the study area. They also used to work on demonstrations at Training centre plots for demonstrations with the farmers and now have resorted to onsite field demonstrations. The Extension workers have engaged the farmers in workshops, seminars and took advantage of field shows as a learning space. Lastly, the Extension

workers work in the framework of government contracts of work making them strictly civil servants and they are also guided by the irrigation's constitution in their conduct with the farmers (**rules**). In essence, they are upheld as the highest custodians of Irrigation constitution by implementing some sections and enforcing some of the elements of the constitution. They also monitor and supervise fulfilment of the tenants of the constitution.

In exercising the above, the Extension workers are believed to fulfil their object that is to provide the farmers with farmer education and training and thereby, achieving an important outcome that is improved household food security and best agricultural practices in the Irrigation scheme. Their object is described to be close to the farmers' activity system and they are said to have a partially shared object with the farmers that is around crop production and improved marketing to achieve household food security. Although the two neighbouring activity systems' activities may differ and their mediation tools as well but, the desired outputs and objects are closely related. This makes the two activity systems inseparable or dependant on each other.

Over time their activity has been known to be shifting. In the past as the irrigation scheme was established the Extension officers were inseparable to Rev. Alvord's plans in Nyanyadzi irrigation scheme. As posited by Bolding (2003: 150) "*by the time Alvord embarked on the MuNyanyadzi (now known as Nyanyadzi) project, he and his team of demonstrators had gained seven years of experience in working with reluctant African cultivators and doubtful administrators.*" The Extension workers then, were called by varying names including agricultural demonstrators, community demonstrators, senior instructors and demonstrator trainees, but in essence, they referred to what we now call Extension workers although I understand that their roles differed significantly depending on the title given but all together formed the extension work function.

According to Bolding (2003) the early extension work advocated for learning-by-doing. He argues that "*in this case they were learning about the force and behaviour of the Nyanyadzi river, seeking to counter every move of the water by mobilising new allies (cement, reinforced weir, financial resources, labour force), thus expanding the network*" (ibid., 2004: 148). However, Chambers (1969: 219) described early extension work by Alvord and his staff (Extension workers) by describing the articulation of the irrigation policy and the refinement of technologies of water

control through his extension workers as “... was not so much a result of a conscious strategy or 'natural sequence of activities', but rather a response to undesirable outcomes produced by the constituent elements of the network including the users.” In addition, Bolding (2003) also claimed that Alvord’s gradual increased management of the irrigation scheme was not by plan, but also in response to the local events.

He and his staff did so by realigning and re-ordering the social and material elements of the network, thus devising increasingly refined procedures for prescribing, monitoring and directing the behaviour of its critical elements, i.e., water, plot holders and crops. When the plot owners refused to repair the faltering infrastructure, water rents were instituted, in the process transforming Africans into plot holders in a government project. In response to opportunistic millet growing by plot holders Alvord devised the 1939 irrigation policy, further refining their obligations as full-time irrigators. One effect of this ongoing re-alignment was that the network became more distinctive. The Nyanyadzi water-network became a bounded entity, literally fenced off from its surrounding environment, forming a self-contained modern agricultural society that provided an alternative to the traditional African kin-based society (ibid., 2004: 150).

Bolding further claims that, in order to

effect this transformation, Alvord skilfully applied a number of translation strategies, overcoming resisting obstacles (trees, stingy Administrators, doubtful Engineers, reluctant lawyers) and enrolling new elements into the network (cash crops, European supervision, experiment station) (2004: 150).

One concept that was developed early in most of the irrigation schemes under Alvord was the demonstration concept. In his autobiography Alvord said upon his arrival at Mt Selinda mission farm in the 1920s he identified that the mission’s farm could not maintain because of the “*wasteful, destructive agricultural practice of shifting tillage*” (Alvord n.d. cited in Bolding, 2004: 41). Hence, in November 1920 he started practicing improved methods of agriculture on the six-acre school plot. Four of the plots were under crop rotation and the other two on cattle manure fertilisation. When the people of Mt. Selinda saw the produce they said, “*Mtakati, Uroyi and muti*” meaning it is the “*magic of the whiteman.*” Reflecting this experience in his autobiography from his own colonial and racially biased gaze Alvord said,

It was then that I made my prodigious discovery (...) that in spite of high qualifications and experience, a white man could not teach agriculture to the superstition steeped African who attributed high crop yields to "muti", witchcraft and favour of the ancestral spirits. I concluded that it was impossible to Christianise the Africans without, first of all intellectualising their agricultural practices, so filled with superstition, ignorance, witchcraft and worship of the unknown. I must create in them wants and desires which would automatically lift them out of the sea of superstition and fear, which engulfed them. I made the discovery that the African must see things demonstrated on his own level, within his reach, by Demonstrators of his own black colour and kinky wool, and before we could successfully preach to him the Gospel of Christ, we must first preach to him the "Gospel of the Plow" (Alvord n.d. cited in Bolding, 2003: 43).

Thus, it is through this colonial gaze that the demonstration method began. In June 1921, the first African Demonstrator was appointed at Mt Selinda mission. Another famous extension approach Alvord used was called “seeing is believing approach” in which he used an example of Mr Mvundhlana, an African farmer who was in Tjolotjo, who had taken up the advice of winter ploughing under the guidance of demonstrators in training in 1925 and reaped a bumper harvest, whereas his neighbour Mr Makothliso reaped nothing (Bolding, 2003: 48). Alvord always used this example to convince farmers and administrators to adopt his sustainable and better methods of farming. Another way was also through the “winners and losers concept” in which he conceived the idea of competition among the farmers. He believed after seeing a winner in the system the next farmer is compelled to copy and compete with the winner and this way the better methods of cultivation increase and spread among the African irrigators/farmers. It was also out of his courtesy that whenever a farmer harvested well under the demonstrator, Alvord himself would take his audience to the maize field, and went on to ask, “*You can see with your own eyes what these mealies are, and you can touch them with your hands. Do you now believe it is possible to grow mealies like this*” (Alvord 1928, 42). This was a way to convince the farmers that demonstration system works and to convince the African farmers that farming has nothing to do with witchcraft or their superstitions. However, cautioning the ideology of demonstration as a method adopted in most irrigation schemes including Nyanyadzi and as was also developed into the Master Farmer programme, Darrel Plowes, the former Manicaland Provincial Agricultural Officer from 1956 to

1982, pointed out that,

you find a progressive individual and you concentrate your efforts on this individual. You get him up to a high standard. He will influence all the others. They learn from him. Say you got a ripple effect. Gradually knowledge spreads out to the rest of the community. But what Alvord didn't realise, and most other people didn't realise, and I certainly was amongst them to start with, was that in African society here things don't work that way. We time and again find a chap has been doing well, brought up to master farmer standard, been farming nicely for just a couple of years and suddenly relaxes. People couldn't understand this (PC files, 2 July 1969).

Whereas in the European context the success of one person triggers the ripple effect which Plowes describes as “*keeping up with the Joneses*” in contrast having worked within African he discovered that progression of one farmer is associated with witchcraft and in a nutshell Plowes said,

I realised that the master farmer scheme was not going to be the full answer to getting everybody coming up. They do not keep up with the Jones's, they pull the Joneses back into their ranks. When we really appreciated that, that was when I was then trying to change our approach here and go for group activities. (...) I thought hell! What you got to be doing is to make everybody a Jones simultaneously. Get them all working together. (Interview with Plowes, 30 November 1996 cited in Bolding, 2004: 67).

Plowes' idea was said to have been adopted from the film “Food or Famine” which was created by the Shell company and the idea was extensively used in extension work in the 1960s. This learning methodology was said to have been further developed into the formation of Master Farmer Clubs in 1967 which started in Masvingo province and later spread on to Manicaland in the early 1970s. Master Farmer Clubs were aimed at promoting farmer-to-farmer extension and allowed the numbers of master farmers to grow. They promoted the idea of group work and allowed for easy diffusion of innovations amongst homogenous segments of society and development of communities. By 1975 it was believed that there were 50 Master Farmers' Clubs in Manicaland but with increased hostility the movement had a premature end (Plowes, 1980,198). Bolding (2003: 74) believed that the “*upscaled and standardised master farmer training, field days, and agricultural shows*” were all used to demonstrate and celebrate the effect of the master farmer

approach to learning. This shows the high emphasis on demonstration approaches in the teaching and learning of sustainable agriculture that was adopted and dominated in irrigation schemes, Nyanyadzi being one of them.

Interestingly, when Alvord incubated his demonstration methods into teaching and learning also known as “learning by doing,” later the “seeing is believing” approaches and lastly, the “winners and loser” approaches he conceptualised demonstration teaching in three ways. Alternative 1) A demonstration plot- where the demonstrator(s) work on a small area of land which he/they will *“retain and work as a demonstration farm or native garden, and on which will be established demonstration plots where he can illustrate the natives of the locality the proper methods of crop culture, and, as his time permits visit and advise other natives living in the area on better farming methods.”* Alternative 2) Partnership- the demonstrator does not own any land but *“select in his area a certain native willing to give a portion of his land to be worked by the demonstrator, who would work this land for 1 or 2 years alongside the ordinarily worked land of the resident native and would then pass on to another similarly selected native farmer elsewhere in the Reserve.”* Alternative 3) Agricultural Advisor- *“locate the demonstrator in a reserve where he will merely go about as agricultural advisor, advising the various native farmers on better methods and showing them how to do the different operations properly, but not actually himself working any land as a demonstrator”* (Alvord n. d. cited in Bolding: 43).

Notably, in Nyanyadzi irrigation scheme the extension workers have wandered around the first and the third alternative to demonstration and these approaches to learning have yielded different but desirable results for both the irrigators and the extension workers although they had also varying challenges associated as well.

Extension work in the pre-colonial and post-colonial period was different for various reasons. After independence in 1980 things changed. Poulton, Davies, Matshe, and Urey (2002) claim that after 1980 there was a strong motive to redirect extension services to the smallholder sector, but in the 1990s a considerable decline in the government expenditure on extension workers was noted. Chisvo (2000), reveals that between 1994-95 the real per capita spending on agricultural support services (AGRITEX, Veterinary services and the research service DR & SS) was 26% lower than

the peak between 1990-91 (Jansen & Rukovo 1992). Up until now, attempts have been made to lower staffing levels in the AGRITEX resulting in reduced recurrent expenditures such as travel costs, training costs and this has reduced the effectiveness of the extension services. Bolding (2003) has also reported on high brain drain among the extension officers in the 1990s, because of their high involvement with donor work. Most extension workers were reported to have joined the leading consultancies and donors as field officers.

It was also noted above, that after independence there has been a high level of contestation over the management of the irrigation scheme. With the assistance of political figures, the IMC and the irrigation farmers managed to establish a different working system that is known for side-lining the AGRITEX authority (see Section 4.1.2). Despite the insurgencies in the early 1993s the government through the AGRITEX attempted to regain control of the irrigation scheme. A newly trained Agricultural Extension Officer (also known as the Irrigation Manager) was deployed at Nyanyadzi irrigation scheme. It is said the first two things he requested were, a) a class A evaporation pan to use for water scheduling and b) an official policy document in regard to the management of the irrigation scheme. But by that time both were non-existent, so he decided to draft his own policy together with his **Nyanyadzi** extension officers in two separate meetings (Bolding, 2004). Noted, in his first two meetings with the extension officer was that the farmers' discipline has improved since independence, and secondly, the AGRITEX could not stick to the "stick method", which was used by the whites because they lacked support from the top political party officials. Hence, the following reforms were put in place, a) the extension workers had to work closely with the Block IMCs b) farmers were no longer allowed to visit the office unless they had clearance from their block extension officers c) a workable farmers' and manageable committee members were to be selected in order to curb disciplinary behaviours by the Block IMCs d) the IMC was barred from communicating directly to the Provincial Officers. One more thing, it was also noted that the IMC did not enforce bylaws itself, but rather sent the water bailiff, without providing proper backing. It was therefore decided that the Extension officers should be responsible for the follow-ups.

All in all, it seems that in Alvord's success in turning the Nyanyadzi irrigation scheme into a bread basket, the Extension workers were instrumental in this achievement, but with time the same

results did not yield the same methods hence there has been constant changes in the object and motive of the object over the time. This historical understanding is important in understanding how the shift in the object and the expansion in the object influenced changes and modifications in the extension work activity. This dynamic shows how activities constantly shape the object and vice versa. Hence, such an understanding is important since this study also argues that understanding the historicity can help in surfacing and responding to contradictions in complex interacting activity systems. The AGRITEX activity system showed that it is an important activity that has also over time been collectively changed by the farmers' activity system and in response its object has also been reshaped together with its activity.

In the modern Nyanyadzi irrigation scheme the AGRITEX activity is seen to have been influenced and shaped by many factors including partisan politics, resistance by the irrigation IMC together with the farmers and lastly, changes in government policies over the smallholder irrigation schemes. From my understanding and observations, the main object of the AGRITEX has not changed at all, but there has been a reshaping and change in some aspects of the activity itself. A movement from Alternative one of the demonstration processes to Alternative three of demonstration can also be visualised in the activity itself. As noted by the following interviewee with FGI 1:

Scenario 1

Researcher: So, when you arrived here before independence as a farmer were you taught any farming through your interactions and working with the Extension workers in the irrigation scheme?

FGI 1: Yes, we learnt a lot, because they used to teach us on things like manuring, plant spacing...

Researcher: So, at most what did they teach you?

FGI 1: On planting, they would call us to the demonstration plot and would teach us there.

Researcher: Okay so there were some demonstration plots?

FGI 1: Yes, they (Extension officers) would call us there, and they would demonstrate how to plant.

Scenario 2

Researcher: But, now as farmers are you still being taught by the Extension officers on how to farm?

FGI 1: Yes, we are learning, but it's now when maybe there is a new variety of seed but yes, there is still some teaching happening... the Extension officers sometimes call us as a Block and teach us on the new variety of a seed...

From the above narrations it can be noted that, the learning pathways in the first scenario is visible and it was by demonstrations “learning by doing,” and “seeing is believing” which was very much captured in the Alternative 1 of the teaching and learning approach introduced by Alvord which was adopted in the colonial era. Whilst, in scenario 2, hesitation can be felt from the Interviewee FGI| 1 on the current learning pathways. This shows the shift in the activity from a demonstration plot teaching approach to the Alternative 3 teaching approach of Agricultural advisory service provision. In the latter, there are strong assumptions to teaching and learning and the assumption was also explained by Participant E3 in the Change Laboratory Workshop (CLW) held on the 20-22 of August 2019. He said,

Yes point taken...what you have said is good, there is a point I want you to understand, in our extension work, I will give you an example if you are a farmer and want to grow a new crop we encourage you to first come to the Extension officer and discuss your mind... But current farmers start by growing then when faced with problems they will come to the Extension officer... Then number 2 on the issue of diseases and pest resistance... As extension officers we advise the farmer to consult with the Extension officer first on the pesticides to use...

Participant E3: My work (Extension officer) is to tell you what to do, so if I tell you to burn and if you don't, it's up to you. So, I am saying today's extension work is different from colonial extension work. The extension work that was done by the late Mr. Mushiri was real extension work because they would force you to comply but now, we beg you to comply.

Researcher: I still have a question, what has changed that we can say the extension colonial era and the post-independence era are much different?

Participant E3: Alright, I would say from the history I know in the past the Extension officers

were called demonstrators because they were believed to be teaching a farmer who didn't know anything at all. But, the farmer of today is different, amongst the farmers some know pesticides better than us... So, today's farmers are educated some have reached form four (Ordinary level), some are technicians, and some are mechanics by professional. They are more knowledgeable than us so, were told from our training that the farmer we are dealing with is knowledgeable of farming already...

Participant E7: *Yes, we heard your question, the issue is that we are supposed to go to the farmer to ask on his intended planting dates and the variety of seed intended to be grown. And ask to use for permission to invite the Block members for a demonstration at his/her plot on his/her intended planting dates because we don't have anything, we are getting these days. We don't have anything even a book or pen we don't have.*

Researcher: *But as AGRITEX don't you have demonstration plots?*

Participant E7: *At the moment we don't have.*

Researcher: *Where did they go?*

Participant E7: *we had them close by, but they were taken during the land distribution process (Land Redistribution Process or Land Fast Track, 2002).*

So, as reported by Participant E3, they assume they are now teaching a farmer who is knowledgeable. This assumption takes a positive approach to all forms of learning and does not necessarily mean all the farmers went to agricultural college or training. It also takes cognizance of other forms of learning like learning by socialization, learning by doing and sometimes the “winners and losers” concept introduced by Alvord. However, this assumption while recognizing farmers knowledge also has dangers if unexamined and has somehow led to many multidimensional complexities that are currently manifesting in the irrigation scheme, some of which shall be discussed in Chapter 5 and 6 that follows.

4.1.3.2 Nyanyadzi Vocational Training Centre (NVTC) activity system

Historically, we start to hear the mentioning of the Agricultural School in Nyanyadzi in 1947. The establishment of the Agricultural School was said to be a relief to labour scarcity in Nyanyadzi irrigation scheme as “*the ex-servicemen and third year demonstrator trainees at the newly*

established school of agriculture... were required to work the departmental irrigation plots, and assist in constructing staff quarters and furrow extensions, as part of their curriculum” (Bolding, 2004: 143). Nothing much is mentioned about the Nyanyadzi Vocational Training Centre (NVTC) shortened as Nyanyadzi Training Centre by most local people. However, I conceptualise the NVTC with the modest understanding and historicity that has been available to me. The NVTC activity system is shown in Figure 4.3.

Nyanyadzi Vocational Training Centre's (NVTC) Activity System

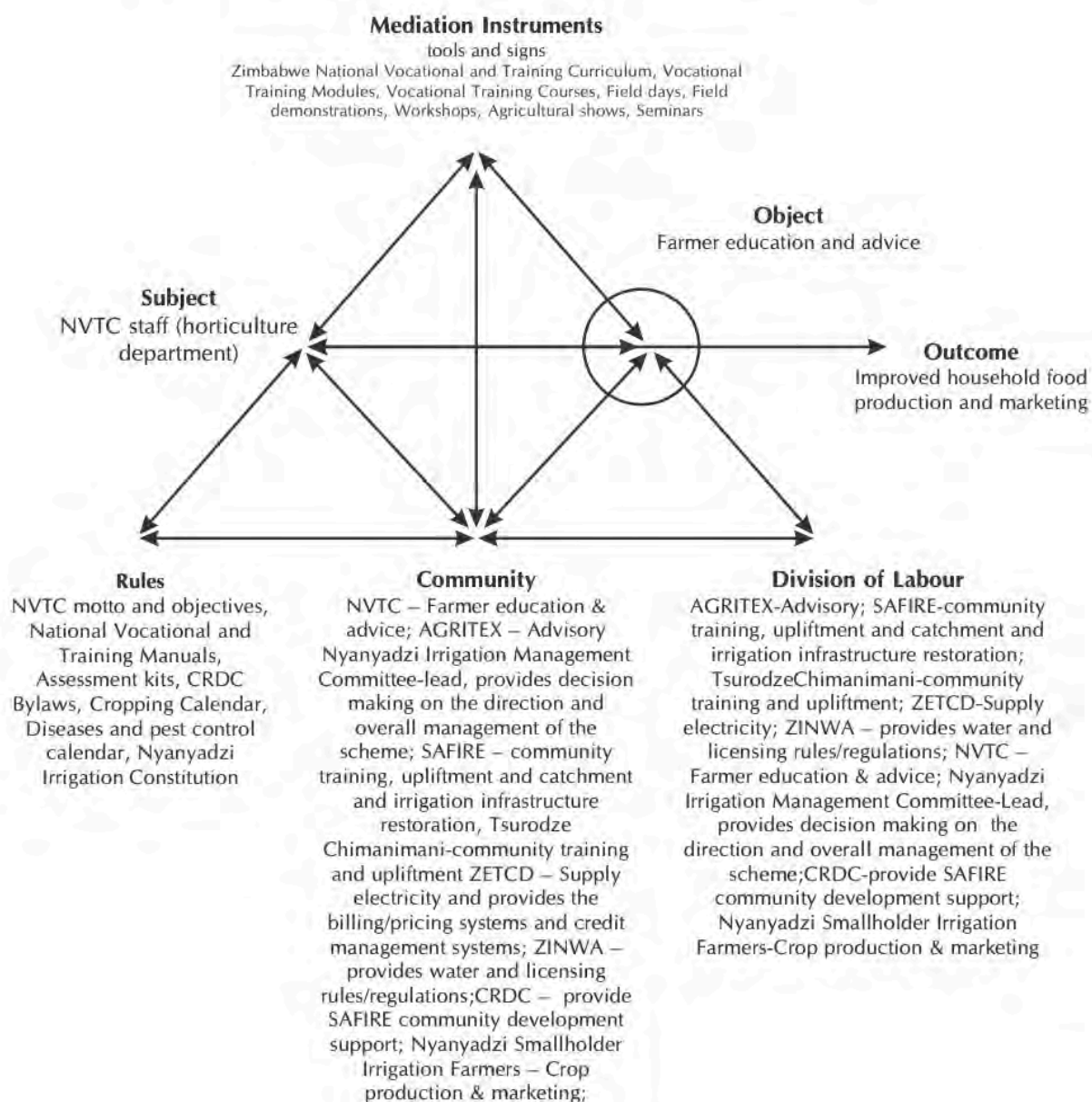


Figure 4.3: Nyanyadzi Vocational Training Centre (NVTC) activity system.

Source: Author

In 1994, the Cabinet of Zimbabwe approved the Training for Enterprise (TFE) programme. The TFE programme was conceived as a development project to support the reorientation of the Government's Youth Training Programme (YTP) in order to increase the number of entrepreneurs

in rural areas as well as to absorb most youths who could not get enrolled into the formal tertiary education institutions due to a number of reasons, including those who would have failed to obtain five 'O' level subjects. Initially, Vocational Training Centres (VTCs) were under the Ministry of Higher and Tertiary Education.

The Nyanyadzi training centre as it is known to many was started in the 1930s, and in 2005 more departments were added, these being clothing technology and horticulture. With 87 graduates in 2011, the NVTC was facing challenges such as shortages of manpower, had no substantive principal due to post freezing by the Public Service Commission (PSC), no vehicle for transport services along the 99 km to and from Chipinge, and obsolete and inadequate tools and equipment. The NVTC also reported to the committee that it was continuously losing much of its land to communal dwellers who were taking college land (Parliament of Zimbabwe, Tuesday, 15th May 2012).

Having mentioned the above it is important to emphasize that the NVTC is a critical activity system whose **object** is to increase entrepreneurs in rural areas which sought to serve Nyanyadzi communal area (**community**) well. Through its agricultural Horticulture Department, the NVTC horticulture staff members (**subjects**) engage with mediation tools such as the Zimbabwean National Vocational and Training curricula, Horticulture vocational and training modules and courses in their daily execution of their duties. They also attend agricultural shows, field day shows, farmer training workshops like the one we were hosting for the purposes of learning and exchanging learning and draw on their professional experience as part of their **mediation tools and instruments**. The main **activity** NVTC horticulture department engages in is theoretical and practical teaching and learning of agriculture concepts. In essence, the Horticulture Department's **outcome** is increasing agricultural entrepreneurship among rural community members. Understanding their outcome in such a way indicates that indeed they have a partially shared object with the Nyanyadzi irrigation farmers' activity system whose object is to improve crop production and marketing under irrigation farming and whose intended outcome is improved household food security and marketing.

It is therefore correct to say that despite being forgotten in most literature and publications

pertaining to the Nyanyadzi irrigation scheme, the NVTC plays a critical and crucial role in the direct and indirect sustenance of the irrigation scheme. Despite losing its positionality as one of the most important stakeholders in the irrigation scheme, NVTC's **object** shapes and improves (or has potential to) the farmers' activity system. It is, therefore, important to understand that some issues of neglect of the NVTC were raised by the farmers in the CWL despite much emphasis of its importance amongst the first generation of farmers. Also, a close quaternary contradiction between the intersecting complex object(s) of the farmers and the technical advisory organs (AGRITEX & NVTC) was also reported (see Section 5.2.4) and much was also explained in the history of the object (see Section 4.2). Seeing the potential invested in the NVTC on farmer education and how important it is as an interacting activity system and a close stakeholder, the NVTC was invited to the three day farmers' Change Laboratory Workshop (CLW) (20-22 August, 2019) and the NVTC was asked to host the CLW.

4.1.3.3 Zimbabwe National Water Authority (ZINWA) activity system

The Zimbabwe National Water Authority (ZINWA) is an outcome of the National Water Policy and Strategy (GOZ, 1995), which was aimed at re-distributing water access, commercialising government departments which were involved in the management of water and involve the water users in the development and management of water on a river basin/catchment scale (see Section 1.5.1.1). Also supported by water Policy and Strategy instrument, the Water Act (GoZ, 1998) which was established to enforce the water reforms and privatisation of the Department of Water Development (DWD). In essence, ZINWA is a government parastatal which was established in 2000 after the amalgamation of the then Regional Water Authority and part of the DWD. ZINWA therefore became the first commercial parastatal agency to provide water services on a cost recovery basis.

However, in this study ZINWA is the second mentioned interacting activity system to AGRITEX. This is because the ZINWA's **object** is to provide water services at an economic recovery basis as mentioned earlier on. Hence, its **mediation tool** in this case which is water is also the most sought after mediation tool in the farmers' activity system. Absence of this tool means the whole irrigation scheme is a failure. Therefore, it can be safely said ZINWA is one of the critical stakeholders in

the Nyanyadzi irrigation scheme. Some of its mediation tools are the pricing and debt collection instruments. The ZINWA officers (**subjects**) are normally located in the areas where they provide water and are responsible for the monitoring and general maintenance of the pump houses together with the users. They also issue water rights permits on behalf of ZINWA and record, report and distribute the monthly bills to all stakeholders.

In executing its role and duties the ZINWA is guided by the following **rules** namely, National Water Policy and Strategy (1995) and the Water Act (1998) as well as the local bylaws. The **outcome** of the ZINWA is efficient water supply and this as said earlier, is particularly important to Nyanyadzi irrigation scheme. It is not by chance, that water has been a contested mediation tool, much has been covered in Chapter two and the history of the object (see Section 4.2) on how over the years from colonial era the irrigation schemes have been problematic when it comes to water rates payments. Nyanyadzi was and is still not the only one. It is on record that the AGRITEX and the government have clashed with the farmers several times on the issue of water rate payments (see Section 4.1.2). as mentioned already Nyanyadzi irrigation scheme is believed to owe several thousands of dollars to ZINWA (also see Analytical memo1 in Appendix Z). The ZINWA activity system is shown in Figure 4.4 below:

Zimbabwe National Water Authority's (ZINWA) Activity System

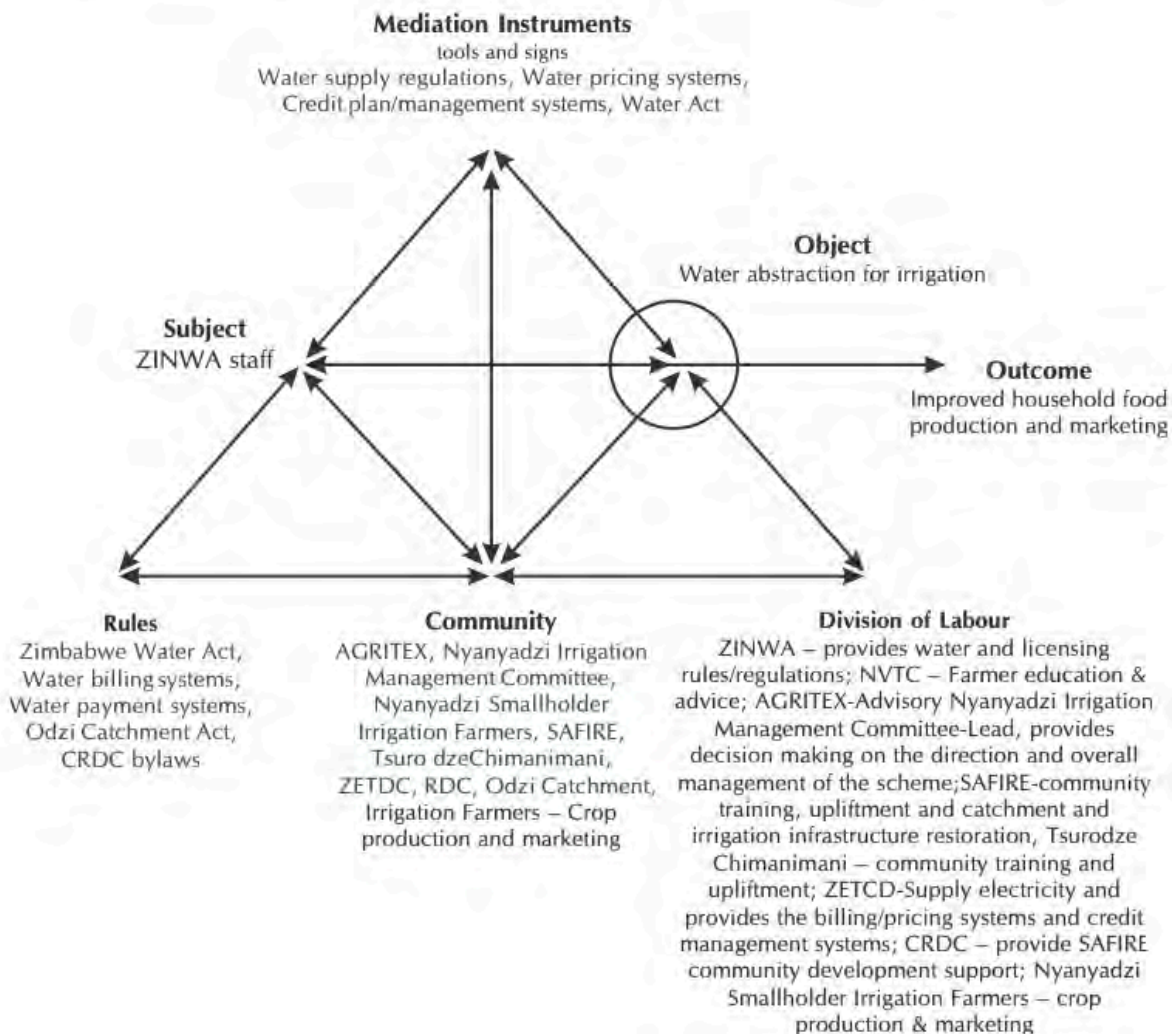


Figure 4.4: ZINWA's activity system.

Source: Author

4.1.3.4 Zimbabwe Electricity Transmission and Distribution Company (ZETDC) activity system

Zimbabwe Electricity Transmission Distribution Company (ZETDC) a subsidiary of the Zimbabwe Electricity Supply Authority (ZESA) Holdings, is one of the important stakeholders interacting activity systems in the Nyanyadzi irrigation scheme. The **object** of the ZETDC is power

distribution and supply, it is essential to understand that ZETDC is just a power supply branch of ZESA whilst the ZESA is responsible for the generation of electricity. Hence, in its activity the ZETDC staff (subjects) work with **mediation tools and instruments** like the power supply grids and billing systems, credit plan or debt management systems. One of their **outcomes** is uninterrupted and efficient power supply and this is one of the mediation tools (decidedly) that Nyanyadzi irrigation system relies on to supplement low water discharge in Nyanyadzi river as well as in times of high-water network system upgrades or damages. A good example is in times of floods and droughts. The former has resulted in silted canals hence, desilting must be manually done whilst the later causes low discharge hence a need for more water from the Odzi catchment reservoir.

There is no doubt that the efficiency of this stakeholder results in the fulfilment of the farmers' activity as well. However, there has been complexities between Nyanyadzi irrigation scheme and the ZETDC company because of overdue debts. The debts have accumulated for various reasons, some of which are discussed in Chapter two, but this will be discussed further in Chapter five and six. The ZETDC activity system is shown in Figure 4.5:

Zimbabwe Electricity Transmission Distribution Company's (ZETDC) activity system

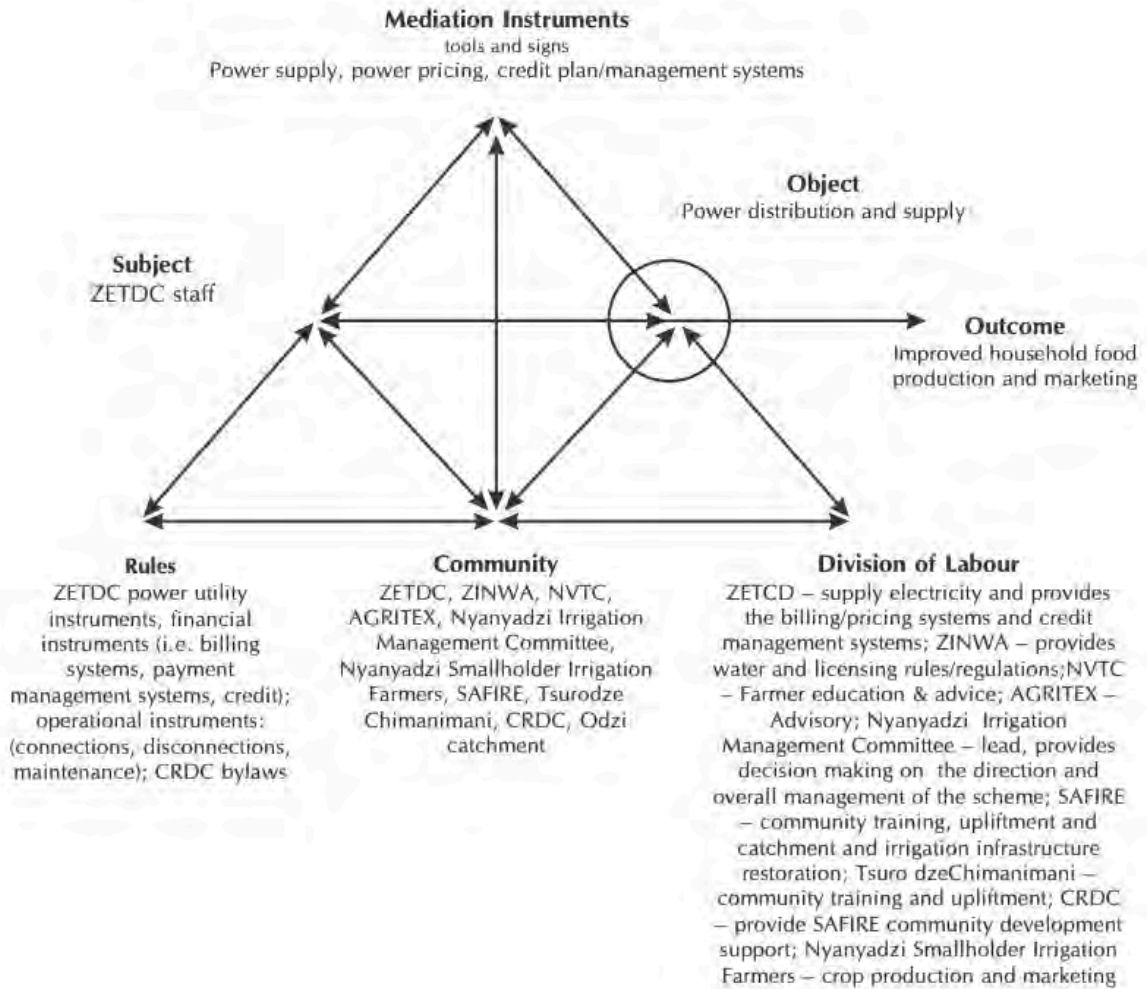


Figure 4.5: The Zimbabwe Electricity Transmission and Distribution Company (ZETDC) activity system

Source: Author

4.1.3.5 Chimanimani Rural District Council (CRDC) activity system

Chimanimani Rural District Council (CRDC) is the local council board that governs Chimanimani district council. Chimanimani District is one of the smallest in the South East of Manicaland province, boarded by Mozambique in the east, Mutare District in the north, Buhera District in the

west and Chipinge District in the south. In size, the district is estimated to cover an area of 3 450.14 square kilometres. The major **object** of the CRDC is to promote rural development in their areas of jurisdiction through the provision of social and infrastructural services. Thus, part of their intended outcome is a partially shared object with the farmers' activity system that is to promote household food security and improved marketing. In essence, their main function is to make sure the rural persons are uplifted, and their lifestyles have improved as well. Hence, they play a major role in the development of rural areas. It is not by chance that they are a key stakeholder in this study. It must be understood that every rural project that operates in a district is under the jurisdiction of that local rural council hence, it operates under the bylaws of that council. In this case Nyanyadzi irrigation scheme which is in ward 8 in Chimanimani district.

The CRDC operates under the Rural District Councils Act [Chapter 29:13] which can be safely referred to as the main **rule** and it is formed by members of the council (**subjects**) who are elected by the **community** into the respective positions. They work according to the bylaws (mediation tools and instruments) to enforce laws and collect levies for operations and management of their jurisdiction. They are responsible for all the internal affairs of the district and the District Administrator resides as the head of the council and gives all the directions. It is also correct to say all the district state land is owned and managed by the council hence they have the last say when it comes to evictions and allocations of land. This activity system is of importance to this study although it may seem like it does not have a direct influence or impact on the farmers' activity system. The farmers are expected to pay levies which are sometimes referred to as lease agreements in this study. The CRDC has a 99 year lease in place with the Nyanyadzi irrigation scheme hence they own and control the land. The CRDC activity system is presented in Figure 4.6.

Chimanimani Rural District Council's (CRDC) activity system

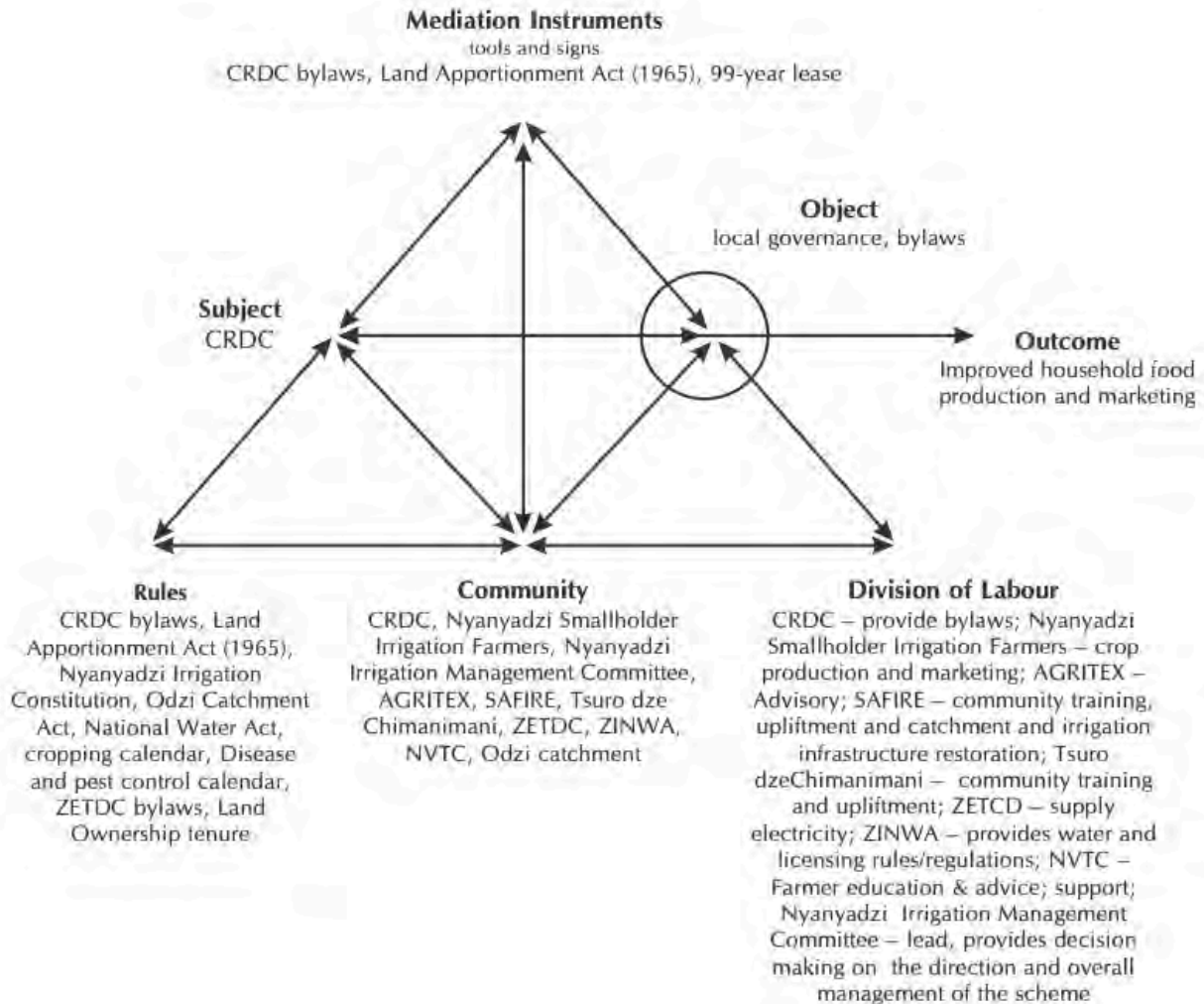


Figure 4.6: The Chimanimani Rural District Council (CRDC) activity system

Source: Author

4.1.3.6 Odzi Catchment's Activity system

According to Kujing (2002), water Catchment councils were formed in the country's eight major river basins. The water catchment councils were constituted of all the stakeholders and involved them actively in the allocation of water permits and development of new (irrigation) infrastructure (*ibid*, 2004). However, there is nothing much known on the Odzi Catchment from the study

participants themselves. The only things that I picked from the CLW is that it is an important activity system that supplies water abstraction rights and permits from the Odzi catchment. Literature shows that there are seven catchments in Zimbabwe and Odzi catchment is one of them (Bolding, 2003). It was only in the below conversation that clarity was sought on Odzi catchment:

Researcher: For interest's sake, I have a question on number 11, it is said ZINWA charges/Odзи catchment charges. What support do you give as ZINWA or towards the maintenance of the infrastructures and how different are you from Odzi catchment?

Participant W6: we are different from Odzi Catchment...

Nothing more was explained in the CLW and no one happens to know exactly what this organization does. This clearly illustrates the ignorance among the IMC and farmers when it comes to Odzi catchment yet, they must be paying abstraction water rights and rates to Odzi catchment and keeping their rates up to date. However, even, though little is known about Odzi catchment it is an important, supporting and interacting activity system that also influence the activity of the object (at least partially). The Odzi catchment's activity system is presented in Figure 4.7.

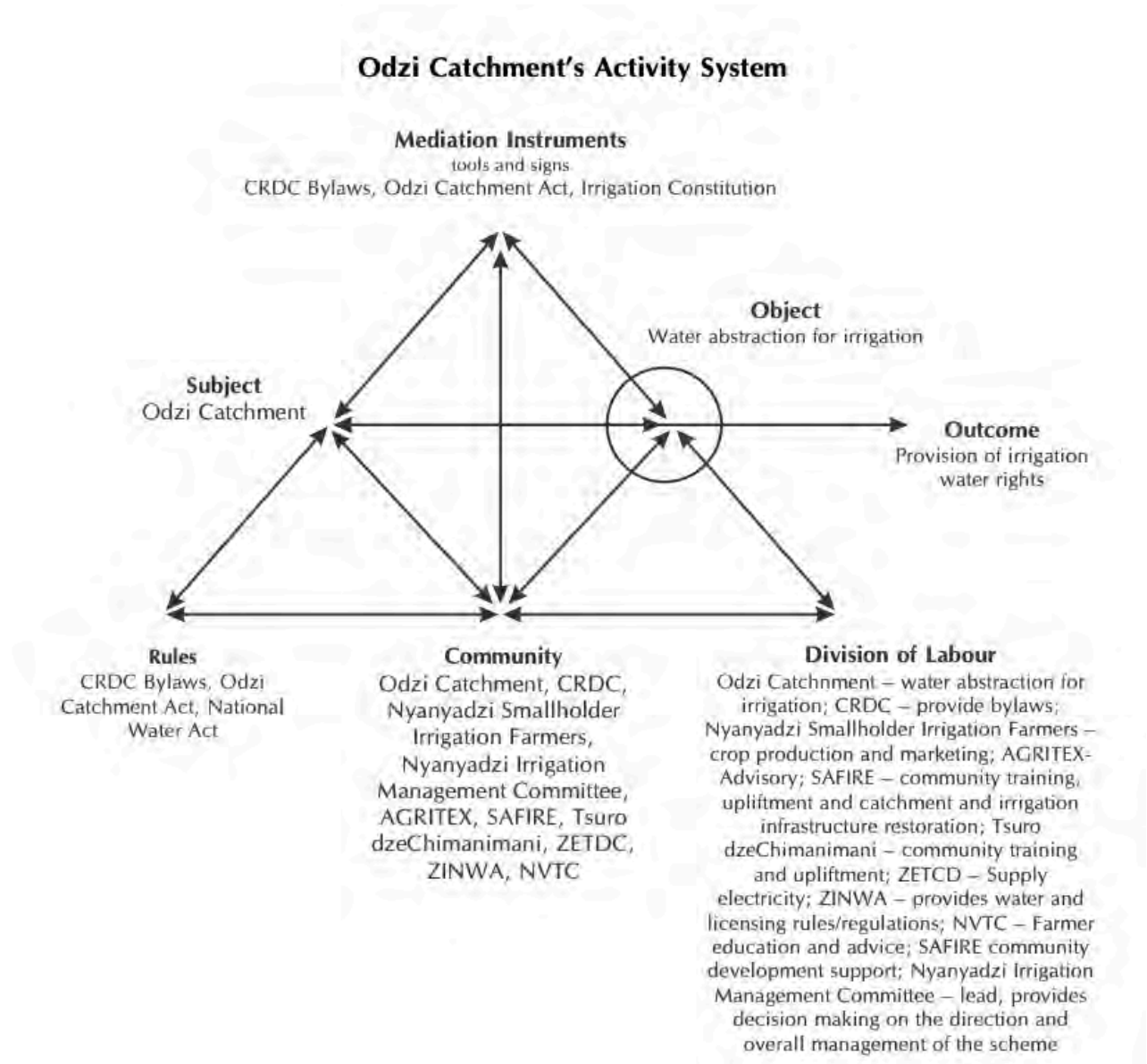


Figure 4.7: Odzi Catchment's activity system

Source: Author

4.1.4 Non-Governmental Organization and Partners

The Non-Governmental Organizations (NGOs) and Partners make up the last group of interacting activity systems that are important to the survival and progression of Nyanyadzi irrigation scheme. This category is made up of the organisations and private partners that provide technical and

material support including financial to fulfil certain aspects in the farmers' activity system. The support can be direct or indirect towards the farmers' activity system object. In essence, these organisations or individuals are pivotal in the maintenance of farmers' activities and the progression of the irrigation scheme and the society at large towards its main outcome, that is improved household food security and marketing. The active NGOs and partners are discussed below:

4.1.4 Tsuro DzeChimanimani Trust's activity system

Tsuro DzeChimanimani Trust's **object** is to promote sustainable environmental development and conflict transformation in Zimbabwe. It is situated deep in the Eastern Highlands Chain of mountains and just an arm's reach to Zimbabwe's border with Mozambique on the Chimanimani Mountain. The Trust is a brainchild of two people, who are resident to Chikukwa Village in ward 10 of Chimanimani. The Trust was inceptioned in 2000 and has been highly active in the Manicaland province and Chimanimani district with focus on permaculture, to sustainably benefit the **community**, whose once dependable yields were suffering the effects of global warming. Despite the sincere focus on permaculture the Trust has also focused on uplifting communities through value addition from natural and farm produces.

They have a subsidiary centre in Nyanyadzi whose object is to train local communities on value addition from local resources like the locally available fruits such as the baobab fruit, the mango, among others. They teach on how to process the fruits into crisps and packaging, they also help communities in other forest related projects such as apiculture. However, in Nyanyadzi this Trust has not had much impact although it could be relatively important to the farmers who are currently faced with marketing challenges and value addition being an alternative. Hence, I view this Trust as important as it could potentially be partnered to bridge the gap in produce marketing. Hence, it was invited into the 20-22 August 2019 CLW as an important stakeholder. The activity system of the trust and its potential to the farmers' activity system is shown in Figure 4.8.

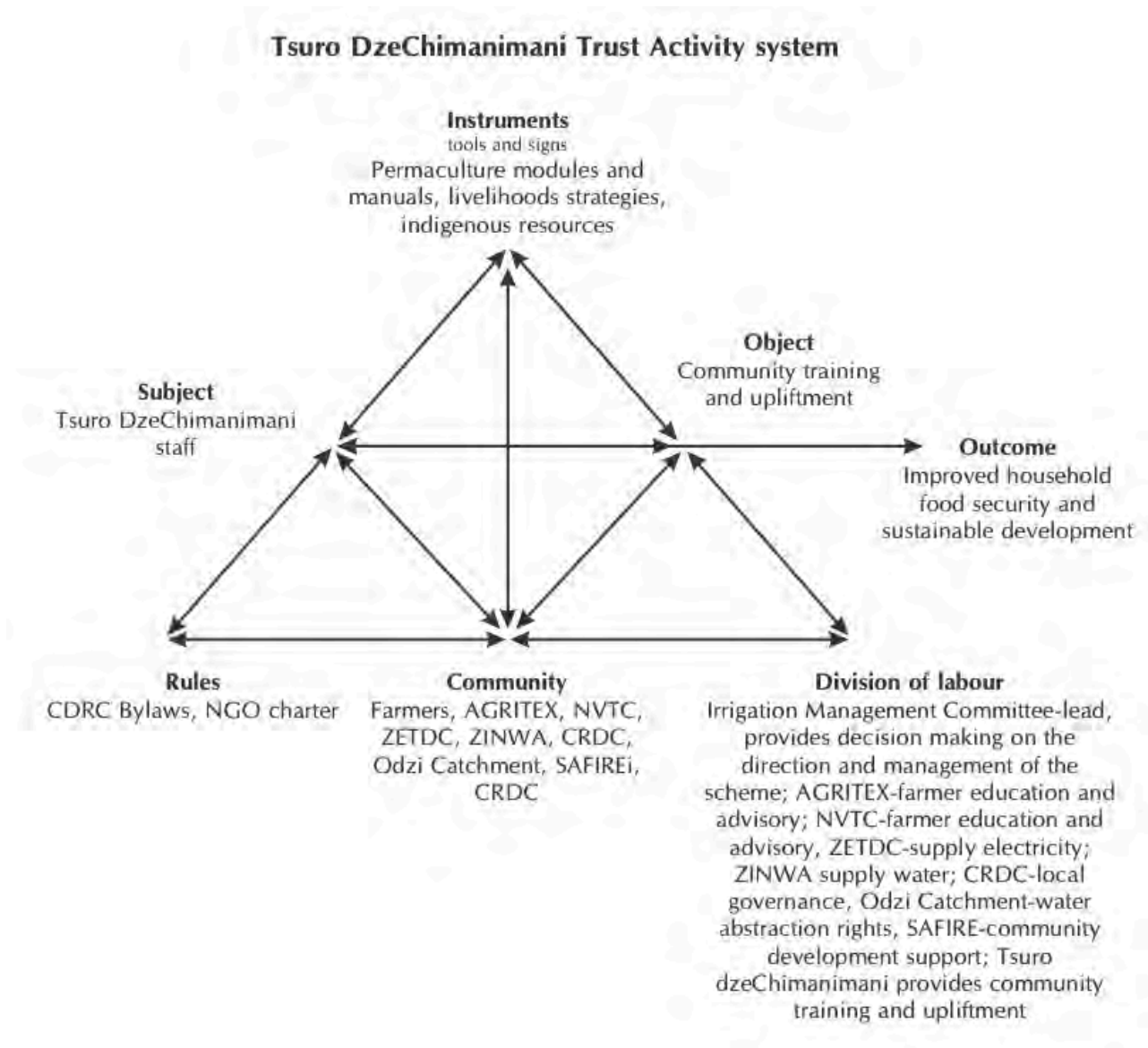


Figure 4.8: Tsuro DzeChimanimani Activity system

Source: Author

4.1.5 SAFIRE's Activity System

The Southern Alliance for Indigenous Resources (SAFIRE) is an NGO registered organisation which was incepted in 1994 in Zimbabwe. SAFIRE is an implementer that partners with several organisations and NGOs such as the **Fuelwood Crisis Consortium (FCC)**, **CARE International (community)** in several of its programmes in Zimbabwe. The main **object** of SAFIRE is to

facilitate the development and application of innovative approaches to improve rural livelihoods, resilience, and sustainable natural resources management. There is no doubt that its object shares some sentiments with the farmers' activity system's object and outcome that is to promote household food security and marketing under irrigation farming, hence, this organisation was identified as an important activity system in the irrigation scheme. Besides that, the SAFIRE has a record of helping Nyanyadzi irrigation farmers on the maintenance of its water network. Recently in 2018, the SAFIRE helped Nyanyadzi irrigation scheme with the widening and deepening the 8km main canal from Nyanyadzi river to the overnight reservoir. They also helped by constructing desilting weirs to rectify the silting problem encountered over the past years. As mentioned by Participant F18 in the CLW that, *“we had a challenge of water and SAFIRE, came to resolve this challenge. They built desilts for us and storm breakers... That's another way forward that was already done...”* An example of a sand strip built by SAFIRE is shown in Figure 4.9 below:



Figure 4.9: Silt trap (gabion) at the Nyanyadzi Irrigation Scheme

Source: UNDP / Oxfam (04 June 2019).

The SAFIRE becomes an important interacting activity system that has provided support in the maintenance of the irrigation scheme's infrastructure. Through its extended hand, sand and sediment were removed from a weir along Nyanyadzi River, and excavators, tippers and other

machinery were hired to scoop silt and sediments in the night storage dam. Part of the maintenance work also involved the construction of four major silt traps on main waterways, 46 gully checks, 6 over chutes and one hydraulic drop structure”, (Dr Leonard Unganai, the Project Manager cited in The Herald, 19 March 2018). The SAFIRE’s activity system is presented in Figure 4.10.

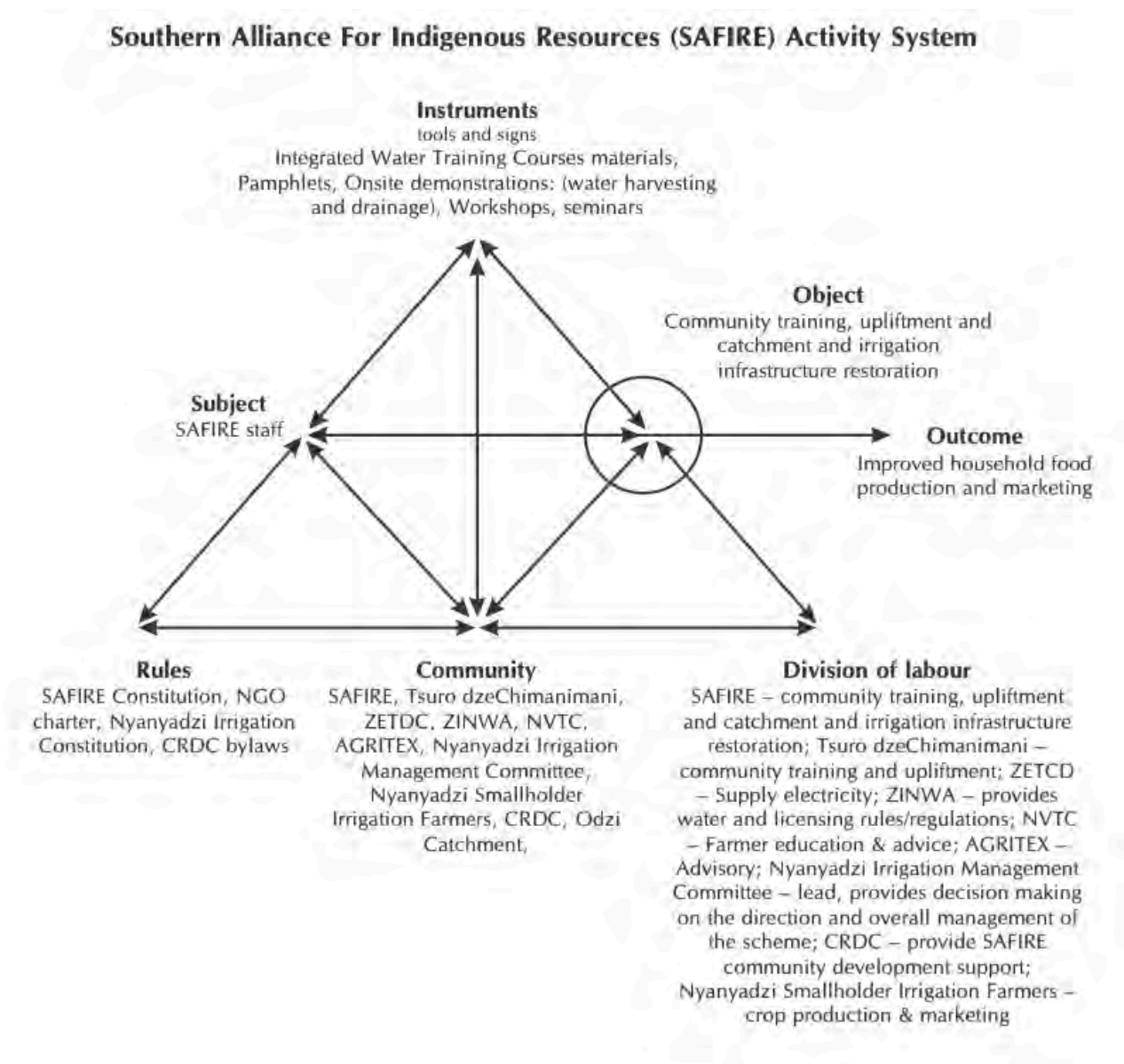


Figure 4.10: The Southern Alliance for Indigenous Resources (SAFIRE) activity system,

Source: Author

4.2. HISTORY OF THE OBJECT

In this section, I discuss the object of Nyanyadzi irrigation scheme (crop production and marketing under irrigation). A historical tracking is undertaken to address first research question together with objective one of this study:

Research question: 1. What are the multidimensional complexities that have (in the past), and are (in the present) enabling or constraining learning of household food production in interacting farmers' activity systems?

Objective: 1. Historicize the multidimensional complexities and learning of crop production (food security and marketing) in Nyanyadzi smallholder irrigation scheme prior to 1980 (year of independence) and 1980 and beyond (past perspective).

This section sheds further light on the cultural historicity of the emergence of the object over time.

As mentioned earlier, Nyanyadzi irrigation scheme has a unique and strong longitudinal history of crop production and marketing over three generations of farmers and over three critical time phases as shown in Figure 4.11. The three distinctive time frames coincide with the three generations of farming in the scheme. The initial time frame is between 1931-1965 which is the first phase of irrigation crop farming and this period has a unique irrigation management style. During this phase only the first generation of farmers were mostly involved, meaning those born before 1900-1920s. Here by generation, I mean rightful plot holding either as a pioneer or by inheritance as indicated in Chapter 2. Hence, most of the farmers I refer to as first generation were the pioneers to the establishment of the irrigation scheme and they were a plot holder. Figure 4.11 shows the generational cycles on a time series scale and they are labelled 1st generation, 2nd generation and 3rd generation. There is also a time frame put to show the historical development of the irrigation scheme. This diagram will be referred to the discussion on the historicity of the object as it unfolds.

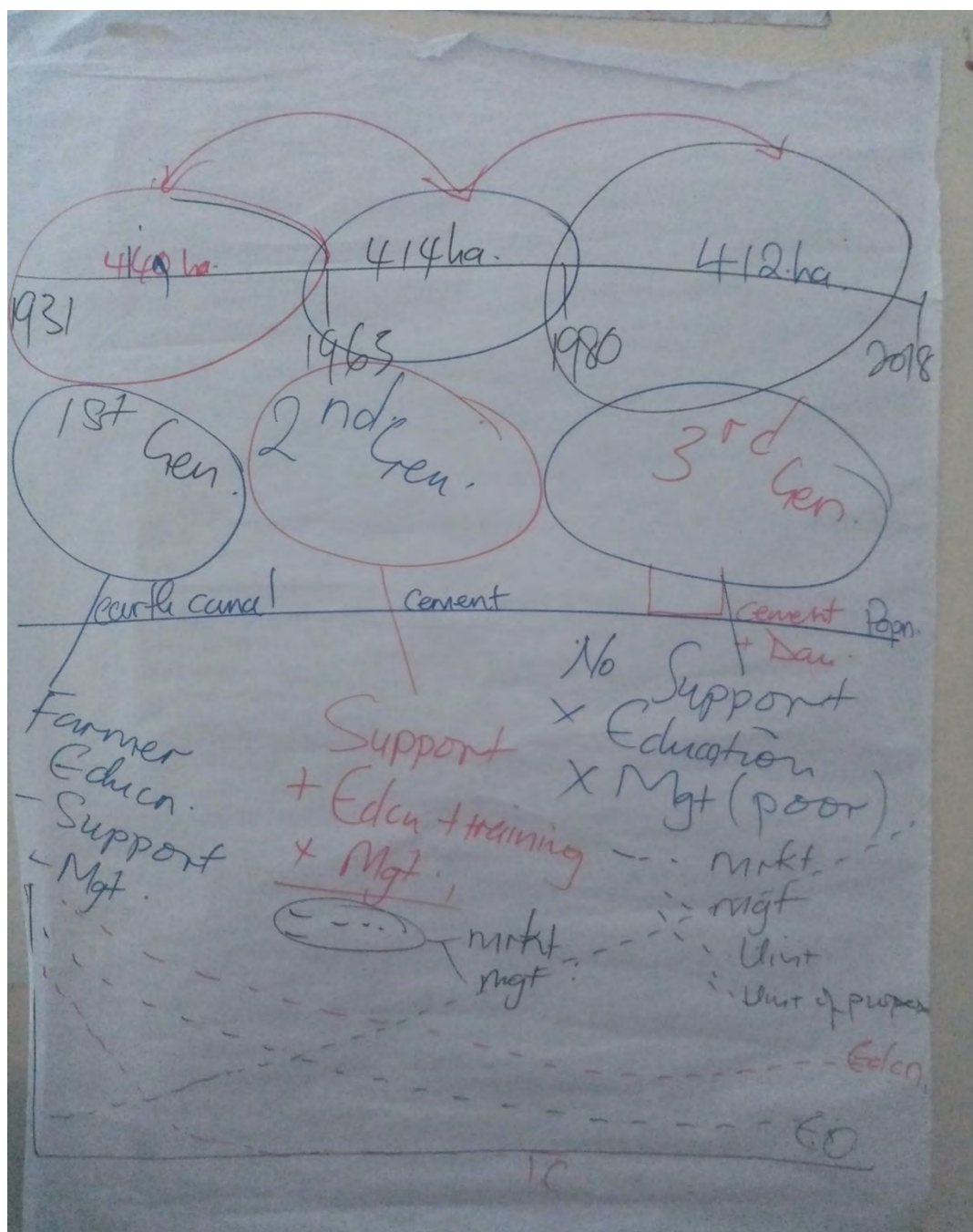


Figure 4.11: Historicizing Nyanyadzi Irrigation

Source: Author

A quick explanation to Figure 4.11 above. This figure is one of the mirror data charts (see Chapter 3) that were used as a double stimulation tool used for historicity of the object in the three-day Change laboratory workshop (20-22 August 2019) with Nyanyadzi smallholder irrigation farmers and other interacting stakeholders. It shows the history of the object (crop production and marketing under irrigations) and three generations of farmers. Lastly, the histogram underneath shows transitions in farmers' activity systems, political and economic interferences between 1931-2018.

4.2.1 Irrigation Crop Production and Marketing in the First generation (1931-1947)

What is noticeable about the first generation of farming period is the diversity and vast experiences that came with the newly resettled irrigation farmers. Secondly, the role they played in the setting up of the irrigation scheme and the cropping practices. To begin with, most of the early farmers came from the eastern parts of Chimanimani and as convicts from Chikore and Mt. Selinda who failed to pay hut taxes during the colonial era (Manzungu & Van Deer Zaag, 1994). Interviewee FGI 3 elaborated on the diversity of the subjects when he pointed out that,

... there were few families living here (Nyanyadzi area) ... we were residents together with Mr. Chipiro and few others. Most of the land you see now, was Mr. Chipiro's orchard area and the residential areas were his grazing lands for his sheep, goats and cattle. Then people started to flood in and were subdivided pieces of lands.

According to Bolding in the latter half of the 1940s Nyanyadzi irrigation scheme was filled and vacant plots occupied by volunteers. There were three types of settlers with

“one category of the volunteer settlers being consisted of mostly mission educated Africans who were attracted to Nyanyadzi for professional reasons and thought of retiring from their profession in order to take up irrigation as an interesting business proposition. An example of such a settler is Luc Jambaya, who as a young boy helped Alvord at Mount Selinda mission to dig an irrigation furrow during the drought of 1922, was subsequently trained as teacher, and after some years working the mines in South Africa returned to Alvord to start work within the Department of Native Agriculture. In 1944, Luc assisted Alvord pegging the upper level canal in Nyanyadzi. Luc was impressed by the hive of activities. In 1946 Luc was transferred to Nyanyadzi to work as an office clerk, and he applied for a plot in block A” (Bolding, 2003: 137).

Another such example was Rishon Gwinya,

born in Ngorima, Melsetter (Mt. Selinda) district, and went to school at Rusitu mission station. After leaving school he took up teaching, first in Mhakwe and later at Changazi, south of Nyanyadzi. In 1946 he settled in Nyanyadzi with his family. He took up 4 acres in block B (later he moved to block A). After one more year of teaching at the nearby

Gudyanga school, Gwinya resigned and went for full-time irrigation farming... (ibid, 2003: 138).

The second category of volunteers who migrated to Nyanyadzi in the late 1940s consisted of individual Africans from Melsetter (Mt. Selinda), Umtali (Mutare) and Chipinga (Chipinge) districts who had failed to be in consistence with the hard and expensive standards of living on European farms where rentals were always on the increase (Ranger, 1985). Lastly the biggest population of the new settlers were drought refugees particularly droughts of 1941, 1944 and 1947. Hence, the settlers comprised of hungry and destitute people from arid Reserves across the Save river, and to a lesser extent from Melsetter (Mt. Selinda) district. For instance, 1947 some saw some 41 new families settled in Nyanyadzi because of the unprecedented famine which was a 20% increase from the total of 210 families.

As already mentioned in Chapter one, Nyanyadzi irrigation scheme was the brainchild of Rev. Emory D. Alvord, a Missionary and a well-known Agricultural Extensionist. How the irrigation scheme was conceived in a dream was narrated and discussed in Chapter one (Section 1.1). Rev. Alvord became the Director of the scheme and history relates that in 1947 a new European Land Development Officer by the name Mr Saunders was appointed which contrasts most Interview narrations in the study that identified Rev. Alvord as the Land Development Officer (LDO) in the irrigation scheme, as explained by Interviewee FGI 1 “*LDO was a title for the whites, no black person held that position...*”. In essence, the LDO, was the highest position in the irrigation scheme under colonial rule and was responsible for the overall management of the irrigation scheme.

As narrated by Interviewee FGI 1, “*the irrigation started on the upper area... at Tsviyana the north part of Nyanyadzi river... Mr. Alvord, is the one who went to the government and requested to develop an irrigation scheme and the government allowed him*”. When granted the permission by the government, the LDO “*said to the communities come let’s construct a canal because the government didn’t have any support for irrigation schemes*” (Interviewee FGI 1). Some farmers had special invites from the LDO, “*... Mr. Alvord himself came and invited us to go with him to Nyanyadzi where he has been constructing a canal and my husband left Harare to construct the*

canal with Mr, Alvord...” (Interviewee, FGI 2). This means expertise was sought and the experts later joined the irrigation program as farmers together with the “hut tax convicts” mentioned by Manzungu and Van der Zaag (1995). Hence, involvement and participation in the irrigation scheme was highly voluntary for the local communities as also highlighted by the involvement and participation of Luc Jambaya and Rishon Gwinya mentioned earlier on in this section.

Another distinctive phenomenon of this era was the management style. Between the period 1931-1947 the irrigation scheme was under the management of the LDO as mentioned earlier. As recalled by Interviewee FGI 1 that, *“when we were given the plots, the scheme was not yet into the government’s control... during the period it was in the LDO’s management, then a Supervisor, Extension officer and the Messenger of Court.”* Interestingly, the LDO had all the management powers shared down a hierarchal structure to his irrigation committee which comprised of the above listed personnel. *“Mr. Alvord’s Extension officers were responsible for allocating residential stands and irrigation plots to the farmers.”* While the Messengers of Court *“oversaw the farmers activities, irrigation canal monitoring as well as law enforcement, arresting and remanding the offenders to Mt Selinda where a new irrigation scheme was being constructed”* (Interviewee, FGI 1). The management style under the LDO’s was typical of a dictatorial style and *“... our fathers were being forced...”* (Interview FGI 3). In support to the above narrations, Bolding (2003: 149) also confirms posting that, *“plots were allocated by the resident LDO, and plot leases extended annually on the basis of water rate payments.”*

History has it that after a wrangle with the assistant Native Commissioner (aNC) over the 'boy' who offered Mr Hunt a plot after he has expressed interest in buying vegetables from Nyanyadzi scheme, Rev. Alvord put the rules of plot allocation on paper. He drafted what was referred to as the first comprehensive Irrigation Policy (1939) with the intention to addresses issues of plot allocation, cost recovery, enforcement of good farming methods, soil conservation and furrow maintenance. The policy drew its enforcement power from the Native Affairs Act (1927). The policy was tipped a crude precursor to the strict 1970 Control of Irrigable Areas Regulations (Bolding, 2004: 132). Understanding this policy can help to understand the context in which the farmers were allocated the plots, the conditions that were laid down and process of abiding by

them. The key elements were the conditions of occupation, allotment of plots and keeping of accounts were as follows;

Table 4.1: The comprehensive irrigation policy (1939)

<u>Conditions of occupation:</u> A contribution to the maintenance of the irrigation works was to be paid in July of each year. The cultivation of the actual plots was to be done by observing the following five obligations: - take out all trees or stumps, - preserve and improve the plot's fertility by practising good tillage methods, correct methods of water application and the use of manure and crop rotations. - furnish returns of crops (yield information) to the Agriculturist; - maintain lateral furrow bordering the plot; - protect lands liable to deterioration by soil erosion. <u>Allotment of plots:</u> The Native Commissioner (NC) decides on the eligibility of applicants for plots and allocates actual plots at the advice of the Agriculturist or his representative [read demonstrator, later the Land Development Officer]. The Agriculturist shall number the plots and provide overview charts to the NC. The maximum plot sizes were set at 2 acres (0.8 ha) for a single tax-paying male and 4 acres (1.6 ha) to a married man. <u>Project accounts:</u> The rate of the water rents due were set by the Agriculturist, and if needed arbitrated by the NC. It was the responsibility of the local NC to collect the amounts due, keep the project accounts and expend funds at the advice of the Agriculturist. A separate bank account was to be opened for each project (the so-called furrow maintenance fund).

Source: Bolding (2003:132)

In essence, Interviewee FGI3 confirms the descriptions in the conditions of occupation in the comprehensive irrigation policy (1939). Another important aspect of the management during this phase was the role of the Extension officers and Water Bailiff.

The Extension Officers would come advise us on how to crop and the Water Bailiff distributed water in an orderly manner. The Extension Officer would advise us on the crop to plant depending on the season, they would say plant this, it's time to harvest, it's time

to plant another crop. So, the Extension Officer and the Water Bailiff were equally important (Interviewee FGI 3).

Importantly, during the first generation of farmers

... the water was managed by the Water Bailiff and the Extension officers. The extension officer would come and wait whilst the Water Bailiff would distribute the water. In essence, when the water is in the canal, the extension officer would assign the names of the people to be allocated water and it was the work of the Water Bailiffs to move around following up on the water distribution list. This is how it was started, the Extension officer would come in person and assign, then give the Water Bailiff the distribution list to manage” (Interviewee FGI 1).

Of interest is the fact that both the Extension officers and the Water Bailiffs were government employees paid to do the job. Interviewee FGI 1 indicated that during this phase, “*challenges were there and included 1, lack of a cash crop and a market especially in the early years of the irrigation. Maize was the only crop that you can sell but there were no other cash crops like beans and tomatoes and there was no market as well. Even when you grow the maize there was no one buying.*” In addition, Interviewee FGI 1 also report that, “*it wasn’t all glitter during this phase because there was no seed and for you to get the seed you were supposed to order and that was where the challenge was. Because the seed was not there.*” Therefore, only a few crops were produced during the first generation of irrigation cropping. One can therefore argue that although the irrigation farmers did not receive any material support from the government, the LDO’s technical support was sufficient to drive a successful subsistence irrigation crop production, albeit with limited produce.

The first generation of farmers in this study referred to this era as the best managed. Because

there were people who were employed to orderly distribute water among the farmers and livestock like chickens, goats were not allowed in the roads let alone in the irrigation scheme. The management system was very smart... we never had a problem, that’s the reason why we failed to return to Chikore and your family also failed to return to Mhakwe. If you see people happy to live in foreign land it means it was good... (Interviewee FGI 2).

Another important issue to take note of this period is the issue that,

Water was distributed to plots rather than to individuals and the canal infrastructure and land was considered property of the government. The only features of Nyanyadzi irrigation scheme which made it deviant of the irrigation factory paradigm was that water was not distributed according to crop water requirements (since water measuring devices were not installed) and that the plot holder was given some freedom to choose the crops he wished to grow (Bolding, 2003: 149).

This was an advantage to the farmers and brought stability to the crop production under the irrigation scheme although this later promoted a water need-water use contradiction that shall be discussed later on (Section 5.2.1.2). This was because the irrigation system never considered water efficiency from the word go yet there has been evidence of inconsistent water supply from the river and high frequency of droughts. Furthermore, although Bolding claims that the plot holders had freedom to choose the crops they want, as contained in the irrigation policy of 1939,

Alvord instructed the Irrigation Supervisor to produce a list of all plots to facilitate control over the planting of crops according to a compulsory crop rotation. In 1940, the crop rotation included maize during the wet season and wheat (50%) and a legume crop (50%) during the dry winter season (Bolding, 2003: 136).

So, a particular systematic cropping system was in place. In addition, during the first generation of farming a three successive stage cropping pattern can be established. As given by Roder (1965: 128-30) cited in Bolding (2003: 136) the three-stage pattern is as follows,

from 1934-39, the dominant pattern consisted of maize in summer and wheat in winter. During 1940-42, maize in summer and beans (50%) and wheat (50%) in winter prevailed. And from 1943 to 1956 the dominant crop pattern consisted of maize in summer, and wheat (50%), sunhemp (45%) and beans (5%) in winter. After 1952 the share of sunhemp in the winter rotation tapered off to zero in 1958, since insect damage terminated high veld use of sunhemp as green manure crop.

A distinctive planned and orderly cropping system existed even though the farmer had a choice to choose. Also, as was stipulated in Alvord's five conditions of occupation in the 1939 policy,

one of the five conditions of plot occupation was agreeing to “sowing and reaping dates” (Bolding, 2003: 143). Hence, the management of this period is said to have been exceptionally good.

Another feature of this phase was the learning process that the first generation of farmers were engaged in. *“We learnt a lot, we would be taught how to apply manure, fertilizer and how to space the holes to plant onions ...”* (Interviewee, FGI 1). To add on, the *“Extension officers would come to inspect and supervise the planting furrows and would teach us how to space them. There were specific Extension Officers who would come for that and in each Block, there was an Extension Officer assigned to teach and monitor”* (Interviewee, FGI 2). Interestingly, *“Rev. Alvord is the one who started to train the Extension Officers at Domboshava and went on to train other extension officers in Chikore and Mt Selinda”* (Interviewee, FGI 1). Yet, through the interactions in the irrigation scheme the farmers learnt,

... to be smart, utilise the water wisely and manage the water well within the irrigatable land. All the learning process was well educative and smart. When we were in the fields it was like in the school, you couldn't separate the educated and non-educated. We were all civilised, it was a school on its own, it was very smart, and we all learnt from the irrigation scheme (Interviewee FGI 2). *We were also taught in groups like on how to plant, with some sort of internship during the group lessons* (Interviewee FGI 4).

The above narrations are also in line with Alvord's vision of the irrigation scheme which, according to Bolding (2003: 144), *“Alvord's development vision entailed more than the transformation of agricultural practices. Alvord cherished the ideal of a modern self-sufficient agrarian community...”* This vision is critical to this study which also has intention to mediate transformative agency through and by expansive learning processes.

An important learning mediation instrument of the time was the Training Centre which was equipped with demonstration plots where farmer education would be facilitated and the farmers together with the Extension workers would be taught and be trained. The Nyanyadzi Vocational and Training Centre (NVTC) formerly known as Nyanyadzi school of Agricultural was established in the 1940s as discussed in Section 4.1.3.2 above. As highlighted by FGI 3 that, *“yes the demonstration plots were there at the Training centre, this is where the Extension officers who*

would have come from Domboshava completed their certificates by practice before graduating and qualifying.” The Training Centre was an integral part of the irrigation scheme both as a mediation tool for the Extension officers and the subjects. Another important function of Nyanyadzi school of Agriculture that is important to this study is the diversity in the participants. Bolding also captured this nicely when he posits that, “*The School of Agriculture, and newly established experiment station, provided a continuous influx of outsiders to Nyanyadzi, consisting of a mixture of ex-servicemen (Alvord 1958: 39), aspiring (purchase) farm pupils and demonstrator trainees. These pupils not only brought an exciting mixture of social life and entrepreneurial activities to Nyanyadzi...*”. (Bolding, 2003: 145). It is this diversity that is at the basis of this research process and its potential to mediate Expansive Learning Process as (ELP), Transformative Agency Pathway (TAP) development and Zonal of Proximal Development (ZPD) advancement (see Chapter 5, 6, 7).

Overall, the management of the irrigation scheme in the first generation (1931-1947) was reported to be good, but there were some major tragedies that happened during this phase. Interviewee FGI 1, posited that,

... in 1942 there was a severe cyclone which washed away the 29 one-acre plots which had been established at the north bank of Nyanyadzi river leaving only the plots on the south bank intact.” Afterwards “the government started to recruit more extension officers and paying the extension officers’ remunerations in 1947. During this period the LDO had left the scheme and relocated to Chikore... the scheme remained solely the government’s responsibility and was placed under the Native Development Affairs (NDA)... should be 1945...

In support, Chambers (1969: 214 cited in Bolding, 2003:151) also reported that,

by 1945, the scheme seemed ready for the withdrawal of government supervision. ... the withdrawal involved two concurrent trends: specialisation in which management and settlers, while concentrating on economic matters, call in specialised organisations to service a scheme; and devolution in which management hands functions over to settlers.

Hence, as it is given in the narratives that, in 1945 Rev. Alvord left Nyanyadzi for Chikore and left the LDO in charge. As mentioned above, in this study narratives have incorrectly reported Rev. Alvord as the LDO, yet a new LDO was appointed in the name of Mr. Saunders and Alvord remained the director of the irrigation scheme. However, shortly after Rev. Alvord left around 1947 Mr. Saunders was recalled from Nyanyadzi irrigation scheme on the allegation of continued accounts of reckless utterance which had resulted in the burning of the Irrigation's Supervisor's house Mr. Sigauke in 1945 and several revolt threats and resurgence afterwards (Bolding, 2003). The LDO was later in the 1960s replaced by the District Administrators (DA) who by then further devolved his power to the chieftainships and then to the Kraalheads. This marked the change in the irrigation management administration and the beginning of the second generation of farmers. A summary of the Object of Activity (1931-1947) in the colonial period is diagrammatically shown in Table 4.2:

Table 4.2: Summary of the Evolution of the Object of Activity 1931-1947 (First Generation of Farmers)

Summary	Pre 1931	1935	1940	1947
People settled & size of Nyanyadzi irrigation scheme.	• By 1931- 26 women + 3 old grandfathers started on 3 feet (0.914m), 18 inches (0.457m) depth and 600 yards (548.64m) length earth canal from Nyanyadzi river to Block C- Tsviyana (northern Nyanyadzi riverbank) • September 1934- 21 men and 8 women worked on the furrow in exchange for free food rations (amounting to 1.25 bags per person) and £1 tax restitution & eight men tax defaulters clearing 35 Acres of land divided among 29 plot owners. -90 plot holders	• 1936- Block A & B vacant plots filled by 90 people (volunteers & drought refugees, mission educated, people from Melsetter etc People leaving European farms and “hut tax convicts”) • 16th of October 1937- southern bank canal was started. • Under 1939 Irrigation Policy- maximum plot sizes were set at 2 acres (0.8 ha) for a single tax-paying male and 4 acres (1.6 ha) to a married man.	• 1940- 48 acres (19.4 ha) cleared & fenced on the northern bank. • February 1942 unprecedented floods flashed away all the 48 Acres on northern bank (Tsviyana) 1943 all northern bank plot-holders were absorbed in the southern bank (Block C).	45 new families (drought refugees)
Governance & rules introduced (management)	Native Affairs Act 1927 Land Apportionment Act 1930	Rev. Alworld- LDO & supervisor, Extension officers & messenger of court hierarchical managerial approach. • The Messenger of Court oversaw the farmers activities, irrigation canal monitoring as well as law enforcement, arresting and remanding the offenders to Mt Selinda. • Law enforcement- dictatorial style • Plots were allocated by LDO. • plot leases extended annually on the basis of water payments. • 1939- Irrigation Policy- addresses issues of plot allocation, cost recovery, enforcement of good farming methods, soil conservation and furrow maintenance (rate payments every July of each year; maintain lateral furrow bordering the plot; protect	New LDO- Mr. Saunders Livestock managed “good management”	

		lands liable to deterioration by soil erosion: The Native Commissioner (NC) decides on the eligibility of applicants for plots, and allocates actual plots at the advice of the Agriculturist or his representative; • sowing and reaping dates • 1945- LDO (Rev. Alvord) relocated to Chikore leaving Nyanyadzi irrigation scheme. • 1945- government withdrew its management & economic support from the irrigation scheme. • 1945- Mr. Saunders was appointed the new LDO • 1945- Mr. Saunders' house was burnt to ashes because of a farmer revolt leading to his recalling from Nyanyadzi irrigation scheme the same year, on allegation of continued accounts of reckless utterance. • Nyanyadzi irrigation scheme was put under the government's responsibility under the Native Development Affairs (NDA)	
Training opportunities		1939 irrigation policy- 5 conditions AGRITEX Officers (EO) provided advise. -each Block had EO- taught how to plant -each Block EO practised teach and monitor approach -learnt how to use water wisely -learn by doing and demonstrations -1939- LDO enforced compulsory crop rotation. -1940s- school of Agriculture (Nyanyadzi Vocational and Training Centre (NVTC)) -LDO preferred <i>modern self-sufficient agrarian community</i> -1947- government recruited more Extension Officers	
Crop production & changes	-early October 1931- 29 Acres of Maize were planted (14.5 bags per Acre output [3.2 t/ha]).	-Lack of cash crop -no seed to order -plot-holders were given freedom to choose crops to grow but compulsory 3 successive stages - sowing and reaping dates -1934-1939- maize in summer & wheat in winter -1940- 1942- maize in summer & beans (50%) and wheat (50%) in winter	-Only a few crops produced mainly subsistence

		1943-1956- maize in summer & wheat (50%); sunhemp (45%) and beans (5%) in winter		
Water supply system & changes		• Water distributed to plots -not individuals. • Under the 1939 Irrigation Policy- rate of the water rents due were set by the Agriculturist, and if needed arbitrated by the NC; the local NC to collect the amounts due, keep the project accounts and expend funds at the advice of the Agriculturist. • Water Bailiff distributed water in an orderly manner. • a working water distribution list	-1944 upper canal pegged. -Irrigation canal monitoring -water rate payments (5 <i>Shilling per Acre...for the maintenance of the irrigation infrastructures</i>) -Water Bailiffs distributed water	-government owned canal infrastructure -water efficiency not considered -1947 water shortage
Marketing & changes		-lack of cash crop & market -only maize to sell- no other cash crops -no market for maize		-no water measuring devices -mainly subsistence -water not distributed to crop requirements
Other major events or issues	Drought	1938/39 growing season delayed of drought	-Land owned by the government	

Source: Author

4.2.2 Commercial farming with the Second Generation of farmers (1948-1980)

Between 1948-1980 marked the second-generation of farming constituted mostly by those born 1948-1960s who either inherited or partnered with their parents in the scheme. This period also fell within the colonial era and experienced internal diversity from the incoming generation and was subjected to abrupt changes to irrigation crop production due to the tense political-economy, ecological and social processes. Some positive developments of this era include the active role by the government in financing infrastructure development and the provision of farming inputs in the form of fertilizers, seeds and technical support to the farmer. To mention a few developments the government built the 8km main cement canal together with several in-field canals and installed two 450Hp hydro-power electric pumps at the Odzi confluence. These were used to pump supplementary water to ease water stress in the irrigation scheme, although gravitational water remained most preferred due to the little operational and maintenance costs involved. Lastly, the overnight storage dam was built in 1949 to supply constant water to blocks A south, B and D (see figure 1.1).

During the period under review, farmers were engaged in contract farming and produced for export as initiatives of the colonial government. Notably, the crop production in the first-generation era was well organised and there were distinctive divisions of labour that existed. However, this was not the same in the second-generation farming era (1948-1980). Understanding the historicity of crop production and marketing during this era can help to understand the tensions, and conflicts over time and how they have evolved to be in the present. Generally, Interviewee FGI 1 felt that during the second generation of farming *“things were much better in the 1960s when there was contract farming and exports for crops like beans, khakhi beans, tomatoes, cotton and paw-paws.”* The variety of crops planted in the irrigation scheme enormously increased as well, so farmers made a living out of it. But the most important lesson is that *“our parents used to get loans. They used to get fertilizers then pay later after harvest and this boosted their farming practices but in now it’s difficult”* (Interviewee SGI 6). During this period, the second generation of farmers had many opportunities and they utilised them.

Despite having high diversity in terms of available crops the market, however, was not very good. During the 1950s it was reported that there was over production of maize crop thereby lowering its market value. Secondly the general market weakened as posited by Bolding (2003: 160) that,

sunhemp production, previously so rewarding, became unprofitable and petered out in the mid-1950s. Onions were tried in 1954 in other Save schemes, but the production quickly saturated urban markets. The same fate awaited the production of peas (Roder 1965, 128). Thus, diversification of the cropping pattern proved difficult, and mainly a matter of finding a suitable market outlet nearby to economise on transportation costs (Ibid., 131).

These continued changes in the marketing proved a challenge to the farmers. Interviewee FGI 1 posits that,

challenges were there, because there are some years, we had droughts. Then the years we experienced the following 1. Lack of a cash crop in some of the years. Because maize was the only one crop that you knew if you grow you can sale the surplus and even if you were to grow other crops there was no market at all. But as of 1970s and sometimes late 1960s things were a bit better there were some contract farming. We would grow sugar beans, tomatoes for companies like Cains...

As also mentioned by Interviewee FGI 1, contract farming was an important happening of this period. In agreement, Bolding (2003) also pointed out that,

in 1957, when the Liebig's canning company opened a subsidiary processing plant in Cashel, Masetter (Mt. Selinda) district. Various types of vegetables, such as onions, carrots, cauliflower, sweet corn, peas, tomatoes and beets suddenly found a guaranteed market, though only green beans proved financially rewarding in the end. The canning factory also introduced a new mode of production: contract cropping. The contracts were negotiated by the scheme's management and the company, involved guaranteed prices and proved quite rewarding for the plot holders (160-161).

There is no doubt that with contract farming the market improved enormously. However, he handling fees were somehow exorbitant forcing the LDO “at times to pressure plot holders to deliver their crops, in order for the scheme to fulfil its contract quota” (Bolding, 2004: 161). The

market was later disrupted by the political environment in the late 1960s when Rhodesia (now Zimbabwe) was under the British sanctions after the Prime Minister Ian Smith declared a Unilateral Declaration of Independence (UDI) on the 11th of November 1965 (see Chapter 1). Immediately afterwards, was a series of African resistance up risings which led to Chimurenga 1 and 2. All this saw a dip in the crop market and the plot holders failed to realise substantial profits until independence in 1980.

However, in comparison to the first generation of farming, the majority of interviewees reported that the second-generation farming era recorded a poor management style for the irrigation scheme. To begin with, Interviewee SGI 6's evaluation is an entry point to this period's narratives,

... learning from our fathers, in the beginning this irrigation scheme was in the total control of the whites, but it was mostly managed through the AGRITEX office. The farmers were supposed to be farming in the plots as an occupation not like we are seeing today, that the farmers are now seen repairing the canals or maintaining the hydro-electric engines. All this was not evident in the first-generation farming era, farmers only knew how to plant and water nothing more...

As mentioned earlier on in the first generation narrative, there was dominance and strict supervision by the LDO and his agricultural demonstrators. This period seemed particularly different towards the end of the second generation farming era as the country approached the independence. There were more African resistance and rebellion. However, history has it that there was more farmer involvement in the irrigation scheme. As stated by Bolding (2003: 163) that,

in 1958 the Nyanyadzi kraalhead committee was formed as a consultative body mediating between the management and the plot holders. The committee administered scheme by-laws that endorsed the principles of the 1948 irrigation policy. The four kraalheads residing in Nyanyadzi irrigation scheme were all members of the committee. Besides instilling discipline, the kraalheads would inform the LDO of what the plot holders wanted, whilst the LDO used the committee to communicate and explain to the plot holders whatever decisions the management had taken.

As said before the above quote confirms more involvement and participation of the farmers in own governance. However, the flow of communication was pretty much one way, as transpires from the following quote of the then Provincial Agriculturist for Manicaland, Mr. Plowes:

you always consulted with people, even if they might not have been able to amend what was going to be done, at least they had the opportunity to know what and why and for their say. And, you know, if they had any really valid objections, we could discuss them and tell them what's up (Mudyenembwa, 1997 cited in Bolding, 2003: 163).

These comments of Plowes show that there was a small degree of the irrigation farmers' involvement and participation, however, this involvement was rather a formal process as they had no input or power to change any decisions. Instead, it was more a process of informing than consulting. Another form of involvement was through the establishment of the 1959 Nyanyadzi producers' co-operative society in which most plot holders were registered co-operative members, paving the way for a wholesale takeover of all marketing responsibilities for the scheme (Roder, 1965, 129). The co-operative operated under the guidance of the Government co-operative Officer in Umtali (Mutare). Its main responsibilities included signing crop contracts with interested companies for example, beans, seed beans and cotton; as well as distributing the seed issued under these contracts; also collecting and registering farm produce and issuing pay checks to individual farmers via a bank account at the local Post Office. As observed by Gregory (1967: 91) over time their functions

expanded to include the bulk purchase of maize and cotton seed; provision of loans for fertilisers, seed and agricultural equipment; and provision of the equipment, insecticides and labour for cotton spraying under the guidance of local Extension staff.

The expanded function of the Cooperative is what Interviewee FG2 6 lamented in his/her own farming generation era saying,

if we go to the challenges of marketing, our markets are dead because we had committees which represented the irrigation. let's say you have grown your crops, you were given the trending sale prices but now its individual marketing...So if we could only focus on reviving the past marketing practices. We had also a time we used to see our parents getting loans, fertilizers to start the cropping season and the costs would be deducted from their produce money that would have boosted their farm produce...

Another improvement in farmer management involvement was later realised in 1968, when the four kraalheads appointed two secretaries each to represent them and among these secretaries were leading farmers, ex-teachers, businessmen and church people, some of whom also happened to be the leading African nationalists in Nyanyadzi (NAZ, 1938). However, according to Bolding (2003) after the denouncement of paternalistic policies after the nation-wide revolt against the Native Land Husbandry Act (NLHA), Department of Conservation and Extension (CONEX) took over the management of African irrigation schemes and introduced management committees in each scheme in 1963. The main purpose of these committees was:

to foster an interest among the irrigators in the problems that arise in the efficient operation and maintenance of the scheme, to bring about an appreciation of the economic need for the higher paying cash crops and the general need for a more efficient approach to irrigation farming, eventually leading to these schemes being operated on a community development basis (ibid., 2003: 163).

However, according to Plowes cited Bolding (2003: 166) the irrigation schemes became political hotbeds, because of two reasons,

Firstly, the nature of irrigation is such that it required discipline, and the enforcement of such discipline was the exclusive domain of outsiders to African society. This application of strict supervision had not (yet) resulted in evictions of mal-performing plot holders, but it did provide a source of insecurity (Roder, 1965: 174-5). The threat of removal provided an easy rally point for African politicians, who denounced the management as “oppressors, and racist colonialists”, and promised the plot holders free irrigation, unlimited acreages, and crops of their own choice after the overthrow of the government. A second source of inspiration for the African nationalist cause was formed by the secretaries of the co-operatives, who, according to Plowes: “regarded themselves as being trained in coop matters. They often put money in their pockets and there was just one problem after another with these chaps. They had little committees, but these would be uneducated irrigators and the secretary could just run rings round those chaps. Then, of course politics started coming in (...) Politicians, somehow, they always seem to gravitate where there are

aggregations of people, where there is money being made. You don't find politicians out in the sticks. What are you going to do out there?

It is also important to remember that this was a time of a series of political interference. From high political party engagements, sabotages and strikes, but for Nyanyadzi farmers became actively involved from 1958 due to the first visit of the Southern Rhodesian African National Congress (SRANC) which was incepted in 1957. What followed were a series of political activism events but one thing for sure as reported by Bolding (2003) is that the September 1962 torching of the top house (LDO's house) and the government storeroom in Nyanyadzi by local ZAPU youths had nothing to do with the LDO since he was tipped off earlier to flee. As recalled by Ndabaningi Sithole, the ZAPU leader, *"we just wanted to destroy government property to make a point that we were serious"* (Sithole, 1970: 123).

It is also understood that, on the 1st of July 1967, through the Ministry of Internal Affairs a new order was announced internalising the affairs of African irrigators with intent to control the function of the farmers in the District Council (DC) whilst the resident Irrigation Manager (IM) oversaw the day-to-day management of the scheme (Bolding, 2003: 172). The full technologies of control that were at the Irrigation Managers' disposal are presented in Table 4.3.

Table 4.3: Technologies of control at the disposal of the Irrigation Manager

Year	Technology	Purpose
1958	Kraalhead committee	Remote control over plot holders, centralising point of interaction
1959	Cooperative society	Control over disposal of crops (1967: crop tax); provision of inputs and chemicals; indirect control over crop choice via crop contracts.
1967-8	Lease permit	Evictions of non-complying plot holders
1970-1	Control of Irrigatable Areas	Legal jurisdiction over land vested in the IM
1972	Siphon irrigation	Control over irrigation watering, by monopolising syphons
1972	Plot no. inscribed in canal	Monitor individual performance; monitor staff's effectiveness
1972-6	Grading/points system	Monitor individual performance, evict low performers
1974-9	IM patrols with gun	Confirm authority, secure personal safety IM
1975-8	Protected village	Control movements of plot holders, prevent guerrilla incursions

Source: Adopted from Bolding (2003: 172)

As shown in Table 4.3, strict refinements were applied in Nyanyadzi irrigation scheme. According to Hughes (1974 cited in Bolding, 2003: 172) the period 1967 to 1975, saw an introduction of strict regulations by the resident Irrigation Managers and DCs turning the communal irrigation scheme into a more commercial irrigation estate.

Bolding (2003: 158) posits that,

throughout the 1950s and 1960s the total staff establishment of Agricolas at the scheme consisted of one European LDO, one African supervisor and four agricultural demonstrators (one for each block), who directed four water bailiffs (one in each block) and the maintenance gang. To increase the agricultural output the LDO and his team exercised the 'strictest control over the plot holders' insisting on the 'manuring of lands, planting dates, row irrigation and communal watering.

This gives a sense that the management set up of the scheme had not changed from what existed in the first generation of farming (1931-1948). Historical analysis further shows that because of the excessive and strict supervision in the 1960s as mentioned above the “*uneducated plot holders, tended to regard themselves almost as employees of a plantation working for a boss, and were*

afraid of being kicked off their land if they do not follow orders” (Roder, 1965: 172, cited in Bolding, 2003: 159). The LDOs like the government economist, believed that 'provision of close supervision' increased yield in the scheme (Hunt, 1958). Yet, in contrast, Gregory (1967: 93) observed that Nyanyadzi scheme, fell short of its *“full potential... because of human rather than natural or technical factors”* arguing that the plot holders needed to be persuaded to abscond their preference for subsistence and leisure henceforth practise what they were being taught by the LDO and his staff”. Hence, there was no freedom, and the farmers did not enjoy what they were doing but, did their best to prevent disappointments. This differs another perspective of working with farmers beyond their will and want hence, conflicts, resistance and tensions were bound to emerge.

In accordance, with the strict controls stipulated in Table 4.3, it is believed that new leases were issued which would *“make each plot holder eligible for eviction, if he/she did not comply with any one order of the Irrigation Managers’ directives i.e. if incorrect amounts of fertiliser had been applied, if planting dates were violated, if water was taken out of turn, etc”* (Bolding, 2003: 172). However, these new leases were somehow not welcomed in Nyanyadzi irrigation scheme. Nyanyadzi plot holders actively contested the new leases and when they were asked to sign the leases and return before the 31st of August 1968, all the plot holders refused. In response, the Irrigation management closed the water in the canal to the irrigation scheme. It is then believed that *“some of the plot holders mobilised solicitors in Salisbury, who duly informed the Provincial Commissioner (PC) that the cutting off water supplies to Nyanyadzi, Mutema and Mutambara schemes was tantamount to eviction, since these schemes had not yet been gazetted as irrigable areas, under the Control of Irrigation Schemes Regulations of 1967* (PC files, 11 September 1968 cited in Bolding, 2003: 172). In September 1968, the Chairman of Nyanyadzi cooperative, Robert Nkomo was asked by the resident Irrigation Manager to sign the newly drafted leases in his capacity as chairman, but he refused claiming that:

The people did not want it. The rumour was that if we signed the whole irrigation scheme would be given to Tribal Trust Land Corporation, predecessor of ARDA (TILCOR) (1967-1981). Then the irrigation manager asked me to call the kraalheads. I refused again, so he called the kraalheads into the office himself. They also refused to sign. Then the irrigation

manager came to me, offering me bags of money, if I signed. I refused again (PC files, 28 October 1968 cited in Bolding, 2003: 172).

Resultantly, no lease was signed, and another reason was that the farmers felt the leases put far too much power in the hands of the Irrigation Manager. Other new regulations were drafted under the Tribal Trust Land Act (control of irrigable areas), “*confirming the paramount role of the IM in areas declared irrigable, whilst allowing the PC to cut water supplies 'if a breakdown of discipline or widespread resistance to the authority of the District Commissioner (DC) occurred'*” (Rhodesia Government Notice No.103 of 1971, cited in Bolding, 2003: 172). Through this new regulation the Provincial Commissioner (PC) sought to address the “*main defect of the Nyanyadzi scheme: the idleness and lack of discipline of the irrigators... by proposing the enforcement of ploughing and ripping by tractor at the plot holders' expense; application of fertiliser and spraying of crops to be done by the extension staff paid by the plot holder; and payment of water rates in advance*” (Bolding, 2003: 173). The PC was convinced such action would result in more efficient production and better yields:

It is hoped that the application of these rules will result in many of the present irrigators leaving the scheme. This is all to the good, as the habit of idleness and non-co-operation is so deeply engrained that we are much better off without them. There should be no difficulty in finding replacements (Provincial Commissioner (PC) files, 14 September 1970 cited in Bolding, 2003: 173).

This ploy was also supported by the secretary for Internal Affairs with an intention to precipitate a massive abandonment of the scheme by the plot holders, which they felt would lighten their task (PC files, 26 September 1970 cited in Bolding, 2003:173). According to Bolding (2003), the ploy was a systematic one, but the Provincial Commissioner preferred an abrupt change through the divide and rule principle. Whilst the District Commissioner (DC) Melsetter (Mt. Selinda) preferred a more cautious and sympathetic approach considering two factors namely, a request for a delay in collection of water rates by the Tribal authority (kraalhead committee) because their cash crops had not yet been paid and the inadequate water supply to the scheme. But after consulting with the Agricultural Officer and the Cooperative Officer it was learnt that most of the farmers were paid and the DC was duly instructed to enforce water payments before the 31st of July (PC files,

June 1971 cited in Bolding, 2003: 173). The net result would see eviction of non-lease paid plot holders in Nyanyadzi in the following year followed by a continued wave of evictions in the following years. The number of evictions could not be established because of access denied to the 'sensitive' files in 1997 by the Irrigation Manager (Bolding, 2003: 173).

Other means to tighten control of the irrigation scheme included the revamp of the irrigation canal system with wider and more elevated cement canals which allowed the use of siphon. The siphon system was believed to increase efficiency and the fact that they were kept in one shed and released upon watering turns means the IM had more control over the irrigation scheme. Secondly, the use of the binoculars by the IM from his top house means increased monitoring of the irrigation scheme. Thirdly, the introduction of a system that graded the plot holder's performance, designed to serve as a 'Sword of Damocles'. The IM came up with a points system whereby, plot holders.,

were rated on their level of production, on preparation of the land, whether they were late in planting, whether they were absent when the water bailiff came to give them their water. The stipulated yield levels were 4.5 ton/ha for maize; 2.1 ton/ha for cotton; 1.1 ton/ha for beans; 1.9 ton/ha for wheat. If the plot holder fell below, he could be evicted 'to make way for a better and bigger producer' (li). In 1975 there were four grades: the top two grades were safe, the bottom two had to improve or risk eviction. (Pambuka, pers comm, 9 November 1995 cited in Bolding, 2003: 173).

The net result of the increasingly sophisticated forms of managerial control was that Nyanyadzi became an irrigation factory and highly productive at the same time. However, there are some slight inconsistencies between the farmers' historical narrations and what Bolding (2003) and other authors cited in his book "IN HOT WATER: A study on sociotechnical intervention models and practices of water use in smallholder agriculture, Nyanyadzi catchment, Zimbabwe," suggested. I will resume by giving slightly contrasting ethnographic narrations gathered through in-depth interviews with the five first generation of farmers. The aim is not to discredit or judge the authenticity or reliability of the farmers' historicity but learn from their deep cultural historicity. The aim is also to empathetically engage in their own understanding of their social construct as they shape and drive their current practice and stance. Hence, as an insider interventionist researcher I worked carefully with their narrations and used both the historicity in secondary data

and primary data sources for double stimulation process. The idea was to engage in progressive and transformative conversation rather than judging.

After saying the above, I will then begin by highlighting that it seems as if the overwhelming majority of the interviewees from the first and second generation of farmers agreed that, in the 1960s there was a ploy to evict Nyanyadzi irrigation farmers out of the irrigation scheme and this was the turning point in the management style in Nyanyadzi irrigation scheme. I want to believe that the ploy explained here resonates to the strict control plan engaged beginning 1968 by the Provincial Commissioner, the District Commissioner together with their agricultural staff members at Nyanyadzi irrigation scheme with the aim to precipitate more Africans evictions from the irrigation scheme. As narrated by Interviewee FGI 1 that,

... yes, the management tried... during this period the management of the irrigation scheme was solely in the hands of the LDO who was a white man and the District Administrator (DA)... so there was a year, I don't remember the actual year when LDO said, you are no longer supposed to farm in this irrigation scheme. That's the same year Mr. Mutendi's family was evicted to Gokwe area and that's the same year they attempted to evict us out of Nyanyadzi. We were given forms to sign... Mr. R. Nkomo and Mr. P Gudyanga asked for the forms before signing and took the forms with them to Salisbury (now Harare) to Mr. Savanhu's office who was a human rights lawyer by then. The lawyers looked at the forms and advised that the forms they were given were forms of eviction, once the farmers sign you would have agreed with the Land Apportionment Act (1942) that you shall be evicted and resettled elsewhere out of Nyanyadzi irrigation scheme and you will lose everything. So, they advised us not to sign and instead appeal to High court. For sure the Nyanyadzi smallholder irrigation farmers did not sign, and the Parliament ruled that the irrigation scheme be placed under the Chieftainship custodian on a 99 years lease (Interviewee FGI 1).

According to ethnographic data, after 1965 another form of irrigation management was witnessed, but everything changed when the British colonial government in the same year announced that,

... as government we have declared that we have handed over back your land and from now onwards you are on your own and the chiefs are now responsible for the management

of the irrigation schemes. There is no more the Water Bailiffs, so you are now supposed to manage on your own. This is where all the struggles started... starting to elect our own irrigation management committees, to transit water allocation, distribution and irrigation's infrastructure maintenance responsibilities to the committees... this is where all the other challenges began... (Interviewee FGI 1).

These views on the management are of course a bit different to that presented earlier but ended the controlling systems which were aimed at improving the irrigation yield as well as control the African farmers in Nyanyadzi irrigation scheme. Hence, in the second generation of farming there was little government support, all the heavy subsidies and contract farming systems were withdrawn. To put it more precisely, of course the heavy subsidies were withdrawn but much of the funding and maintenance of the scheme was drawn from the water and crop taxes that were imposed on the African farmers in Nyanyadzi irrigation scheme as well as from the Native Development Fund (NDF). And the high-water rates and crop taxes under the Native Land Husbandry Act (NLHA) have been highly contested by Nyanyadzi farmers.

It is further agreed that the situation further worsened,

... around the 1960s, 70s from the 1969 coming to the 1970s the liberation war (Chimurenga 1) started... Also imagine the Irrigation Management Committee allocating and distributing irrigation water on voluntary basis. The government even recalled most of the Extension officers, just leaving a few, one or two per irrigation scheme. Just imagine that during the same period, the Irrigation Management Committee was supposed to allocate water and monitor the irrigation farmers during the main canal maintenance work since, the gravitational canal from the catchment to the irrigation and overnight storage dam was damaged and leaking (Interviewee FGI 1).

In essence, this shows that the Irrigation Management Committee (IMC) was overwhelmed by the daily tasks and responsibilities they suddenly had to shoulder to see the irrigation functioning properly, yet they were just volunteering. It must be emphasized that, during the period under study the roles and positions in the IMC were totally voluntary with just a few allowances that were not sufficient to cover most of their expenses. Additionally, the day-to-day management activities of the scheme are within the irrigation scheme hence, the IMC members especially the women who

cannot ride bicycles, walk long distances to deliver their duties and responsibilities. Hence, most of the IMC members spend more time on executing the IMC's duties than working in their own plots further jeopardizing the division of labour principles or risking the families of household food insecurity for their families.

In addition, during the second-generation farming era the roles of the Agricultural Technical and Extension Services (AGRITEX) and Nyanyadzi Vocational and Training Centre (NVTC) changed abruptly. The two organs mentioned above were noted to have played more critical role(s) through farmer education and advisory services in the first generation of farming than in the second-generation farming era. Their role(s) became more invisible and unrecognized during the period under study. One of the farmers from the first-generation of farmers said the following in an interview, *“we learnt a lot during our time, we had Extension officers teaching farmers at the Training Centre (NVTC). But the bankruptcy of the Training Centre (NVTC) led to the distribution of the demonstration plots to us in 1964”* (Interviewee FGI 3). This, therefore meant that by 1964 the extensive farmer education programs which were conducted by the NVTC started falling away. The importance and role of the NVTC deteriorated further towards the third generation-farming era. The NVTC staff member referred to as CLW 2 in one of the plenaries in the Change Laboratory Workshop said,

... thank you for this opportunity, I never thought we would have a time we sit together and reflect on how the NVTC has become a White Elephant. Parents I want us to critically think why was the NVTC established and what role does it play? We feel like we are isolated, we are neglected, and we have never been invited to any important decision making processes of the irrigation scheme, yet we have ideal brains here... it is a shame to mention that most of the farmers and guardians in this irrigation scheme do not know that we offer Horticulture courses at the Training Centre but, they prefer to send their children to learn agriculture and other courses in TVETs that are far and expensive despising our own Centre.

There is a true disconnection and lack of synergy between the NVTC and the farmers as well as, between the AGRITEX and the NVTC, yet they have a shared object that is providing technical support to the farmers and mostly farmer education. CLW 2 also mentioned that,

... we don't feel connected with the AGRITEX, yet it was interesting learning from the history of the irrigation scheme, how the two entities are complementing... we feel like there is so much we can work together be it in the teaching of farmer certificate courses here at the Centre or our students can be practically exposed through internship in the irrigation and/or with the AGRITEX. Together we can help the farmers and the irrigation scheme to develop...

True reflections on the history of the object further reveal that even the farmers felt they have drifted from the AGRITEX and the Training Centre (NVTC) as reported by Interviewee SGI 6 that,

... what we used to see was that our parents were well organized, they did much of their farming together with the Extension officers unlike in our own time, the Extension officer is on his own, the farmer on his own and the end is disaster. We can actually envision the end as the death of the scheme and no improvement at all...

Interviewee FGI 3 reports that, “*the Extension officer quitted fast*”. Meaning that the AGRITEX lost its responsibilities and mandate too soon before the farmers were able to adapt, adjust and cope with the new developments regarding the management of the irrigation scheme. In addition, Interviewee SGI 7 also posit that,

... you can tell from the way the farmers respond to the Extension officers, that it's not being respectful. The respect disappeared, it now appears as if the farmers despise the Extension officers because of their long histories of farming or because they are older than the officers, yet the officer is just there to share knowledge and experiences...

The above narrations reflect the disjuncture between the AGRITEX and the farmers. Issues of disrespect were reported in the ethnographic data and in the Change Laboratory Workshops (19-21 September 2019). In extreme cases the Extension officers were reported to have been physically assaulted. This disrespect has destroyed the farmer education processes that existed.

Another critical issue that started to surface in the second-generation era is the power transition within and between the generations. It is no secret that socio-cultural rules played a major role in power dynamic relations within and between the farmers' activity systems. Importantly, there were

smooth transitions between the first-generation to the second generation. This process did not happen overnight but was a process as narrated by Interviewee SGI 7 that,

... I was born in 1967, and the irrigation scheme was already functional, so we grew up seeing what was done by our parents until we were old enough to help out in the fields. I would say I started to get involved in 1974, ploughing in the fields and we would plant beans, cotton, maize, wheat, tomatoes and green... so it went on like that until I inherited from my father...

The above description from a second-generation of farmers opens critical space for the expansive learning process especially learning from the history for the betterment of the future. However, the idea is not to duplicate the previous systems but to understand the holding straits in the previous farmers' activity systems and how they have constrained or aggravated expansive learning, agency and transformation of/in the object. The main changes in the object of activity in this period are summarized in Table 4.4:

Table 4.4: Summary of the Evolution of the Object of Activity 1948-1980 (Second Generation of Farmers)

Summary	1948	1960	1975	1980
Second generation of farmers	• inherited or partnered with their parents in the scheme	• Contract farming + Access to loans • 1972- Plot number inscribed on the canal- to monitor individual performance; monitor staff's effectiveness		1983- 414ha cleared in Block A, B, C & D
Governance & rules introduced (management)	• Farmer Representative Body (FRB) also known as the Kraalhead Committee • 1951- Native land husbandry- allocating unproductive land to Blacks and minority White colonialist to fertile and productive lands • 1950s – LDO manages the irrigation scheme's contract farming doing all the legal contracts & making sure the farmers satisfy contract quotas. • 1958- formation of the Nyanyadzi kraalhead committee - mediate between the management and plot holders; administered scheme by-laws; remote control over plot holders, centralising point of interaction • There was a small degree of irrigation farmers' involvement and participation • 1959 Nyanyadzi producers' Cooperative Society- Control over disposal of crops (1967: Crop tax); provision of inputs and chemicals; indirect control over crop choice via crop contracts; collect and register farm produce and issuing pay checks to individual farmers via a bank account at the local Post Office. • 1960s – the LDO system together with the Native Development Affairs management systems were replaced by the District Administrators (DA)- this system devolved power to the chieftainships and then to the Kraalheads lastly, to the Irrigation Management Committees (IMC) • government in financed infrastructure development and provided farming inputs i.e. fertilizers, seeds and technical support to the farmer • 1963s the irrigation farmers revolted to the Native Land Husbandry Act (NLHA), Department of Conservation and Extension (CONEX) introduced in the irrigation scheme • 1st of July 1967- new order was announced through the Ministry of Internal Affairs to control the function of the farmers in the District Council (DC) and make the resident Irrigation Manager (IM) oversee the day-to-day management of the scheme			

	• 1967- Control of Irrigation Schemes Regulations of 1967- • 1967-1968- Lease permit; Evictions of non-complying plot holders • 31st of August 1968 most farmers contested against & in-line with the Lease permit policy, water was cut off Nyanyadzi irrigation scheme and the ploy was wrongly interpreted as a move to evict the irrigation farmers since the schemes were not yet gazetted as irrigable areas, under the Control of Irrigation Schemes Regulations of 1967. • 1970-1971- Control of Irrigatable Areas; Legal jurisdiction over land vested in the Irrigation Manager (IM) • 1972-1976- Grading/points system- Monitor individual performance, evict low performers • 1974-1979- Irrigation Manager (IM) patrols with gun- confirm authority, secure personal safety Irrigation Manager (IM) • 1975- 1978- Protected village- control movements of plot holders, prevent guerrilla incursions			
Training opportunities		1939 irrigation policy- 5 conditions AGRITECH Officers (EO) provided advise -each Block had Agricultural Demonstrators (Extension Officers)- taught how to plant -learnt how to use water wisely -learn by doing and demonstrations - Master Farmer Certificate -school of Agriculture (Nyanyadzi Vocational and Training Centre (NVTC)- Demonstrators - 1967 to 1975, - an introduction of strict regulations by the resident Irrigation Managers and District Commissioners turning the communal irrigation scheme into a more commercial irrigation estate.		
Crop production & changes	-early October 1931- 29 Acres of Maize were planted (14.5 bags per Acre output [3.2 t/ha]). -1943-1956- maize in summer & wheat (50%); sunhemp (45%) and beans (5%) in winter -1952- sunhemp was removed as winter crop- insect terminated	Lack of cash crop -no seed to order -plot-holders were given freedom to choose crops to grow but compulsory 3 successive stages -1960s- contract and export crops- beans, khakhi beans, tomatoes, cotton and paw-paws		-Only a few crops produced mainly subsistence
Water supply system & changes	• December 1957- the pump house became operational. • 2 hydro-electric pumps were installed at Odzi pump house.	• Water distributed to plots - not individuals. • 1968- water shortage	-1944 upper canal pegged. -Irrigation canal monitoring	-government owned canal infrastructure -water efficiency not considered

	• 8- kilometre gravitational canal system was constructed to connect the overnight reservoir. • 1949 overnight storage dam was built • 1949- water shortage • 1952- water shortage • 1957- water shortage • 1960 – water shortage • 1961 – water shortage • 1964- water shortage	1972- Siphon irrigation- Control over irrigation watering, by monopolising syphons • Four Water Bailiffs per Block	-water rate payments -Water Bailiffs distributed water -a working water distribution list -1970- water shortage 1971- water shortage 1973- water shortage	
Marketing & changes	-lack of cash crop & market only maize to sell- no other cash crops - 1950s- over production of maize- low market value - 1950s- Sunhemp became unprofitable and petered out - 1954 onions were tried but quickly saturated the market - 1957- Liebig's canning company contract farming- <i>onions, carrots, cauliflower, sweet corn, peas, tomatoes and beets suddenly found a guaranteed market although only green</i>	• 1960s – contract farming -better market - Export farming - beans, khakhi beans, tomatoes, cotton and paw-paws • 1965 -peas was tried but quickly saturated the market. • The market was later disrupted by the political environment in the late 1960s	-no water measuring devices -mainly subsistence	-water not distributed to crop requirements

	<i>beans proved financially rewarding</i>			
Other major events or issues	• Drought • 1950s-water crisis management	1938/39 growing season delayed of drought • 11th of November 1965- British sanctions after the Prime Minister Ian Smith declared a Unilateral Declaration of Independence (UDI) • September 1962 torching of the top house (LDO's house & government storeroom)	-Land owned by the government -1970- Control of Irrigable Areas Regulations - water deficit due upstream water use -1967-1979- Second Chimurenga - 18 April 1980 – Independence of Zimbabwe	

Source: Author

4.2.3 Subsistence farming without Government support (post-Independence, 1980)

According to Manzungu and Van deer-Zaag (1996) from the 1980s until the present, a new *era of reform* in irrigation farming came to the forefront. In the third generation farming the grand children born post-independence (1980) were integrated in the scheme. During this era, a new Zimbabwean government came into power and many agrarian policies were since passed into law, and the political-economy environment became a heavily contested one. This period is described by all the three generations of farmers as chaotic. Interestingly, most second-generation multidimensional complexities spilled over to the third-generation era.

The personality and passion of the third-generation farmers was the one quickly judged and condemned. For instance, Interviewee SGI 6 lamented that,

... if we are to talk about the challenges faced in water distribution in the irrigation scheme, it's because the farmers are in total control of everything, yet some of the farmers are still young they don't have the knowledge...they are misleading and they don't have any attachment with the land they inherited, they just think of leasing and drink the money.

The above lamentation opens up further complex issues in the third generation of farming era. This has to do with the lack of farmer education and training; misleading acts by the third generation of farmers, issue of inheritance and plot attachment, and lastly, the issue of illegal leasing of the plots.

Of importance to this study are the dynamics in the family inheritance rules. The issue of youths in the irrigation scheme is not a new concern but was also raised by Bolding (2003). He argues that “*over time the irrigation management increasingly directed its attention at creating employment for the many unemployed school leavers resident in Nyanyadzi. These were perceived by the Administrators to form a potential security threat*” (179). As of 1975 onwards there was a youth extension worker whose focus was on establishing the so-called Young Farmers Clubs (YFCs) which aimed at supporting and training the youths in all kinds of income generating activities, for example, poultry, gardening, horticulture, veterinary care and wood carving. There were two female community workers who trained the young girls in cookery and sewing (Tembani, 1997 cited in Bolding, 2003).

Despite the youths' unemployment concern prior to independence, the current concerns are rather overwhelming. The unprecedented rates of the unemployed youths are undesirable and the irrigation scheme cannot absorb them all. As a result, more pressure is placed on irrigation plots as the lone livelihood strategy in the third generation of farming. But other factors have also come into play during this period making the situation unbearable. Natural increase in population growth has taken its course which was the major problem the past generations have been struggling with. However, in the third generation of farming there has been a new twist to population growth. There has been an issue of natural decrease (deaths) which have also affected the irrigation scheme. Natural deaths have caused a series of challenges some which shall be discussed in this section and some further elaborated in the next chapters. It is important to understand the irrigation inheritance rule for us to be able untangle and further understand the multidimensional complexities manifesting in the irrigation scheme. As mentioned earlier own, deaths have caused a new challenge which is brought in by both national and irrigation scheme inheritance policies. Related challenges that have been realised in this study and shall be discussed further are multiple plot holders and illegal leasing.

According to the Irrigation Constitution (1987), the living spouse is entitled to the full custody of the deceased's plot ownership. In this case under the first-generation management, the husband was registered as the rightful plot holder. Hence, in case the husband passes on the living spouse inherited as the rightful plot holder. This contradicts the dominant male primogeniture rule under the customary law in which a widow had no capacity to inherit from her husband's estate and hence she could not be appointed intestate heir. In essence, heir to the intestate estate of a deceased African male will be his eldest son and or in the absence of a son to the nearest male relative. As a derivate the Shona culture does not recognize the surviving widow as part of the lineage but acknowledges the surviving eldest male child or male children in general as rightful heir(s) to their fathers' plot. Surprisingly, the power dynamic transitions in the first generation of farmers in Nyanyadzi irrigation scheme was a deviant from patriarchal ideology. Instead, it was organized in a manner that awarded the surviving spouse a sole benefication thereby, maintaining of one plot holder. This was important in maintaining the irrigation scheme's integrity, unit of purpose and holding tight to the irrigation scheme's object.

Secondly, this inheritance rule in Nyanyadzi Irrigation scheme also defies the amended Deceased Estates Succession Act Section 3(A) which provides the equal right of inheritance to every surviving spouse and the children either men or women. Meaning as soon as one parent is deceased, the surviving spouse and children must equally benefit from the properties. In essence, the Nyanyadzi irrigation scheme constitution went on to promote the surviving spouse ahead of the children. However, this could make sense considering that the 1987 Nyanyadzi Irrigation Constitution also went against the early oppressive Customary laws in Zimbabwe during the colonial era. It is important to mention that the stance and positioning of the local Irrigation Scheme Constitution has been critical in maintaining one plot holder system thereby, easing resource distribution including water and farming inputs as well as cooperative initiative management systems.

However, challenges began with the onset of the second-generation of farmers especially after both parents died. The irrigation constitution now makes reference to the amended customary inheritance law commonly known as the Deceased Estates Succession Act Section 3(A) which provides that the plot is supposed to be divided equally amongst the children regardless of gender. This process ended up promoting constitutional rightful multiple plot holders. One thing to note is the fact that, *“there has been no Acreage increase in the scheme”* (Interviewee FGI 3) but more players, creating a more complex land tenure system which is also difficult to work with from within. Let’s say

you have two Acres and they have been sub-divided among your four sons and each wants to water his own piece of land and what does that mean to the other person in the scheme who also want to water his one plot, this is where the challenge begins (Interviewee FGI 1).

Plot holding in the irrigation scheme is beyond being the rightful owner, but it also comes with the decision-making power and opens access to several irrigation benefits and essentials including water and the farming inputs. In this case, multiple plots holding exerts pressure and creates internal competition for the limited and scarce resources like water. Somehow, multiple plots holding creates complex water and farm inputs distribution cycles that are difficult to manage and

resultantly, superficial water management crisis and crop failures are reported. This issue if carefully traced reflects deep seated contradictions in the inheritance rules the farmers are using and dilemmas that result (see Chapter 5). Death and succession are natural and particularly important for generational transition and expansion of the object but when succession threatens survival of the scheme transformation agency to deal with this challenge becomes a dire necessity.

The failure by the third generation of farmers to do what has also gave birth to another critical issue of concern, that is illegal leasing of the plots. The issue of illegal leasing was not new in the irrigation scheme. From the onset of the irrigation scheme Rev. Alvord was careful to maintain and prevent what he termed land-lordship (Bolding, 2003). According to Alexander (1993: 55) the 1954 Native Land Husbandry Act (NLHA) assessment of Nyanyadzi irrigation scheme showed that there was a “*sub- division of irrigation plots below the threshold of economic viability.*” In support to the mentioned observation the top provincial Agricola also reported that “*in Nyanyadzi 171 plot holders out of a total of 275 held two acres or less of irrigated plots. Only 86 plot holders farmed on holdings of four acres*” (Bolding, 2003: 160). Unlike now, these reported uneconomic holdings were created by administrative pressures in the past to resettle as many displaced Africans from European farms as possible. Learning from the past, what was termed economic holding consists of four acres, which were purposeful subdivided as three acres of food and commercial crops and one acre of grass-legume pasture (Bolding, 2003: 160). Currently, it has been as a result of two discussed forces namely, inheritance policy and unsupportive political-economy leaving many without options other than to make ends meet by securing the little lease funds.

However, it is important to reflect that, illegal leasing adds on to farmer diversity in the scheme and this bring forth dissonance and contradictions which are important for fruitful expansive learning (Engeström, 2008). On the other hand, adding more plot holders further complicates the object and defeats the unity of purpose in the scheme. One important stream of thinking that was shared by most the first and partly second generations of farmers is the issue of attachment to the land and passion for farming by this third generation of farmers. Interviewee SGI 6 claims that, “*we can also see that we have attachment issues, and these ones are big, the second generation to the first generation we are attached to the land... but the third generation are not interested in the farming at all.*” He further argued that, “*yes things changed a lot... but there is a strong sign of*

laziness from the new coming generation. We were taught by our parents how to farm but this new generation don't take farming seriously as we did... there is no improvement at all...” Illegal leasing was reported to be high in this era. On the contrary, Interviewee TGI 3 attribute this to the fact that, *“most of the initial plot holders passed on, so the kids lease to the teachers...and policeman due to high input costs that are beyond many.”* Apparently, illegal leasing of the plots has closely related consequences to multiple plot holding system explained earlier on in the second-generation of farming era.

Another important development in this farming era was the change in the national irrigation policy, the involvement of the Irrigation Management Committee in managing the scheme and the abrupt irrigation management transfer from the government to Nyanyadzi's politically divided users after 1996. These shifts in policies and subsequent withdrawal of subsidies and support by the government affected irrigation farming enormously in Nyanyadzi. Bolding (2003: 193) realised that after independence, *“the dominant discourse on irrigation management incorporated shifts in both the onus and focus of management.”* According to Chambers (1988) the focus shifted from plot level to main system management, whilst the onus for both development and management of irrigation schemes shifted from the state to a combination of the market and the actual users, along the neo-liberal mantra of *“less state, more market, more users”* (Repetto 1986, Ostrom 1990, 1992 cited in Bolding, 2003 193). Three policy reforms heightened during this period as informed by the new international policy discourse namely,

- (a) the introduction of water markets through volumetric water distribution and pricing;*
- (b) the establishment of financially autonomous irrigation agencies that were accountable to their clients instead of to the state;*
- (c) promotion of self-governance and irrigation management transfer from public irrigation agencies to water user associations* (Oorthuizen 2003, Rap 2004 cited in Bolding, 2003: 193).

In the previous farming era, it was learnt that the state was heavily involved, monitoring, supporting and controlling the critical operations of the scheme. Such critical operations that were generated from the farmers themselves but managed by the government agencies and such included infrastructure maintenance, electricity bills for the water pumping house, water extraction bills and irrigation network management and maintenance of personnel salaries. As of the

beginning of new era under the new Zimbabwean government dispensation areas such as the Electricity, Water bills and relief of the Water Bailiffs were the most affected. Especially after 1996 when the government officially and successfully handed over the irrigation scheme to the community. It is important to quickly remind ourselves that in the first-generation era, farmers “paid 5Shilling, 5 Shilling per Acre... for the maintenance of the irrigation infrastructures” (Interviewee FGI 3). Although according to Bolding (2003) the water rates and crop taxes fluctuated but reached as high as £28 per acre per annum. But currently, the scheme sits on a more than US \$60 000 Electricity debt and an unmentioned debt on Water tariffs. In the wake of the debt the irrigation management committee adopted a pay per watering cycle model. It was estimated to cost US \$18 to water an Acre on which Interviewee FGI 2 posit that,

... the problem of water is that you are supposed to pay per cycle, and we are no longer sure if this is still our water or what? If this were the model, we would have left the irrigation scheme long time back because now all the remittances from our children abroad now goes to watering and the cycle is very expensive.

Important during this era is to note that the gravitational water from Nyanyadzi river cost \$10 per cycle while, the hydro-electric pump from Odzi river costed \$18 per cycle. Interviewee FGI 3 pointed that, “it’s no longer profitable, am just paying the \$10 so that I can harvest the crop, but I can’t keep farming on these expenses.” Critically, Interviewee SGI 6, said

... in relation to water crisis, I think we are faced with big challenges. Let’s start with the hydro-electric water, I have observed that the irrigation pumps (450hp) we are using don’t compare well to the type of farming (subsistence) we do. The hydro-electric water is expensive, when comparing the farming type and the operational costs involved - they don’t tally. Even if you work extremely hard all the money will go to the electricity bills, so the outcome of your hard work remains nil hence, the farmers are not progressing in any way.

The last issue of interest is the failure to successfully integrate the third generation of farmers into the activity system which is mostly related to poor or no farmer education, passion and dedication. This failure has left the third generation wanting and incapable to promote the vision and object of the irrigation scheme causing further household food in security. A careful understanding of the history of the object therefore, surface up and opens a better understanding of the contradictions

experienced in the scheme. A summary of the main changes in the object of activity in this period are summarized in Table 4.5:

Table 4.5: Summary of the Evolution of the Object of Activity 1980- to date (Third Generation of Farmers)

Summary	1981	2000	2010	2019
People settled & size of Nyanyadzi irrigation scheme.	• First generation of farmers; second generation of farmers and third generation of farmers participate • To date – approximately 430 -450 ha of arable land in Nyanyadzi irrigation scheme. • 99-year lease • 1987 Irrigation constitution- inheritance law • Multiple plot-holders			
Governance & rules introduced (management)	• Era of reform • 1980s -to date: Radical era of reform- highlights the diverse nature of the farmers as problematic. • Irrigation Management Committee (IMC) • 1981- Derude policy- responsible for construction and management of smallholder irrigation schemes. • July 1987- Derude was transferred to AGRITEX- • Irrigation Constitution (1987)- govern and guide the day-to-day activities in the irrigation scheme; customary law • towards the end of the 1990s the Government withdrew financial obligations • 1985- National Farm Irrigation Fund - meant to alleviate government spending on financing operational and maintenance costs of the smallholder irrigation schemes by providing loan facilities to maintain and expand their irrigation schemes' infrastructures using the land as collateral. • 1990-1994- FAO and GTZ (a German Development Agency) initiative financing the development of an irrigation policy and strategy in Zimbabwe. • 1991-1993- Decentralisation Policy- intended to establish a participatory system of local government based on the devolution of authority to various levels, at village (VIDCO), ward (WARDCO) and district level (District Council)		• April 2016, - Chimanimani District Climate Change & Watershed Management Dialogue Platform- to promote and facilitate an inclusive dialogue process concerning Climate Change and Watershed Management with all the relevant Government departments, traditional leaders, NGOs and other civil society organisations, private sector, rural community representatives and other interested individuals or actors. • Three policy reforms- a) introduction of water markets through volumetric water distribution and pricing b) establishment of financially autonomous irrigation agencies that were accountable to their clients instead of to the state c) promoting self-governance and irrigation management transfer from public irrigation agencies to water user associations	

	• 1995-1998- National Water Policy and Strategy- re-distribute water access, commercialise government departments involved in the management of water and involve the water users in the development and management of water on a river basin/catchment scale. • Department of Water Development was later changed to the Zimbabwe National Water Authority (ZINWA). • August 1996- Zimbabwe Agricultural Policy Framework- facilitate the release of international funding for the implementation of World Bank mediated Public and Agricultural Sector Investment Plans. • Deceased Estates Succession Act Section 3(A)- plot distribution	
Training opportunities	-1975 onwards- Young Farmers Clubs (YFCs)- support and train the youths in all kinds of income generating activities.	AGRITEX Officers (EO) provided advise -each Block had EO- taught how to plant -learnt how to use water wisely -learn by doing and demonstrations -school of Agriculture (Nyanyadzi Vocational and Training Centre (NVTC))
Crop production & changes	-	Lack of cash crop -no seed to order -plot-holders were given freedom to choose crops to grow but compulsory 3 successive stages -Only a few crops produced mainly subsistence - Poor markets mostly informal market -lack of contract cropping - Plot-holders have liberty to choose crops to grow but lack cropping calendar- no unit of purpose - Mushrooming of multiple-plot holding, illegal plot leasing
Water supply system & changes	• 1983- water shortage • 1984 – water shortage • 1987- water shortage • 1991- water shortage • 1992 -drought • 1994- drought • 1995- drought	• Farmers distribute own water. • Government withdrew financial support in the water and infrastructure management • water rate payments -\$18. 00 per Acre per watering Cycle • Water Bailiffs were removed and replaced by volunteering farmers • Lack of a water distribution list • Water efficiency not considered • - US\$ 60 000 Electricity debt (ZESA-ZETDC)

	• 1996- Cyclone Bonita • 2003- Cyclone Japhet • 2007- Cyclone Fabio • 2015- Cyclone Chedza • 2019- Cyclone Idai • 2020- Tropical storm Chalene	• -Unmentioned Water utility debt (ZINWA) • -Unmentioned Water drawing Debt (Odzi Catchment)		
Marketing & changes		-lack of market -non-functional Irrigation Marketing Committee - individual marketing - decrease in plant diversity & productivity	-no water measuring devices -mainly subsistence	-water not distributed to crop requirements
Other major events or issues	• late 1990s- War veterans' land invasions causing political unrest • Rural District Council Amalgamation Act of 1991- attempted to entrench the involvement of line departments in the administration, operation and management of local projects, including smallholder irrigation projects • National Water Policy and Strategy-led to the rise in national blend price charged for agreement water and withdrawal of electricity subsidies on pump operated smallholder irrigation schemes.		-Land owned by the government	

Source: Author

4.3 CHAPTER CONCLUSION

Careful work was undertaken in presenting and tracking the history of the object (crop production and marketing under irrigation) in this chapter. Attention has particularly been paid to the ethnographic data generated from the fifteen in-depth interviews and verified in three focus group discussions with various farmers from Nyanyadzi irrigation scheme as well as careful analysis of available documentation, especially the study of Bolding. In this chapter I have let data spoke and my interest as an insider interventionist was to facilitate a dialogue between the multiple voices in this study and a conversation with the literature from prior studies, particularly in the same context. In other words, the process involved ethnographic data triangulation with prior studies, and archival files at AGRITEX Nyanyadzi. The above historicity is important in CHAT work, and I argue earlier on that a careful historicity can enable and enhance surfacing of contradictions within and between activity systems. Hence, historicity can bring forth in-depth understanding of the past, gives attention to the detail of how things have come to be. It can, therefore, be concluded that the long historicity of Nyanyadzi irrigation is rich, making it conducive and possible for expansive learning process via double stimulation in change laboratory workshops. The historical analysis can inform a strong mediated process of expansive learning opening possibilities for developing transformative agency and advancing the farmers and other key stakeholders' zones of proximal development. Hence, this chapter provided the necessary material needed for the expansive learning process via change laboratory which shall be discussed in the next chapter.

Chapter Five: Contradictions in and between the interacting activity systems in Nyanyadzi Irrigation Scheme.

5.0 INTRODUCTION

This chapter presents, describe and explain the contradictions faced by the farmers and other key stakeholders in Nyanyadzi irrigation scheme. The contradictions are categorised as primary, secondary, tertiary and quaternary and are presented in this sequence.

5.1 THE CONCEPT OF CONTRADICTIONS

The concept of contradictions emerged from Marxist dialectics (Marxist, 1990). Engeström and Sannino (2011) argue that first and foremost a contradiction is a foundational philosophical concept and must not be equated to a paradox, tension, inconsistency, conflict, dilemma or double bind. They further argue that the latter are supposed to be theoretically defined on their own, set in relation to the concept of contradiction and understood as manifestations of contradictions (*ibid*, 2011). “Contradictions cannot be observed directly; they can only be identified through their manifestations” (Engeström & Sannino 2011). Therefore, “contradictions are historically emergent and systemic phenomena” which we don’t have any direct access to (*ibid*, 2011: 371). Hence, we can only approach them through their manifestations and these manifestations can be viewed as constructs or articulations. Meaning, contradictions can only become visible when practitioners articulate and construct them in words and actions (Hatch, 1997).

Engeström (2011) further explains that, contradictions are not the same as problems or conflicts rather they are historically accumulating structural tensions within and between activity systems. In essence, an activity system is constantly working through tensions and contradictions within and between its elements and the contradictions manifest themselves in disturbances and innovative solutions. Subjects can experience the four levels of contradictions namely, primary, secondary, tertiary and quaternary (Barowy & Jouper, 2004; Cole & Engeström, 1993; Roth, 2003d), depending on where they occur in the activity system. The above mentioned four contradictions shall be discussed in detail in the sections to follow.

According to Roth and Lee (2007) **primary** level contradictions exist internally to a

constitutive moment. For example, a primary contradiction could be between a commodity value and its exchange value. Another good example would be tensions or conflicts arising from within the activity systems itself. It is also important to mention that primary contradiction have been reported to have a tendency of generating secondary contradictions that are specific to the conditions of the given activity (Giddens, 1984). While **secondary** level contradictions exist between two constitutive moments (Roth & Lee, 2007). A secondary contradiction normally manifest itself when a new element from the outside has been adopted into the activity system for example a new technology. The adopted technology often leads to ends in a conflict with some old element such as the rules or the division of labour. Such contradictions generate disturbances and conflicts but also innovative attempts to change the activity, making the zone of proximal development an invisible battleground. Old rules lagging and thwarting possibilities opened by advanced new instruments are a common example.

Tertiary level contradictions exist between one activity system and its possible forms in more advanced states. Or when the object of the older activity systems clashes with the object of what can be seen to be a more advanced activity system. According to Roth (2007), tertiary contradiction can also exist between the object (motive) of the dominant and the object of a culturally more advanced form of the activity. Finally, **quaternary** level contradictions occur when elements of the central activity clash with elements in any neighbouring activity systems (Engeström, 2005; Mukute, 2010). Interestingly, the inner contradictions mentioned above may “reveal themselves only during analysis, but they express themselves as trouble in ongoing activity” (Roth & Lee, 2007; 2004).

It is critical to understand that my study is situated within the dialectical tradition of cultural-historical activity theory (Engeström *et al.*, 1999; Sannino *et al.*, 2009), and employed the theoretical lens of the model of a collective activity system (Engeström, 1987), complemented and extended with models of multiple interconnected activity systems (Engeström, 2001) in the mapping out of the dialectical contradictions and manifestations as indicated in Chapter 2. Discursive manifestations of contradictions were applied in the mapping out of the central contradictions. The discursive manifestations of contradictions as described and explained by Engeström and Sannino (2011) are discussed in the following section:

5.1.1 Discursive manifestations of contradictions

In essence, the four types of discursive manifestations of contradictions were employed to

describe and characterise the emergent of contradictions which Engeström and Sannino (2011: 371) referred to as dialectical contradictions. Contradictions are therefore, manifested and constructed in patterns of talk and discursive action in sense making processes by and with the participants in dealing with and transforming or resolving their contradictions (Engeström, 1999; Taylor & Van Every, 2011).

The dialectical framework was applied to identify and analyse the dialectical historical contradictions that emerged in the study using the four kinds of manifestations that emerged from the ethnographic and change laboratory data. It is important to point out that because of the differences in linguistic structures and the modes of socialization, between the Shona language used in the data acquisition process and European language family, it was difficult to apply the linguistic cues as suggested (Engeström & Sannino, 2011) but this had to be adopted, as in case of Jalasi (2018) who was analysing data in Chichewa. The biggest challenge encountered working with Shona as the medium of instruction and socialization during the data acquisition process is that Shona has many borrowed words, and some of the words have multiple meanings. Hence, there is need for deep engagement with the cues and phrases in their original context and for sense and meaning making. In the study I ended up with fourteen (14) linguistic cues used as correspondence to manifestations of contradictions (see Table 5.2). The dialectical framework comprised of the four kinds of manifestations namely, dilemma, conflict, critical conflict and double bind. The four kinds of manifestations are described below:

5.1.1.1 Dilemma

Dilemmas are traditionally studied “as means for understanding processes of decision making, moral reasoning, social representations and ideologies” (Engeström & Sannino, 2011: 373). Dilemmas characterize our everyday thinking and conduct. As Billig *et al.* (1988) point out, dilemmas do not refer to the agonized mental states of the decision-maker who is faced with a difficult choice but to aspects of socially shared beliefs which give rise to the dilemmatic thinking of individuals. Dilemmas are ideological, ahistorical in nature hence, “they can hardly be universal” (Billig *et al.*, 1988: 149) and they could be in form of expressions or exchange of incompatible evaluations between people or within the discourse of a single person. Dilemmas are commonly expressed in the form of hedges and hesitations; hence, they are typically reproduced rather than resolved often with the help of denial or reformulation.

5.1.1.2 Conflict

De Dreu and Van de Vliert (1997: 1) describe conflicts as a form of resistance, disagreement, argument or criticism which usually occurs when “an individual or a group feels negatively affected because of perceived divergence of interests, or because of other’s incompatible behaviour.” Tjosvold (1997) further described conflict as a situation whereby one person’s actions interfere, obstruct or make another person’s behaviour ineffective.

Conflict can be in various forms. There is verbal conflict in which utterances, actions, or successive turns at talk by participants are observed (Vuchinich, 1990: 118). Common expressions are “no”, “I disagree”, and “this is not true” (Grimshaw, 1990) also particularly, the negation, denial or rejection expressed with a “no” which is also a powerful indication of a conflict (Litowitz, 1997). Vuchinich (1990) note that compromise or submitting are the dominant conflict resolution strategies. This typically happens by means of finding a common agreement to authority or majority. Ideally, Vuchinich (1990) also conceptualised five conflict resolution strategies conflict termination, namely submission, dominant third-party intervention, compromise, stand-off, and withdrawal.

5.1.1.3 Critical conflict

Engeström and Sannino (2011) described a critical conflict as a situation in which the subject’s inner doubts paralyze the motives to solve a contradiction. While Vasilyuk (1988: 199) describes it as “a situation of impossibility or unintelligibility.” Leont’ev (1978) cited in Sannino, (2008a: 273) further described a critical conflict as a conflict of motives and went on to argue that in most cases it happens outside the subject’s consciousness and “are revealed to consciousness only objectively by means of analysis of activity and its dynamics. Subjectively they appear only in their oblique expression, in the form of experiencing wishes, desires, or striving toward a goal.” Ideally in the social setups, critical conflicts typically involve feelings of being violated or guilty, often silenced (Sannino, 2008 cited in Engeström & Sannino, 2011: 374). In this case, subjects’ personal, emotional and moral accounts hold strong narrative structures and are frequently manifested in strong metaphors. A good example of critical conflict or conflict of motives is when “... waking up, a person knows he must get up yet, on the other hand, he would like to sleep a little longer” (Vygotsky cited in Engeström *et al.*, 2014: 120). Hence, the two motives alternate, appear in consciousness and replace each other. You cannot fulfil both motives there has to be one and the other one is replaced. Therefore, the

resolution of critical conflicts involves finding a new personal sense and negotiating a new contextual meaning and this can lead to personal liberation or emancipation.

5.1.1.4 Double bind

Double binds have been described as processes in which subjects are repeatedly faced by pressing and equally unacceptable alternatives in their activity system, without a breakthrough (Bateson, 1972; Sluzki & Ransom, 1976). The repetitive processes become or threatens to be crises of unpredictable and explosive consequences. In essence, when the farmers are constantly attempting but keep failing to resolve and contain yield failure because of a resistant and persistent pesticide (fall armyworm-*spodoptera frugiperda*) it becomes a double bind. According to Engeström and Sannino (2011: 374) “in discourse, double binds are typically expressed first by means of rhetorical questions indicating a cul-de-sac, a pressing need to do something and, at the same time, a perceived impossibility of action.” So, the impossibility is commonly expressed with the help of desperate rhetorical questions like “What can we do?” Ideally, a double bind requires a transition from the individual “I” to the collective “we”, such as “we must”, “we have to,” loaded with a sense of urgency (Engeström & Sannino, 2011: 374). A double bind can be resolved through a transformative and collective action that goes beyond the words evident in the expressions like “let us do that”, “we will make it” (*ibid*, 374).

Engeström and Sannino (2011) remind us that there are distinctions between contradictions, their discursive manifestations and linguistic cues. Mapping out the possible presence of manifestations has important methodological implications. Engeström and Sannino liken the analysis of contradictions in discourse data as similar to the peeling of an onion (Figure 5.1). Where the outer layer of the onion consists of rudimentary linguistic cues, such as “but” and “no”, or narratives seasoned with metaphors and rhetorical questions (*ibid*, 2011: 374). In practical the clusters of “buts” may lead us to dilemmas, and clusters of “nos” may lead us to conflicts but this does not mean that rudimentary linguistic cues correspond mechanically to specific manifestations. There are some instances where a “but” carries multiple meanings besides a dilemma, and where a rhetorical question may not certainly show double bind.

The above-mentioned observation that, rudimentary linguistic cues do not mean or correspond mechanically to specific manifestations is helpful. In my study, the word “*Asi*” translated as “But” was also problematic as a linguistic cue. In Shona language “*asi*” has multiple meaning namely, “but, yet, because of” and one can only make sense of the word in a phrase or in a sentence. In some instances, the word “*asi*” does not confirm to any conflictual situation and does not pose a dilemmic situation. The four discursive manifestations of contradictions are presented in Table 5.1 to follow and the Methodological onion for analyzing contradictions in discourse data mentioned earlier on is also shown in Figure 5.1.

Table 5.1: The four discursive manifestations of contradictions

Manifestation	Features	Linguistic cues
Double bind	Facing pressing and equally unacceptable alternatives in an activity system: Resolutions: practical transformation (going beyond words)	“We”, “us”, “we must”, “we have to”. Pressing rhetoric questions, expressions of helplessness Let us do that, we will make it
Critical conflict	Facing contradictory motives in social interactions, feeling violated or guilty Resolution: finding new personal sense and negotiating a new meaning	Personal, emotional, moral accounts narrative structure, vivid metaphors “I now realise that...”
Conflict	Arguing, criticizing Resolution: finding a compromise, submitting to authority or majority	“No”, “I disagree”, “this is not true”, “yes”, “this I can accept”
Dilemma	Expression or exchange of incompatible evaluations Resolution: denial, reformulation	“On the other hand,” “yes but”, “I didn’t mean that”, “I actually meant”

Source: Adopted from Engeström and Sannino (2011: 375).

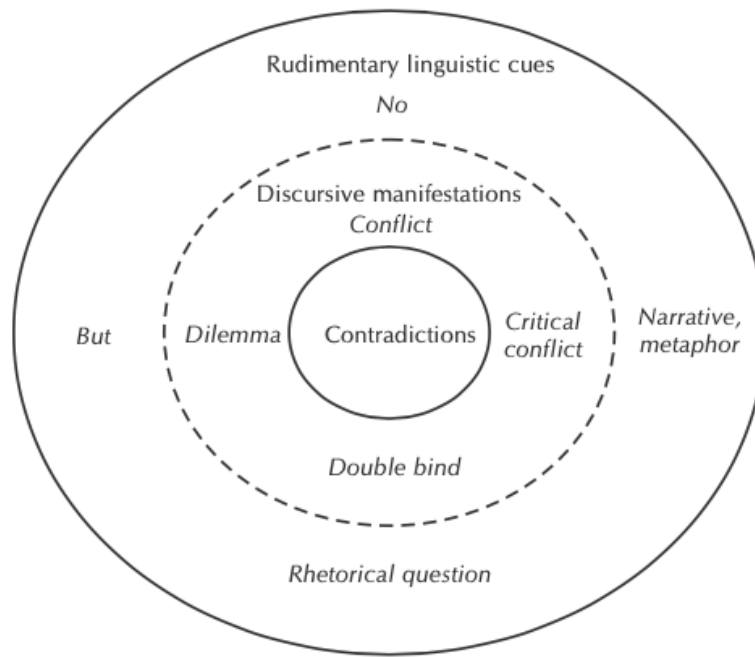


Figure 5.1: Methodological onion for analysing contradictions in discourse data

Source: Adopted from Engeström and Sannino (2011: 375).

Engeström and Sannino (2011) suggested that detecting rudimentary linguistic cues in data is a critical preliminary step and forms part of the initial analysis. They further observed that, high concentration of cues in certain parts of the discourse could be an important pointer that demands deeper understanding beyond superficial meaning of the cues. I found this observation extremely useful and in other words it implies that although linguistic cues are not directly or explicitly connected to the corresponding discursive manifestations, they give a clue or point to critical conflictual situations that may or would have been implicitly or under surfaced for long yet, critical manifestations. This, therefore, means that there is a need to carefully understand the linguistic cues themselves, not only for the purpose of locating possible manifestations but also for a better understanding of the connected contradictions.

In this study I applied the linguistic cues for discursive manifestations of contradictions as the preliminary data analysis phase although, I was bearing in mind that the correspondence between the cues and the manifestations is only probabilistic. The dialectical framework was applied to my data as sense making lens to classify and map out the contradictions Nyanyadzi

Smallholder Irrigation farmers' activity system and its other interacting activity systems were faced. I used the "Find" function in MS Word to analyse the linguistic cues. As shown in table 5.2 below there were 51 occurrences on which clues reflected on conflicts while there were 302 occurrences where the cues suggested dilemma and lastly, 63 occurrences where the cues were suggestive of a double bind and only 2 occurrences that suggested critical conflict. The rudimentary linguistic cues used, and their correspondence discursive manifestations are shown in Table 5.2.

Table 5.2: Rudimentary linguistic cues potentially indicating discursive manifestations of contradictions.

Discursive manifestation	Linguistic cue in native (Shona)	Linguistic cue in English	Occurrences
Conflict	• <i>Aiwa</i> • <i>No</i> • <i>Handizvo ba</i> • <i>Kwete</i>	• No • No • This is not true • I don't agree	• 29 • 08 • 01 • 13
	Total		51
Dilemma	• <i>Asi</i> • But • <i>Eho asi</i>	• But • But • Yes but	• 149 • 152 • 01
	Total		302
Double bind	• <i>Tinofanira</i> • <i>We should</i> • <i>dai</i> • <i>Ngatidai</i> • <i>Ngatiti</i>	• We must • We should • lets • Let's do this way • Let's say	• 11 • 01 • 40 • 04 • 07
	Total		63
Critical conflict	• <i>Tatodzidza</i> • <i>We should</i>	• We have learnt • We should	• 01 • 01
	Total		02

Source: Author

As mentioned above, however this was only a standing point for analysis, as I had read the words in context due to the differing assigned. For the critical conflict I purposefully left out phrases and narratives which best described critical conflict since most were in the form of strong metaphors. Some participants used strong native or vernacular metaphors for emphasis and in some cases to confirm their positioning across the four discursive manifestations at hand. Therefore, in this study the use of strong metaphors and rhetoric questioning were not limited

to critical conflict and double bind. Hence, as suggested earlier, there was a need to carefully and deeply study these linguistic cues for a better understanding and more definitive grouping and interpretation of the manifestations and contradictions.

5.2 CONTRADICTIONS IN AND BETWEEN THE INTERACTING ACTIVITY SYSTEMS IN NYANYADZI IRRIGATION SCHEME

In my study through and by double stimulation processes in the change laboratory workshops, contradictions were surfaced, and the emergent manifestations were mapped. Three central contradictions were identified and dealt with in the three-day change laboratory workshop that was held on 20-22 August 2019 at Nyanyadzi Vocational Training Centre (NVTC), in Ward 9 of Chimanimani District in the Manicaland Province of Zimbabwe. These contradictions shall be discussed in detail below:

5.2.1 A primary level contradiction within the Rules: the farmers' inheritance rules over the three generations of farming

Drawing from the primary data generated in this study and insights from the three-day change laboratory workshop held with the participants as mentioned in Section 5.2 above, the study identified a primary level contradiction within the farmers' inheritance rule over the three generations of farming and it manifests as a double bind as evident by the complex land tenure systems (multiple plot holder, plot leasing), and superficial water shortages. Since independence (1980) the political economy of Zimbabwe has been unstable. Due to the political and economic hardships most people have been displaced, becoming political and economic refugees countrywide. Somehow, most economic refugees have concentrated in the productive agricultural patches of Zimbabwe in search of household food security and livelihoods. They found refuge in irrigation communities and have put pressure on the available land and water resources. Nyanyadzi irrigation was not spared and this was time bomb in waiting. In fact, due to the diamond rush in Chiadzwa area between 2007-2009 there was a high influx of people. Most of the people were illegal artisanal diamond miners and were harboured in Nyanyadzi since Chiadzwa area is just opposite, some 18km away. By the end of 2009 to the early months of 2010 there was a massive military and police crackdown driving all the illegal artisanal miners from Chiadzwa, blocking their source of livelihoods. Most of the illegal artisanal diamond miners were left with no option other than to stay and farm in

Nyanyadzi irrigation scheme which later saw many permanently relocated and this increased pressure on the irrigation scheme's activity.

The effects of this on the Nyanyadzi irrigation scheme will be discussed later but the illegal artisanal diamond miners became the fuelling factor behind multiple plot holding and illegal plot leasing mentioned earlier on. They have also been reported to be very corrupt and problematic, compromising the realisation of the farmers' object. The story goes on like this, the inheritance transitions within and between the first-generation and the second generation of farmers was smooth but, the transition between the second generation to the third generation of farmers has been problematic and muddled in deep complexities. In the process a complex land tenure system (multiple plots holding and illegal plot leasing), superficial water shortages and crop management failure has resulted in the irrigation farmers experiencing a double bind situation.

The above-mentioned manifestations have been lived over two generations of farming and farmers seemed not to understand what is happening and instead they wrongly put their focus and effort in trying to rectify the manifestations instead of the opposing forces that have generated, fuelled and kept shaping these manifestations. Hence, I argue in this study for the liberative power of careful historicity of the object. I argued that a careful understanding of the history of the object can help to surface and understand the contradictions we are working with/in and this can help us to envision transformative agency, the change needed or transformation of the activity. In this case both were needed, and I shall build upon the historicity described in Section 4.2.2 in regard to the inheritance rule in the irrigation scheme and how it contrasts with the National and customary inheritance rules and how it has caused the mess in the scheme as evidenced by the manifestations highlighted above. I shall dwell more on empirical evidence, drawn from the Change Laboratory Workshop (CLW) data to discuss and describe how Nyanyadzi farmers have been left in a double bind due to contradictions deep seated in the inheritance rule as manifested by the above mentioned trajectories affecting the irrigation scheme. The contradiction sits deep within the inheritance rules of the farmers activity as shown in Figure 5.2.

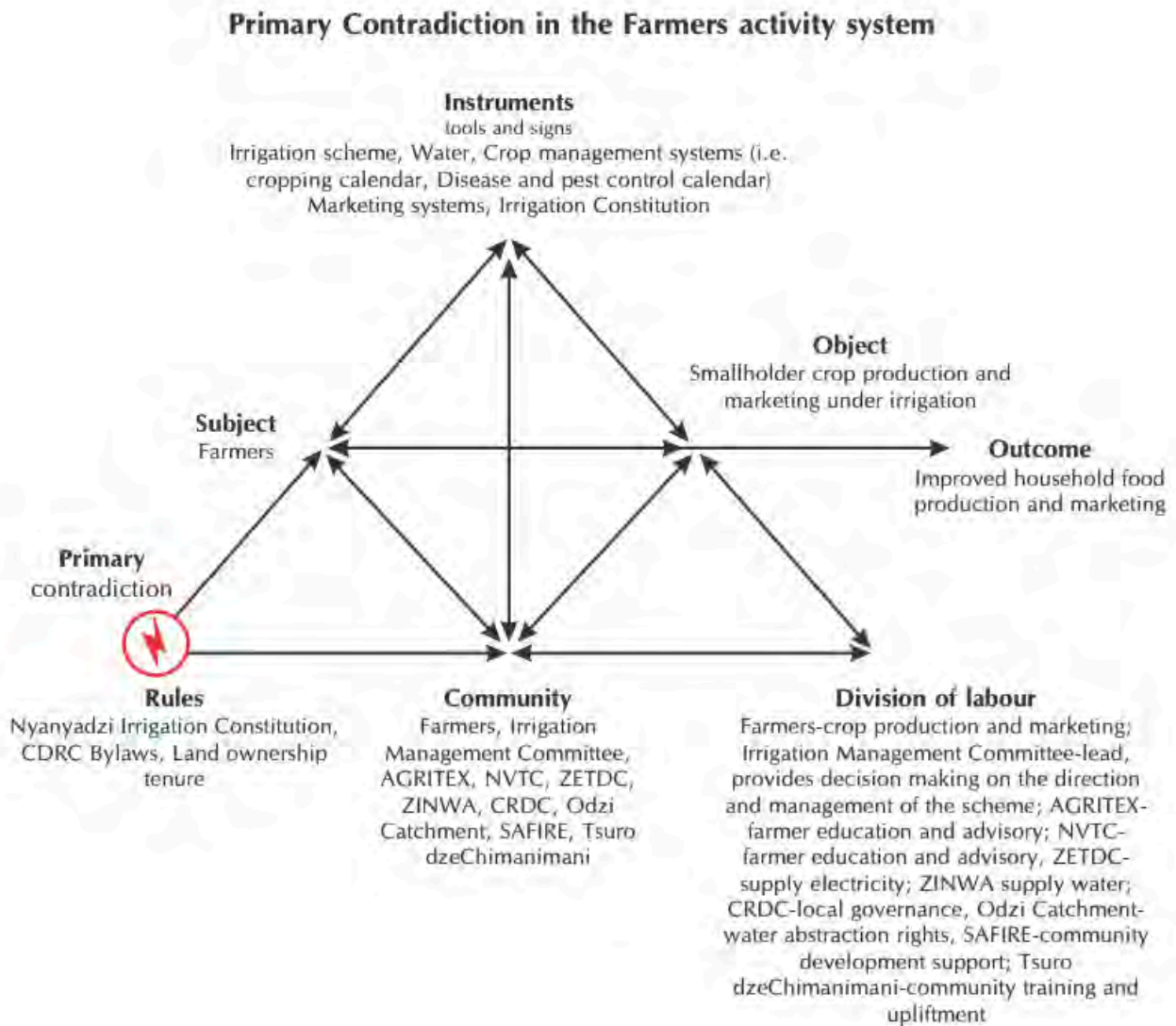


Figure 5.2: Showing a Primary contradiction within the farmers’ inheritance rules.

Source: Author

5.2.1.1 A primary contradiction deep seated in the Farmers’ inheritance rules that manifests as a double bind resulting in a complex land tenure system in the irrigation scheme

There is a primary level contradiction that is deep seated within the farmers’ inheritance rules and manifests as a double bind resulting in a complex land tenure system (multiple plot holder and illegal land leasing) compromising the object in the farmers’ activity system. As reported in Section 4.2,3, the farmers’ inheritance rules as spelt in the Nyanyadzi Irrigation Constitution (1987) states that, “... *the living spouse is entitled to the full custody of the deceased’s plot ownership.*” This meant that after a loss the surviving spouse(s) return ownership to the plot (a

plot is made of 4 acres). When both parents pass on, the plot is inherited by the eldest child or shared among the children if they are above the age of 18 years. In a case that the children are still young (below the age of 18 years) the plot could be inherited under custodianship by any immediate family relative until the first child is eligible (at 18 years). The policy used to observe the male child only in inheritance, but with the constitutional amendments, through the Deceased Estates Succession Act Section 3(A) it's now regardless of gender but the age of the surviving children. Of most importance, it is the family of the deceased who decides and the AGRITEX endorse the nominees.

As discussed earlier on this promoted a complex land tenure system that has encouraged multiple plot holder and illegal plot leasing hindering the smooth management of the irrigation scheme. I shall therefore describe and explain the two manifestations (multiple plot holding and illegal plot leasing) separately, drawing empirical evidence from the CLW data. I shall begin by describing and explaining how the multiple plot holder has emerged and how it hinders meeting the farmers' object in Nyanyadzi irrigation scheme.

5.2.1.1.1 A double bind in form of multiple plot holding.

There is no doubt that multiple plot holding is one of the biggest challenges in Nyanyadzi irrigation scheme as it hinders smooth watering roster managements, farm input allocation, disrupts the cropping and pest control calendars, among others. It is important to first define what I call multiple plot-holder. In this study, multiple plot holding shall be defined and understood not in their literal meaning of one farmer being entitled to more than one plot, it means many rightful owners to/on one plot. For the purpose of fluidity in the study, I would also include the illegal occupants who operate on short or prolonged leases. Together many rightful owners and the illegal tenants operating on one plot form a complex and problematic system in the irrigation scheme. A plot shall be understood as a piece of land registered in the plot holder's name and has been allocated a plot number regardless of the size, it could be four acres, one acre or $\frac{1}{2}$ an acre. This clarity was important because these terms have been used loosely and variably in this study and in the change laboratory.

From the onset of this irrigation scheme (see Section 4.2.1) farmers were allocated a piece of land to clear. After the clearance, depending on size of the land cleared the farmers were allocated the plots from one Acre to maximum of four Acres, although there are few farmers

who managed to acquire more than four Acres and these Acres would be not on the same canal line system and sometimes not on the same Block. Each plot is then allocated an individual plot number, giving example, our plot number its Plot A21 (never divided) and it is comprised of four Acres but designed as two Acres on the other side of the road and the other two Acres on the other side of the road, meaning these four Acres are served by two different canals as shown in Figure 5.3. Therefore, when I refer to a plot it means all the four Acres (different pieces of land) registered to one Plot number. I will keep exemplifying pieces of land A and B represented in Figure 5.3 as one plot in most of this discussion in order to aid understanding of the multiple plot holding manifestation in Nyanyadzi irrigation scheme.



Figure 5.3: The irrigation plots' set up A and B.

Source: Author

During the change laboratory workshop there was heated discussion over land ownership tenure. The overwhelming majority of the participants were not aware of which type of land

tenure system they were in. This point was discussed earlier on in the previous chapter and shall be discussed further, later in this study and at the moment this can be our entry point. Nyanyadzi irrigation scheme is under a 99-year lease land tenure and each plot has a rightful owner. However, there is a common misinterpretation of the constitution and understanding when it comes to issues of plot holding. As Participant F18 questions,

Researcher I want to ask, in reference to the issue that was mentioned earlier on by Extension officer. Mr. MK, first generation of farmers who were plot holders have died and their children and grandchildren removed. Now there is no one who was allocated a plot by Rev. Alvord. They all died and left their children and now their children are parents and have their own children so is the rightful plot holder?

Participant F18 asked a question on the most confusing and problematic issue. It's an issue of inter-generational inheritance and rightful ownership to the plot. As discussed in the previous chapter in the first generation of farmers the fathers were sole and rightful owners to the plot under the 99-year lease. However, the transition from the first generation to the second generation was more systematic since, it was to the mother, the elder son and subsequently to all the surviving children. This is where the multiple plot holding begins. At the same time, the generational overlaps pronounced above are problematic for several reasons. By generational overlaps I mean the period when two or more generations are fully participative in the irrigation activity system. At this overlapping phase the grandfather, the son and the grandson are typically active and fully participative in the management of the plot. Ownership and responsibilities can be shared (division of labour) but a strong succession plan must be in place since, the elder ones are expected to slow down and leave the plot to the younger generation. And the same succession is also expected between the second and third generation. In reference to Nyanyadzi irrigation scheme, we successfully passed the first transition from the first to the second generation of farmers. However, we are now in the overlap phase and the much expected succession phase is slowly diminishing. However, this generational succession has its own power relations, social ethical dynamics and political orientations at play and all these result in complex tensions which can destabilise and compromise the farmers' object in the irrigation scheme.

To be specific to the Nyanyadzi irrigation scheme, there are strong internal tensions between the younger generations and the second generation of farmers. Deeper engagement with data shows a gap in unit of purpose between the third generation and the second generation of

farmers. These internal tensions have resulted in further distortions in the divisions of labour that existed in the early 1980s in the farmers' activity system. A better understanding can be reached if we understand these tensions from a political-economy perspective. The political-economy environment in the country has been very harsh and taxing for both generations after 1980. The unemployment level for the youths is tremendous and the youths have been forced to resort to farming as a livelihood. This wasn't the case in the past, younger men were expected to complete the rural-urban migration expedition looking for employment and a better life. They were only expected back to farm if they failed to make it in the urban areas, or when they were fulfilling the urban-rural migration for retirement purposes and that's only when farming was considered a means of livelihood again.

At the same time, because of the high poverty levels, the second generation cannot afford to retire from farming and have no other option other than to cling on as plot holders, while in few cases the youths forcefully declared and claimed plot holder ownership. Many families out of mutual understanding of the situation, have voluntary sub-divided their plots to accommodate the youths thereby, creating multiple plot holders on one plot. One way the youths have forcefully established themselves is by illegally leasing out the piece of the plot to external farmers claiming the rightful ownership to those plots and through several confrontations with the youths, the first and second generations of farmers could surrender, losing out the rightful ownership and entitlement to the plot. There has been also few cases where orphans, normally the grandchildren would confront their relatives to claim rightful ownership of pieces of land on their grandparents' plots resulting in further divisions of the plots creating multiple plot holders as well but these I shall discuss later.

As discussed earlier on, farmers are in a double bind situation as is evident by the emergence of multiple plot holder system in Nyanyadzi. The emergence of multiple plot holding has been a root of many misunderstandings and dissonances in Nyanyadzi irrigation scheme. As posted by Participant F22 that,

Right, can you assist me here, the generation between 1931-1964 we no longer have them in our midst, then the generation of farmers between 1965-1970 and those between 19700-2018, we do have them. So, my point is that, managing these generations on its own is a great task that needs proper management skills. There are some among ourselves who think we no longer have rightful plot holders, I disagree, because let's say if my father died the older son is entitled to rightful plot holder and

ownership as stated in the Constitution that the deceased cannot be honoured as the rightful plot holder anymore. This is what we referred to as good management not as we are between 1980-2018 period as illustrated by the circles on the chart (Figure 4.11).

The above narrative by Participant F22, shows a time series inheritance transition from the first generation to the second and third generations of farmers as described earlier on, but what is important is his reflexivity on how this inheritance policy has contributed to better irrigation management in the past compared to now. Secondly, is the confusion and existing pressure to maintain rightful plot holding even in this taxing period of overlap explained earlier, and how this pressure has contributed to the bad management era as explained in his narrations.

Plot holding is important in the irrigation scheme because it is legally binding and at the same time it comes with some benefits and privileges you can enjoy as a plot holder in the irrigation scheme. As explained by Participant F18 that, “*there was a meeting we held at the AGRITEX and they said if you are not a plot holder you don’t sign anything as stated in the Irrigation Constitution...*” She further forwarded the same question of legitimate plot holding as narrated by Participant F22 above, although she focused more on the family inheritance dynamics and not between the generations. She asked, “*so in a case that, on one plot you find the Mother being the rightful plot holder of a certain piece of land and the children are subdivided on the remaining pieces of that plot and are all rightful owners so who stand in as the rightful plot holder to that A72 plot.*” The question she raised is an especially important one in this irrigation scheme because of the uniformities in our families. Participant F16 reflects further:

Her point I noted it, she is not exiting from the point that there is still a true plot holder system. The ownership of the land is among the children born to our fathers (second generation of farmers) and in some of the families were blessed with daughters only and these daughters become rightful plot holders. But we have a problem that some of these daughters are married in faraway places maybe in Harare or United States of America. On that note, maybe the close relative who could be the aunt become a steward to the plot, farming on the plot. The aunt dies and leave her own children to inherit the plot. Later the nephews and nieces (who in this case are the sons and daughters of the Harare and USA married daughter) come back to inherit their grandparents’ plot as rightful owners. The aunt’s children also claim rightful ownership as they inherited from their deceased mother. So, in this case they may share

the plot but, the rightful plot holders still exist and are known. There is not a single plot without the rightful plot holder that's what I know (Participant F16).

These family dynamics as said before, coupled with this confusion of applying the customary inheritance law as stated in the Irrigation constitution and deep seated in our Shona culture norms and values against the revised and new Deceased Estates Succession Act Section 3(A) create tensions in the scheme and are the source of most double bind situations. In the above example, imagine the Aunt's children born to the plot knowing their mother owns it though might not be rightful owner, they have developed intimate relationship and evolved all their livelihood around the plot and only to be evicted after 30 years of practice. How are they going to cope with the current economic situation where poverty is extreme?

In the change laboratory workshop, a fair explanation was given by one of the extension officers who stated that,

Participant E3: Maybe let me shed more light, since we are the ones who do the plot inheritance implementation. What happen is that as AGRITEX we don't allocate the inheritance, but we... for example Mr. M has died and he is the rightful plot holder to Plot A43. So, the family must come together on their own, and agree. For instance, since Mr. M has died what shall we do, okay he had three sons so we can share them among the four Acres in Plot A43. After the family has agreed they bring with them the Kraal Head or the Headman and one Irrigation Committee member to our offices. We ask them they are here, and they should explain their intention. We confirm if they agreed. Yes, they respond and what have you agreed, that part of the Plot A43, Acre 1: Patrick, Acre number 2: Chrispen, Acre number 3: James and Acre number 4 to the Mother. In this case its 3 boys and the mother. Chrispen owns his own Acre and that's what we call organised allocation but, if you just show some element of disagreement, we return you back to be organised first.

Participant F2: Should Chrispen have his own plot number?

Participant E3: Yes, we will give him his own plot number immediately.

Participant F2: So, plot number, means you are now a rightful plot holder and you can make own decisions. Not to be vocal when you don't have a plot number or rightful plot holder.

Participant F16: Are most farmers are tenants.

Participant F10: But you will be surprised to learn that a farmer could be a tenant but

representing you in the Irrigation Committee Management (IMC).

In the above discussion there was a fair description of the role AGRITEX plays in the plot holder system and gives the impression that they are just mere enforcement agents and they don't have decision making mandate. Hence, drawing from the example given by Participant E3 it is evident how the inheritance rule in the irrigation scheme promotes further subdivision of the plot creating more rightful plot holding to a plot, yet the hectarage of the Irrigation scheme remains the same. In the 1980s there were approximately 213 rightful plot holders to the 414ha plots in the irrigation scheme but as of 2018 there were 280 rightful plot holders in the same 414ha plots in the irrigation scheme. This has paralysed progress and the smooth management of the irrigation scheme. As pointed out by Participant F2, it means the inheritance rule creates more people who have a voice in the proceedings of the irrigation scheme and who can make personal decisions on their plot(s), and who have benefits and privileges in the irrigation scheme.

When interpreting the inheritance rule with farming input allocations in mind, it therefore means that the multiple plot holder system creates constraints in the system resultantly there is pressure on the limited available resources. The element of right to decision in own plot mentioned earlier that is promoted by plot holding defeats the concept of collective crop production and marketing under irrigation farming in many ways. A simplistic understanding would be the plot holders are rightful and entitled to equal farm input allocations and they hold the decision to their benefits and may decide how to use them. As a result, there has been several cases reported whereby, some farmers sell the inputs yet remain under performing in farming. A close look into some of the farmers extracts from the change laboratory workshop transcriptions may help to understand the complexity and persuasive forces.

Participant F22 posit that,

right sometimes we need to help each other to understand that it is the issue of inheritance that is troubling us in the irrigation scheme. Starting from the learning processes for example the workshops that are held here they will be focused maybe let's say beans production. But if you get to that workshop you will experience some sort of segregation. Let's say I am a tenant at Mr. Mk's plot, and I arrive at a workshop which at the end participants enrol for inputs so I can forward my name as well, but Mr. Mk

is not aware and available in the workshop. When Mr. Mk hears about and go to enrol he will find my name written already. That's where the confusion begins, that's the reason why they encouraged to enrol the name of the plot holder and the plot number.

Participant F22's narrative above shows how farm inputs allocation is a strong drive towards farmers' double bind situations. It may happen that, let's say a new Seed Variety Workshop is held and the Seed House decide to give out inputs in the form of seeds and the fertilizers to the farmers. The questions of who the rightful beneficiary is arises between the actively involved farmer (tenant) and the dormant plot holder farmer who doesn't attend any learning workshops but remains the rightful plot owner. Tensions and dissonances arise, but normally we forget that leasing of plots is illegal too. At the same time farmers are supposed to be actively involved in the irrigation proceedings such as briefing and quarterly meetings, as well as emergence meetings and learning process such as workshops, seminars among others, but most of the farmers don't get involved in the activities, as issue I will discuss in the next sections.

In most of these cases the farmers end up in conflict when the rulings support the active farmer ahead of the rightful plot holder thereby, supporting another problematic act of illegal leasing and the tenants in some cases becoming strongly active, and involved inside swiping the plot holders of their benefits and privileges.

As Participant F6 narrates,

it's not the issue of inputs alone. But for us married into these families we were taught that the meetings are not attended by anyone unless you a plot holder. However, today if they call for farmers meeting you will find everyone attending and it becomes politically affiliated as well. Who is chairing the meeting? That's why you realise some of the meetings fail because of the tenants. Some attendees come to disturb, some just go for no apparent reason, but we grew up knowing that only the plot holders are allowed to attend these meetings. Only, if they would describe and follow what they have been taught in the meetings it was going to be better but, they don't. Nowadays some farmers would be accompanied by children, grandchildren and there will be lots of noise making it difficult to follow the meeting proceedings and to hear properly...

Another important issue raised above on the importance of the plot holder system in the irrigation scheme is the maintaining of order, unity of purpose, focus and peace in the farmers'

gatherings be it a meeting or a workshop. In the past, the meeting attendance was by plot holders hence, there were few participants but nowadays there are multiple plot holders resulting in many participants in attendance. It can therefore be concluded that multiple plot holding created and promoted by the farmers' inheritance rule in the farmers' activity system has left the farmers clueless on what to do. Firstly, in the CLW not all the farmers understood the root cause of most of the manifestations they lived with, complex watering rosters, pressure on farming resources like water, and farm inputs, among others. Instead, efforts were noted on trying to curb manifestations and not the generative mechanism in the rules which is driving the primary contradiction. In the change laboratory workshop, double stimulation efforts were undertaken to surface and understand the plot holding double bind the farmers were in (see Chapter 6 and 7). As also mentioned earlier the farmers are also in an illegal plot leasing double bind, discussed in detail below.

5.2.1.1.2 A double bind in the form of Illegal leasing

There is no doubt that the inheritance rule has manifested in an illegal plot leasing double bind in the study. The double bind has caused tensions and dissonance within the farmers' activity thereby compromising the farmers' object in Nyanyadzi irrigation scheme. In the change laboratory workshop, some farmers were quick to point out illegal leasing as a double bind linked to the inheritance rule and the effects were made visible in the CLW. As argued by Participant F4,

one problem I have seen in our irrigation scheme is illegal leasing. The illegal tenants are now many and the plot holders second. If these illegal tenants lease your plot, they behave like the plot holders themselves and they can even become very powerful more than you. These illegal tenants are our problems, I sometimes advise that if you want to lease your plot, please study your tenant and understand if he/she will accept to be under your plot management rules or else he/she becomes like the plot holder. These illegal tenants have also troubled us a lot on water distribution gates, they are vandalising our canals because they are not permanent on our plots. However, some of them have resorted to stay here in Nyanyadzi and are renting out houses and survive by renting out plots as well. They know if the water dries up in Nyanyadzi irrigation scheme they can simply pack their belongings and relocate to other irrigation schemes. They leave after they have destroyed our canals and disturbed our water allocation systems in this irrigation scheme. But, even if I try to mention this to other farmers in

the irrigation scheme no one listens, but these illegal tenants are our biggest problem. They are the same very people who are stealing our irrigation scheme's perimeter fences and they are also destroying our water gates. If you do a careful follow up, you will find out that they are the people who have destroyed our irrigation scheme a lot.

Participant F4 offers a full narrative that described the double bind on illegal leasing and how this has affected the farmers' activity. She firstly, points out to the influx of the illegal tenants in the irrigation scheme and the problem created for the society at large. She was quick and discrete to pronounce illegal leasing as a complex challenge they have experienced in the irrigation scheme even though some farmers are still yet to understand it, believe it and act. I also share her perspective and I shall expand her ideas and discuss them further a bit later.

Another important critique she raised towards illegal leasing is the issue of belonging. She argues that most of the illegal tenants lack belonging and stewardship character because they know if Nyanyadzi irrigation scheme is dysfunctional they can easily relocate to other functional irrigation schemes. She reiterates that a careful tracking of some of the challenges they are currently facing such as vandalism of the irrigation canal systems including the canals themselves and the water gates, the stealing of the irrigation perimeter fences shows that these are all linked to illegal tenants.

Lastly, if I understand her well, there is the issue on power dominance by the illegal tenants. The illegal tenants are being described as opportunistic and if not professionally managed they siege the plot holder power and subsequently the control of the irrigation scheme. Such exercise of control has been noted in the water distribution processes where they have become notorious and disruptive of the existing watering roster systems. They have also been reported to be destroying the water gates to allow constant flow of water to the fields they are leasing. The reason being that the illegal tenants are more commercialized in their operations hence, they want to profit at all costs, rather than invest in maintaining the existing formal systems that favours and sustains the existing subsistence farming.

Participant F12 further shared his thinking stating that,

I want to say a non-plot holder must not be allowed to control a farmer who is entitled to the plot and who has a plot number (plot holder). The reason is that, as farmers we have a problem that whoever say anything that excites us we vote for him. Yet, that

farmer is not a plot holder. Right now, most of the people leading us in the IMC are non-plot holders.

However, on the issue of power siege and control stated above Participant E3 blames the irrigation farmers and argues the following:

... it's you the Nyanyadzi irrigation farmers who are to be blamed, your heads are not up straight. Why do I say so, it's because we said a person who is supposed to be voted into the IMC must be a plot holder? But you will find an illegal tenant who is being leased a part of plot at my Uncle's plot being voted into the IMC, does that make sense? Is that going to improve the scheme why can't you vote for plot holders only and respect the Irrigation constitution.

Participant E3, questions the higher order reasoning of the farmers and the motive to elect non-eligible farmers as per constitution and they complain of power and control siege of the scheme. However, he raised an important question related to the irrigation constitution about illegal tenants I probed this further to raise a better understanding of leasing in the irrigation scheme. I asked the following:

Researcher: What does your Constitution say about plot leasing?

Participant F18: Mr. Researcher the constitution is not yet in use because there are some amendments going on.

Researcher: Okay, what does the old constitution say about leasing?

Participant F18: On leasing I don't know...

Participant E3: Leasing is not allowed at all.

Participant F22: I want to refer to the issue of leasing, it is true plot leasing is illegal. They say in the past if you were found to have leased the plot of any part of the plot you were asked for sensible reason to why you did it. The reason being that there were some individuals who also wanted the plots and were on a shortlist so if you fail to maintain it you were asked to surrender to those on the shortlist. I do believe the revised constitution of 2013 is the one we are still using the one that stated and integrated gully reclamation...

This opens a critical space to question whether the farmers were aware and understood their constitution. Responses above left me wondering as a researcher whether the farmers are

deliberately leasing, or they are doing it out of ignorance. One thing for sure is leasing is causing them problems as related by narrations that follows. Participant F22 posit that, “...*but what has been said by Participant F4 is true, why do non-plot holders rush to control our gates and some of the plot holders have that attitude as well.*” The rhetorical question asked above shows a double bind. This happens when the farmers are trapped in/by illegal leasing and they feel they must, but in the end can’t come out of or immediately resolve the problem (Engeström & Sannino, 2011). For instance, as mentioned earlier on in Nyanyadzi irrigation scheme it is known that the illegal tenants are violent and non-observant or respectful to the Water Bailiff’s decisions on watering rosters yet, no one chases them away instead, the farmers themselves keep leasing their plots to them. At the end thus expect the situation to change on its own. This is the current situation for most of the farmers in the irrigation scheme, and they can’t liberate themselves from it, they are trapped.

5.2.1.2 A primary contradiction deep seated in the Farmers’ inheritance rules and manifests as a double bind in form of superficial water crisis in the irrigation scheme.

The second double bind manifests in the form of a superficial water crisis in the irrigation scheme. An eagle’s eye view of Nyanyadzi irrigation scheme can leave you disheartened and convinced that the major problem the farmers are faced with is water crisis yet, it is superficial. When I first visited the irrigation scheme in the initial phases of this study, I could easily have been convinced that the biggest problem is water shortage since I grew up in the same irrigation scheme believing the same. However, a deeper engagement with the Cultural Historical Activity Theory (CHAT) (Engeström, 1987) widened my horizon and gave me a chance to probe deeper and understand the real issues and how they have become to be. I was then convinced that the water crisis that I grew up believing, could be just a superficial crisis, or a manifestation of a deeper issue that could be lying elsewhere within the farmers’ activity system and/or between its neighbouring interacting activity systems.

In the change laboratory plenary discussions, we came to understand that the inherent superficial water crisis is a double bind manifestation resultant from many forces not only limited to but also strongly linked to the existing inheritance rule. A few narrations presented here give an overview of how our understanding transformed in the change laboratory workshop to a better understanding of the contradiction at hand. I asked the farmers to mention

the challenges and further prioritize these challenges, water shortage was dominant. As shown below;

01:43:56: Shortage of water- of course we have the water in the scheme and ZINWA is providing us with the water but it's not enough. A farmer can spend 2 weeks or three before watering and once he got the water, he has many blocks that are in dire need of watering, yet another farmer is also waiting. So, the water is not cycling correctly.

00:09:28: Participant F10: Water Shortage, that's what we see as our major challenge in Nyanyadzi irrigation scheme.

Like I said before the farmers were confident and at ease to point to water shortages as their major challenge. In the narratives above, there is a fine line of argument that portrays a challenge in water distribution cycles in which a farmer has to wait longer and may take longer to be allocated the water and still the water would be insufficient. Because of that the farmers are not blaming the ZINWA which is the water supplying authority but, are blaming the volume of water that is not sufficient to serve all the farmers. This was interesting and became a departing juncture as I figured out this salient line in the narratives. I realised that this salient line strongly pointed to some deep-seated forces other than water supply to more sophisticated water distribution system. In essence, I realized that the water supply system has been constant and the irrigation hectareage has been the same since 1960s but water shortage as it is reported still exists or has even intensified.

Through double stimulation processes we then realized that one of the hidden driving forces has been the increased plot holders. As figured out by Participant F16 that, "... yes, *it's because there has been increased plot holders.*" Then we were quick to engage in a reflective discussion with the farmers as follows;

Researcher: yes, that's what I am also saying, but the issue of water management confuses a lot. For example, let's look at the management of how the irrigation is run. If we reflect to the first-generation period of farming to the period of the second generation of farming and ultimately to the period of third generation of farming you can't ignore the issues of natural population growth, and you can't also ignore the issue of inheritance and what the constitution says. The hectareage of the plots hasn't been increased beyond 414ha but the plot holders have increased. On top of that we had also an emergent sub-letting system that has brought illegal tenants. These tenants you should be critical of them because your Irrigation constitution ultimately prohibits

leasing, hence, they are illegal tenants. It's illegal, that tenant has no right to control or open the water gate. This is where the challenge has emerged, the leadership and management (IMC) are failing to clearly implement these constitutional policies. The other one we can't ignore it, it's natural that people die and there comes the inheritance rule that entitles the surviving Spouse rightful plot holding rights then after all the parents pass on, then every child is subdivided. So, if you are in a family of 13 children, it means each child should have his/her own plot number. Now what happens is that if six of the children want to water their plots, they should at least water their 2 Acres and no one can stop them since they are neighbouring plot holders in the same canal. And if one or two of the children decides or is busy that week and opts to water next week it means next week he/she can come and be allocated water to the same block again. Can you see this is where our water distribution cycles are disrupted? Also consider what our Irrigation constitution say about inheritance, how does all this affect the plot holder system and again the biggest issue of illegal leasing.

The above discussion is self-explanatory, in the discussion we managed to pin down how the inheritance rule plays a pivotal role together with illegal leasing, causing the superficial water crisis in the scheme. A deeper engagement via double stimulations showed that, what has increased is water demand due to increased plot holders and illegal leasing distorting the existing water rosters. The issue of inheritance rule, and superficial water crisis shall be repetitively referred to and further expanded since the contradictions are interrelated.

Researchers' reflections

I was then asked to give true reflections concerning the above double bind in form of illegal plot leasing I said the following;

...the issue of leasing is complicated and if you carefully look at it you realise that it is inter-connected to the issue of poor farmer education we have discussed earlier on, and it is also highly influenced by the issue of intergenerational inheritance rule we were also talking about. And if you look at it very closely, AGRITEX has positioned itself out of the system holding a more consultative role to say, "if you come to us, we can only do what you would have requested us to do." The stance taken by AGRITEX on the issue of farmer education is also causing many challenges in the irrigation scheme. So, because of the lack of synergies which used to exist between AGRITEX and NVTC we can realise many issues are arising, these two institutes become runaway blocks in our

collective activity system and now there is disintegration everywhere. If you look at leasing from the Leadership and Management perspective, there are so many issues emanating and if you carefully track leasing from the Irrigation inheritance rule perspective, you can also see how the inheritance policy has encouraged increments in plot holders in the irrigation scheme. Just by merely becoming a plot holder it means that the part of the plot being owned becomes an individual plot on itself. Ideally, when we allocate water to the Plot A21 (Mukwambo) I should stand as an individual and all my young brothers stand for their own plot numbers. In short I am saying through this Irrigation inheritance rule we are sub-dividing the irrigation scheme's plots into smaller units (as shown in Figure 5.3). Such that, if I am watering on my plot (A in Figure 5.3) my young brother has right to stand by my side waiting to water his own plot (B in figure 5.3). This is because he has own plot number so our plots are no longer the same, so he is independent now.

5.2.1.3 Conclusion on the primary contradiction within the inheritance rule

In conclusion, based on the evidence provided earlier on and the above personal reflections it is safe to argue that there is a primary contradiction deep seated within the farmers' inheritance rule and it has manifested as a double bind in form of a complex land tenure system (multiple land holders and illegal plot leasing), and superficial water crisis in the irrigation scheme. As a result, the farmers don't know what to do and how resolve this situation and the AGRITEX has distanced itself and has maintained a law enforcement role in implementing the irrigation's inheritance rule in the irrigation scheme. The double bind situation farmers are in, has resulted in more linked complexities around farm input resources such as water and farming input (fertilizers and seed). In essence, the inheritance policy has further fragmented the farmers' activity making it difficult to meet the shared object in the irrigation scheme. The double bind has further exposed the farmers' ignorance and arrogance to the irrigation's constitution. Most of the farmers in Nyanyadzi irrigation scheme have shown that they were ignorant of the fundamental principles and provisions of the Irrigation Schemes' Constitution on plot leasing. In wrapping up the below narrative, Participant FG3 15 helps to point out some of factors that have or are pushing the farmers into this double bind. Participant FG3 15,

... also, the challenge now is that a lot of the people who were the owners of the plots (first generation of farmers) have died and the remaining children they sublet the plots to Teachers and Police people because of the high costs of inputs. These irrigation

schemes were meant to subsidise food cost to the local communities and promote food security. But the situation is now that the Teachers (civil servants) are the ones who can afford because the costs of the inputs are now beyond reach to so many people. Hence, many farmers have surrendered to leasing so that they may earn through the rentals of Z\$10 or \$15 per Acre. So, one person can rent up to 10 Acres or plots meaning the plots are no longer benefiting those intended or targeted marginalized people. Remember the irrigation scheme was meant to provide food security, to benefit the much-marginalized people of Nyanyadzi. But those people cannot afford because of higher prices of the inputs and at the same time the market for the produce for example, the onions, tomatoes, beans and maize it's a challenge so the farmers prefer lease for two or three seasons getting that little rental fees for household sustenance. I think these are the issues unless if you have any other questions.

The above narrative has pointed out to some of the driving forces behind illegal leasing. But, like argued in the opening Section 5.2.1 the influx of immigrants to Nyanyadzi has provided surplus demand for illegal leasing. The old and third generation of farmers as described above find it more appealing to lease than to farm, resulting in complex farm resource allocation rosters including water, seed and fertilizer further destabilising the farmers' activity and defragmenting the object. This is one of the double binds the farmers are faced with and there is need for deep engagement through expansive learning via double stimulation to expand the farmers ZPD and develop transformative agency in order to resolve this primary contradiction (discussed in Chapter 6).

5.2.2 A central secondary level contradiction between the subjects and the mediation tool (water management)

There is a central secondary level contradiction between the subjects' perceived water need practice and the mediation tool (water) which has manifested as a conflict between farmers' water use and management vs the irrigation scheme's water need resulting in persisting superficial water crisis in the irrigation scheme, as evidenced by tensions and dissonance among and between farmers towards water. The contradiction is diagrammatically shown in Figure 5.4.

Secondary Contradiction between Farmers perceived need for water and the mediation instruments (water management)

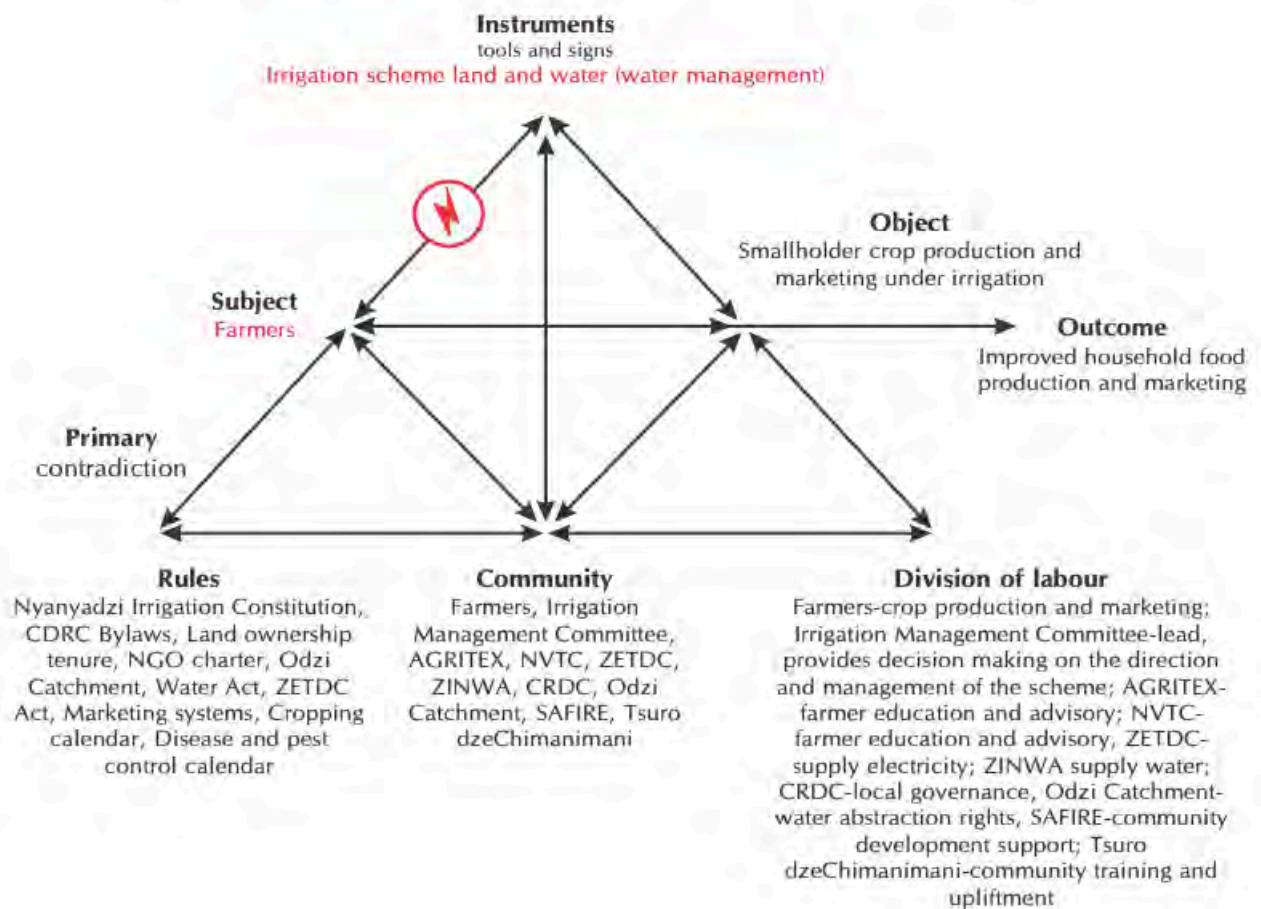


Figure 5.4: Secondary contradictions between Farmers perceived need for water and the Mediation tools (water management)

Source: Author

As discussed earlier, water is a strong mediation tool in the irrigation scheme, which if effectively managed can lead to high productivity and household food security, but if unwisely used there is likely to be high demand and conflicts among the farmers for the precious resources. The conflicts are likely to manifest in unscrupulous activities among/between the farmers such as breaking of keys to the water gates, stealing of the water gates in order to secure a constant supply of water and alleviate household food insecurity. But the ultimate result is a dysfunctional irrigation scheme full of leaking pipes and canals and broken gates. As a result most of the farmers time, is spend in management meetings trying to resolve the conflicts and tensions that would have erupted between the upper and lower (Chitinha, Block C vs Dirikwe,

Block D; Block A north vs Block A South) water users as well as within the same Block of plots.

All these manifestations resemble a conflict that is not new to Nyanyadzi irrigation scheme. One moment in time, around 2005, I remember waking up on one of the quiet nights, I heard sound of water flowing down the canal in the close by mountain going to the irrigation scheme. Our house is just some 200m away from the gravitational canal that supplies water to Block A north and A South, so it was easy to hear all that happens in the canal and in the irrigation scheme on a quiet night. On that night I was curious, and I went to Block A South irrigation scheme, only to find some farmers busy watering under the moonlight. I went back home and gathered a shovel and siphons then returned to the field. I remember I watered the whole Acre that night and no one even came to check on me, at exactly 04:30hrs the water had dried up in the canal. I took my siphons hid them in our banana plantation at the plot and I returned home for a late sleep. What surprised me most was that, by noon of the following day not even one person came to ask about my last night's deeds. The same noon, I took a walk in the irrigation scheme towards Block A south and I realized that most of the fields were watered including those of the IMC members. So, I concluded that it was an organized syndicate not a mistake that the water flowed to the fields at night. I declared that I won't struggle anymore but be part of that gang. I would wake up any day I felt there was need to water. I would then go around 9pm with my big torch which I rarely used because of the secrecy in the activity. I continued this act for years until it became a norm to the irrigation farmers that some farmers would water during the day and others at night. Now back to this study, I wonder what this means to the irrigation scheme?

I observed deep tensions that existed between the farmers' water use, management and irrigation water need. As argued before, the hectarage of the irrigation scheme did not change but surely something was wrong. When I shared my little story, I narrated above to the farmers in the CLW, they became very critical of the situation. As said before, from the word go farmers were convinced it was water shortage as shall be illustrated by some narratives I shall present in this section, but by double stimulations we reached another level of understanding the contradiction at hand and it became clearer on how it was manifesting in the irrigation scheme.

As reported in the section above, when the farmers were asked to deliberate and prioritize the challenges they are faced with in their activity and against the neighbouring activity systems,

they reported the following;

Participant F13 reporting for the farmers, *“01:43:56: Shortage of water- of course we have the water in the scheme and ZINWA is providing us with the water but it’s not enough. A farmer can spend 2 weeks or three before watering and once he got the water, he has many plots that are in dire need of watering, yet another farmer is also waiting. So, the water is not enough.*

00:09:28: Participant F10: Water Shortage, that’s what we see as our major challenge in Nyanyadzi irrigation scheme,

Participant E3: No, I don’t see it as a challenge maybe we can say poor water management. We have sufficient water in the irrigation scheme but the management of water is lacking. We can safely say there is poor water management.

Researcher: Poor water management.

This was the turning point in the CLW proceeding. Participant E3, was out standing in pinpointing the contradiction. The farmers saw water shortage as the challenge (see Figure 5. 5) but he saw the contradiction in water use and management.

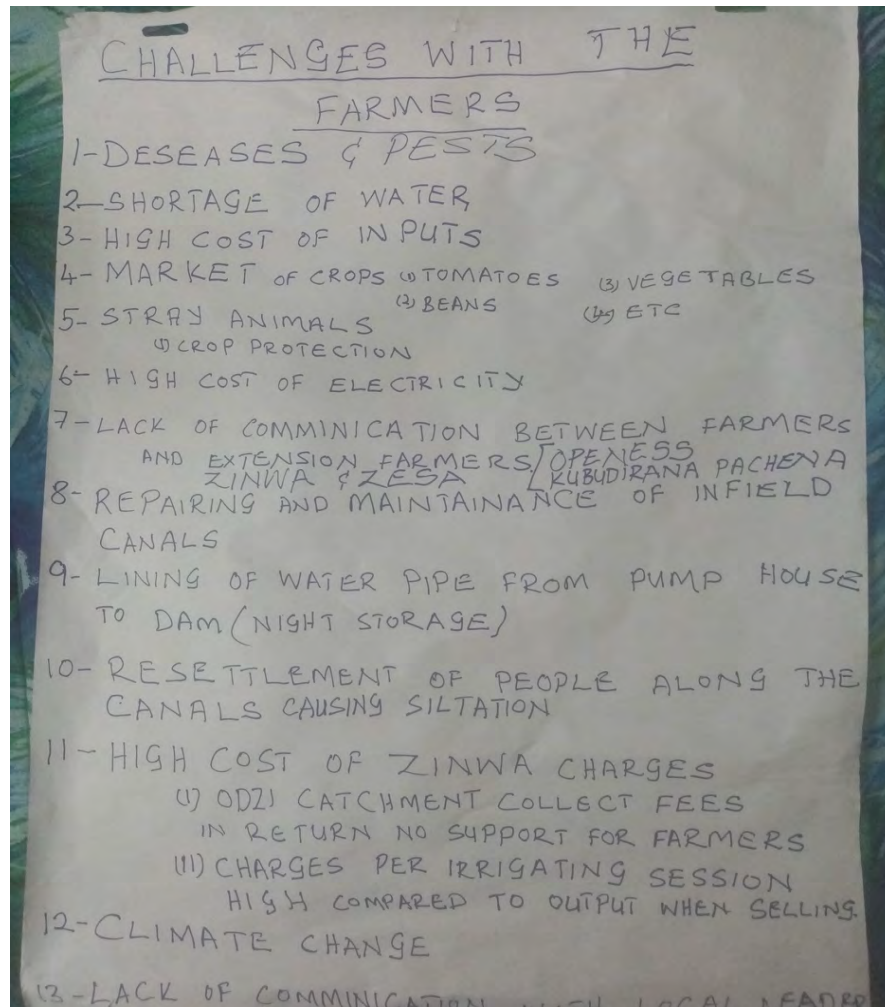


Figure 5.5: Challenges faced by farmers in the irrigation scheme

Source: Primary

However, Participant E3's position on poor water management was denied and contested among the farmers as was the case of Participant F10, who argued that,

Participant F10: Please can I explain, its water shortage because there is a time when Munyanyazi river dries up. Poor water management may come but let's agree that the water sometimes dries up. That's why I say its water shortage although, sometimes we lack water due to other various issues.

Participant E3: Let, me respond to you Mr. X. I am not disagreeing, but what I know is that when this irrigation scheme was established even Rev. Alvord himself knew that Munyanyazi gravitational water levels decreases now and then that's why he designed the diesel pumps that drew water from Odzi river to supplement in the irrigation scheme. They were meant to supplement when Munyanyazi water levels were critical

low. Then the diesel pumps became old and the new pump house was built, and it was known that as long as there is not a dam water is bound to dry up at Munyayazi river.

Participant F10: ...So the challenge is now that we have realized that Odzi pumped water moves in one direction and it's not feasible to sufficiently sustain the whole irrigation scheme. All this planning was done to resolve water in the irrigation scheme.

Participant F14: ...May I ask, was Block C (Chitinha plots) functional during Rev. Alvord's period?

Participant F8: Yes, they were functional.

Participant F14: If they were functional, then our main problem is poor water management because sometimes reports are learnt that water is flowing over the spillway back into Munyanyazi river in Block C (Chitinha). ... Yet, on this lower end of the irrigation we say water is insufficient.

What has been shown in the above narrative is a deeper reflection of reality. It is on record that Nyanyadzi area is situated on the leeward side to the Chimanimani mountain range that brings relief rainfall to most of the eastern highlands and the shadow are droughts to areas like Nyanyadzi and the rest of the Sabi-Limpopo valley (Manzungu & Van deer-Zaag, 1996: 70). So geographically, the area is dry and there are few perennial rivers. Munyanyazi river which flows through Chimanimani area collects part of the relief rainfall but normally dries or the water flow levels drop critically in the summer that is between July-September. The river normally regains its discharge in the offset of September due to the relief rainfall. Despite these natural rainfall cycles, the participants appreciate the innovations that were done in the irrigation scheme to curb the likely water shortages but, were also quick to cite poor management of water as the problem. Particularly, Participant F14 pinpoints the post Rev. Alvord management era as the most affected or problematic periods. This cannot be taken lightly since the management styles and structures between the periods under study are quite different (see Chapter 4).

Another farmer Participant F17 in the change laboratory workshop reflected on the conflict at hand by saying;

Right please may I talk now, I am one of the farmers mentioned from Chitinha (Block C). Right, there is an issue discussed here, the issue of poor water management, there is a water gate called the power gate in Chitinha which is situated close to the water intake. This power gate is used as a spillway to return water into Munyanyazi river

when there are flash floods or floods in general. So, there are times when they just open that gate and the water is lost back to Munyanyazi river. We had water challenge before the works of the donor, "SAFIRE". The NGO helped desilting the canals and in building the water weirs along the main water canal from Chitinha to Nyanyadzi Knight storage dam. So after the desilt water is sufficient but the main issue is remaining is poor water management. The power gate maybe irresponsibly opened but it is part of the poor water management we are talking about and this is where the issue resides. Coming back to Chitinha (Block C) we have enough water and I wonder why you say it's insufficient to you. This is because the way Safire designed the gates are that each water gate can be open, but it allows the water to pass to the next gate until it reaches you. In essence, the water gates were designed in a way that there is enough water flowing to the knight storage dam. This is what I have realized and this is what is happening.

There has been a tendency of blaming Block C farmers (Chitinha) for blocking all the water and sometimes deliberately releasing the water into the spillway and according to Participant F17, this is a manifestation of a conflict in water use management that has been going on.

It was interesting that within my insider interventionist researcher's role in the CLW, I could easily figure out true reflexivity and sometimes intentional/deliberate reflexivity. At some time, the farmers could hold back important information. For example, Participant F10 tried to maintain his positionality and stance on water shortage for a long time in an attempt to influence a decision but when other farmers failed to bow to the gesture, he openly said it, and this changed the tone of discussion and farmers jointly echoed water shortage as the main challenge. , as an insider interventionist I could feel the deep internal tensions and conflicts amongst the farmers' reporting and I was convinced the farmers were holding important information and feelings in their reporting. One important issue I realized is that the farmers were reporting with sincerity, empathy and purposeful mis-narrating own practice and they never hid the intention to be helped or seeking some sort of assistance. Participant F10 posit that,

...in fact, we want to get assistance in Nyanyadzi irrigation scheme, let's raise issues such that if the Researcher has his own strategies should help us and we should benefit. What make us have insufficient water in the scheme? Let's raise points that show the need for us to build a dam on Nyanyadzi river. But if we report that we have enough water we would have defeated the whole purpose of our meeting. What would be the

reason for coming here if we have enough water in the irrigation scheme.

Participant F10's call changed everything, but I was quick to pick up the deep salient internal conflicts and tensions in the voice and the words themselves. There was a conflict of motive as well of the object of the activity (CLW) and the farmers' object of the activity. This workshop was an expansive space to deliberate and collectively ignite transformative agency towards the common object. Yet, to Participant F10, it was the space to report on the challenges and seek external assistance in the form of construction of a dam on the upper catchment to ease seasonal water shortages. One could feel that he was provoked by the fact that some farmers had dismissed water shortage as a challenge but questioned their practice and water use. This triggered more enthusiasm to further probe the tensions that are deeply encultured in the farmers' practice. One way was to leave the conversation burst uncontrolled and that's what I did. The continued conversations were as follows;

Participant F18: "Yes, I agree on the issue of water being discussed, our water is insufficient in the sense that right now we are in winter that's why you see as if we have enough water. However, if we were in summer time that's when we could say we have enough water because of the rain water that is collected into Munyanyazi river but most of the water flows downstream leaving us without enough water. So, we have insufficient water because we lack a dam on the upper catchment, only if we have such a dam then we can safely say our water is enough. So, because of that, in the hot summer we don't have enough water.

Participant F16: I want to come to the point raised of water shortage and say the truth is we don't have the water in the irrigation scheme. We don't have the water, why do I say so, because look we grew our maize and beans harvested beautifully because there were lots of water received and harvested from cyclone Idai. The cyclone brought in lots of floods and it is the same water we are still using right now. If there is no rains Munyanyadzi river dries up and now we can't rely on Odzi river because 1. The electricity is expensive 2. The pumps, the pipelines are heavily leaking little water reach the knight storage. So, if we don't have enough rains, we will be in deep water shortage problem. We need a heavy water harvesting strategy on the upper course of Munyanyazi river, so that on the onset of the rains we are able to catch and store more water only, then can we say we have enough water in the irrigation. That's when we can safely say Nyanyadzi irrigation has enough water and what we just want is a water harvesting strategy on the upper catchment of the river.

Participant F20: The water is insufficient; we never had such experiences we are now seeing that you can take chances to go at night and water our plots. People rotate to go and water at night.

Participant F9: Yes, if we are saying the water is insufficient, we are talking the season we are in right now and the few months were moving into. If we are looking at this moment in time and we say the water is insufficient do, we have anywhere we can look at to harvest more water? This shows that we don't have water in Nyanyadzi irrigation scheme. The farmer who said there is no water said the truth, because we don't have the water and sometimes it dries up and we are left with no option other than to sit and wait until the next rains.

Participant F16: I want to say the design of the irrigation scheme was wrong, whoever, designed didn't finish there was supposed to be a dam on the upper catchment of Munyanyazi river and we could have safely said we have enough water. Because the dam can capture and store the water then the water can be released slowly as per need.

The above narratives show deep tensions and conflicts deep seated between the farmers' activity and the mediation tools (water). To begin with Participant F18 agrees that there is water shortage and went on to say, *"right now we are in winter that's why you see as if we have enough water"* on the other hand, Participant F9 argue that, *"... if we are saying the water is insufficient, we are talking the season we are in right now and the few months to come."* There is already confusion and conflict on when they experience water shortage. We facilitated this change laboratory workshop between the 20th and the 22nd of August 2019. Therefore, if the above observation by Participant F18 that they had enough water in late August and if Participant F9's observation that they experience water shortage in August, then there is a conflict. Secondly, drawing on Participant F18's claim that, *"..., if we were in summertime that's when we could say we have enough water because of the rains that would have been collected into Munyanyazi river. But most of the water flows downstream leaving us without enough water... because of that in the hot summer we don't have enough water."* There is a clear conflict since, we were already in summer and late August in Nyanyadzi is extremely hot hence, a person can hardly confuse it to winter. Furthermore, he claims that if we were in summertime *"we could say we have enough water."* So, what should we believe then, summertime is dry, we are already in summertime and farmers confuse with winter some claim summer has enough water because of the rains? In essence, Nyanyadzi area is dry at the end of winter and first rains are expected early October, the famers failed to express their dry periods

simply because there was enough water augmented by Odzi hydro-electric pumps. Water shortage wasn't an issue anymore but water use remains the biggest challenge.

Lastly, Participant F16 argue that, *“look we grew and harvested our maize and beans crops beautifully because there were lots of water received and harvested from cyclone Idai. The cyclone brought in lots of floods and it is the same water we are still using right now.”* A quick review shows that, Cyclone *Idai* happened between the 4th -21st of March 2019. It's, therefore hard to believe that flash floods of 17 days can last approximately 5 months as runoff and seepage into the river channel. One thing for sure that we can pick from these conflicting narratives is the confirmation that there was enough water in winter and summer of 2019. Secondly, these narratives were exaggerated to prove and forward Participant F10's motive to source external resources and assistance towards the construction of the dam on the upper catchment through empathetic and false reporting. Another thing, the repeated highlighting of a need of a dam on the upper catchment of Nyanyadzi by the participants was also suggestive of the hidden motive. Furthermore, the highlight by Participant F16 indicate in that the irrigation scheme's design was incomplete without the dam on the upper catchment was suggestive of the hidden motive being pushed forward in these conversations. I am not in disagreement of the urgent need for construction of a dam on the upper catchment of Munyanyazi, it's a very noble idea but in this case the farmers used it to divert from critically questioning their own water use management practices, and watering need.

5.2.2.1 Conclusion on the secondary level contradiction between farmers perceived need for water and the mediation tools (management of water).

In conclusion, there is evidence that suggests that there is a secondary level contradiction between the subjects need for water and the mediation tool (water management) and this has manifested as a conflict between water use and water need as evidenced by the superficial water crisis in Nyanyadzi irrigation scheme. As part of the conclusion, I shall offer the personal reflections I also gave in the CLW in trying to surface the same contradiction using mirror data.

... when I am looking at our mediation tools, the irrigation rules, I found out that water shortage is not the challenge, it is poor water management. So basically, the issue we are dealing with is of poor water management in nature...

1. So to the water is not reaching the main target of the irrigation because it is lost to illegal gardening farmers.

2. *We as farmers if we find ourselves allowing our irrigation system to have leaking canals and on top of that I will add earth canals. This Irrigation scheme when it was established you will find that in the early period (first generation of farming 1931-1965) we were discussing there was a program to upgrade the irrigation scheme by constructing cement canals in the scheme.*

I was discussing with another farmer, (I want us to carefully understand this part) he said, “our major challenge in B block was that when you are allocated water it takes more than 30 minutes for the water to reach your plot and the reason being that the water first infiltrate into the earth only when it saturates that’s when it can flow and reach your field.” In short, we are saying where we have earth canals approximately, 30 % of the water is lost through infiltration and that, 30% if it was used to water the field it can cover bigger space. Right, we have earth canals as well on our main canals starting from the control gate close to Mr. Chipiro’s homestead passing through the ZINWA house. And if you closely look at that Fig tree, water in the canal is stagnant around that area and if you get inside the canal you will be shocked the depth is above the waist but its stagnant. If you also carefully look you will realise that the soil on the canal edge silt into the canal and that area was the most difficult to scoop during canal maintenance work. The main reason was that the canals were poorly designed, so the water discharge and velocity was extremely low because of the low gradient. If then the water in the canal reaches that area it infiltrates first, then builds up and at the same time mud sliding the canal walls due to high water saturation. Whenever, it rained that area was heavily prone to silting hence, constant call for desilting by scooping out the mud.

Added to that, we have issues of settlements on top of the canals. This area was difficult because, if you look at that area there are some houses built on top of the canal and close to the canal. Especially that whole area up to that small bridge it used to silt, and people would scoop, and that area was so difficult because of the black sticky mud. So, another issue we have is earth canals. I also travelled on the main canal from Mabika store to the night storage dam most of the canal is earth and most of the water is lost. If you go to Block B as well especially close to Nyanyadzi primary school area, I went there most of the plots around Mr. Chatema’s homestead up to Mrs. Nezandoni’s

homestead majority are earth canals. So, the presence of earth canals is one of the manifestations of poor water management I realised in the irrigation scheme.

3. Our water canals are leaking almost everywhere. Majority of the cement water canals have crevices and do leak; you can even see some holes or tracts underneath them because they are not supported. All these signs show poor water management.

For us to really understand the issue of poor water management there is something I learnt when I was interviewing one farmer. He said, “when we started this irrigation scheme we used to do plain flood irrigation there were no ridges (madhunduru). It was until Rev. Alvord’s Extension officers came who then said no, no, this watering system is bad because let’s say in one Acre we would open the water into the whole Acre. It was difficult to control the water and ensuring that the water reaches every part of the Acre. That’s when they said let’s subdivide into small blocks (Interviewee FGI 3).” That’s when they began the small block system, they subdivide as shown in the picture. The interviewee also said “since we started using these small ridges water was no longer an issue because we were now using siphon system” but in his case he didn’t have the siphon system, so he used earth system then can we say Nyanyadzi irrigation scheme has insufficient water? Mr. Extension Officer what’s the capacity of our night storage dam ... let’s say 35-40 Mega million litres of water. Our Irrigation scheme has 414ha, and one farmer I talked to said do you know this irrigation scheme and the water it uses do you know the same volume that you use is enough to water 3 irrigation schemes of the same capacity.

As soon I finished my reflections Participant F10 was quick to say,

“Yes, we don’t have water efficiency. What you are trying to teach us is for us to use our water wisely, very soon we should start using drip irrigation that’s the only ideal irrigation scheme for us with the efficiency to use less water. As long we are using the flood irrigation its wasteful and the seepage is the same of which what you are encourages us to move from our flood irrigation system.

Researcher: No, I am just mirroring to you what people are claiming and the actual practice on the ground. So can we say we have water shortage if we can afford to water where there is no crops and we haven’t mentioned the water that overflows into the road? We are only referring to the water that we agree that we are using in the fields.

The above narratives and discourse going on is enough to say there is a conflict between farmers water use and management and the water needed in the irrigation scheme resulting in a superficial water shortage in Nyanyadzi. The methods used are rather wasteful and if the same water was to be utilised under more water efficient methods like drip or pivot watering system that available water would be surplus to the water need of the irrigation scheme. Issues such as earth canals, night watering, leaking canals, non-maintenance of the canal lining and in and off field water bursts are true manifestation of poor water use and management in the scheme.

In essence, the current irrigation system and water management conflicts with the need to use water wisely hence, efficiency and maintenance are wanting. Interestingly, the farmers were quick to understand how their own poor water use practices have also distorted the watering rosters and caused a superficial water crisis in the scheme. Of most importance, farmers became more critical of their own irrigation practice and vowed to move on to more water efficient ideal irrigation models. It can, therefore, be safely said in Nyanyadzi irrigation scheme there is a central secondary level contradiction between the subjects perceived water need and mediation tool (water management practice) which manifests as a conflict between farmers' water use and management practices and the irrigation scheme's water need, and results in tensions and dissonances around water use among and between the farmers, making it difficult to realise the irrigation's collective object of improved household food production and marketing thereby, exposing the society to imminent threats of food insecurity.

5.2.3 A more advanced tertiary level contradiction residing in the partially shared object of the Irrigation Management Committee (IMC) and Irrigation farmers' activity systems.

There is a more advanced tertiary level contradiction residing in the partially shared object (which is to promote crop production and marketing under irrigation) of the IMC and Irrigation farmers' activity systems which manifested as a critical conflict paralyzing the motive of the activity systems, as evidenced by the high political interference, poor management, poor marketing and lack of financial management structures. The IMC activity system is in constant conflict with farmers' preferences of the type and style of leadership they want resulting a management crisis. The IMC seem clueless of what the farmers want and the course of reforms they should engage to resolve the management crisis that looms in the irrigation scheme, while the ordinary farmers seem to have surrendered to individualism and survival tactics to meet

household food security. Resultantly, the common good fellowship has eroded, the unity of purpose that existed has vanished and the stewardship spirit has disappeared making the situation complex, paralysing and rather difficult to meet the partially shared object. The advanced tertiary level contradiction is shown in Figure 5.6.

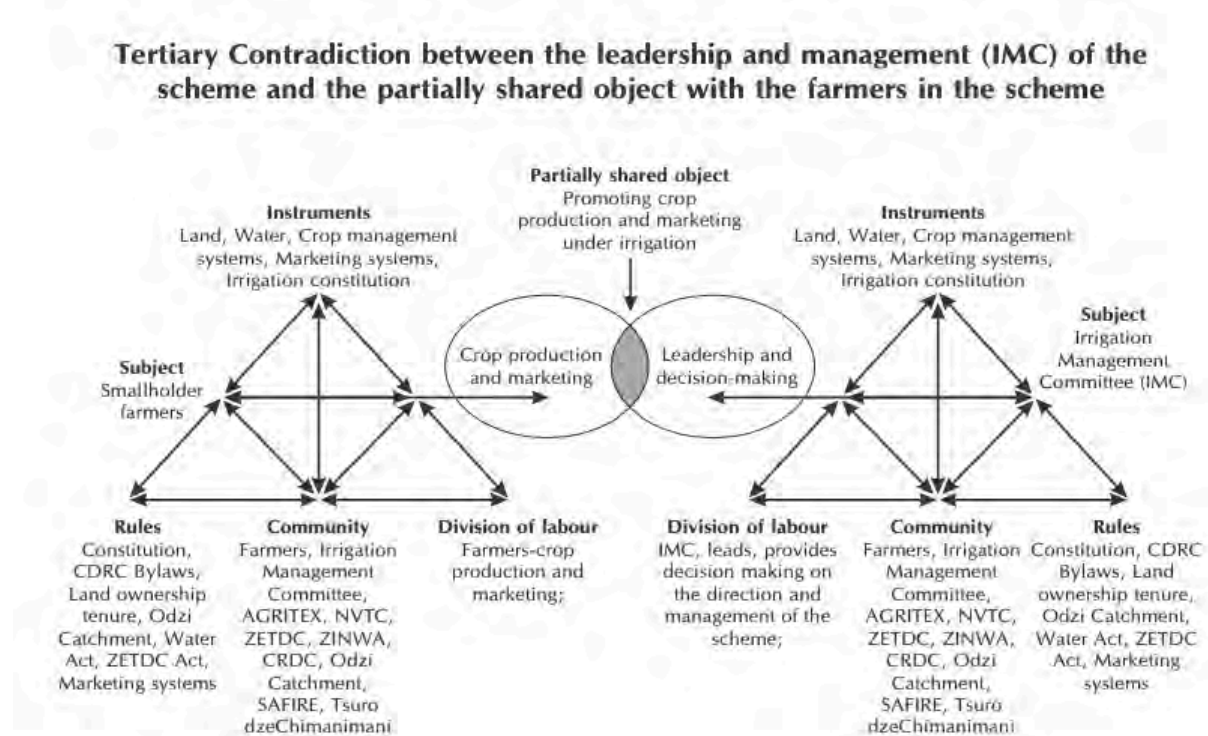


Figure 5.6: A tertiary contradiction between the Leadership and Management (IMC) and the partially shared object with the Farmers.

Source: Author

Figure 5.6 above shows two intersecting activities within the same farmers' activity systems. In essence, the object of the farmers' activity is to produce crops and market under irrigation whilst the IMC's activity produces the leadership and management decisions to realise a smooth achievement of the farmers' object. In other words, the IMC leads and provide the decision-making organ that plans and direct the irrigation scheme. Where the two activities conflate is in the partially shared object and this is where the critical conflict manifests. It may sound as if it is a critical conflict residing in the farmers' division of labour, but what makes it different is the way in which the management and leadership (IMC) of the scheme are set. The IMC is the high order leadership and management organ that produces decisions that directs the irrigation scheme and most of the time these decisions are not consultative or shared with the ordinary farmers but among the IMCs. These decisions and directions may in some cases

be received and perceived with different feelings leading to critical or conflicts of motives between and among the farmers and the IMC resulting in four major trajectories namely, high political interference, poor management of the scheme, poor marketing and lack of financial management structures. Below I shall describe the opposing forces that produce and fuel the critical conflicts as shown in the four trajectories mentioned above. The four trajectories shall be described and explained in the following sub-sections.

5.2.3.1 A more advanced tertiary level contradiction manifesting as a critical conflict in form of high political interference.

It is important to realise that historically, Zimbabwe and the Manicaland province to be specific have been politically active, and the history as opposition force backdates to the colonial era. The main opposition party to the Rhodesian government was the Zimbabwe African People's Union (ZAPU) which was incubated in 1961 under the leadership of Dr. J. Nkomo after its predecessor, the National Democratic Party (NDP) also led by Dr. J. Nkomo was banned by the colonial regime. After the ban of ZAPU in 1962 by the same Rhodesian government, ZANU was born in 1963 as a protest against Nkomo's decision to set up a government in exile. The leader of ZANU was Ndabaningi Sithole and its secretary-general was Robert Mugabe (Astrow, 1983). Rev. Ndabaningi Sithole roots are tracked to a Ndau tribe of Gazaland in the Chipinge district in Manicaland province of Zimbabwe. After the ban of the ZANU led by Rev. Ndabaningi Sithole in 1964, the next year (1965) Rhodesia announced a Unilateral Declaration of Independence (UDI) which led to guerrilla war. Rev. Sithole lost his position in ZANU to Mugabe in 1970, after denouncing violence in order to be released from detention, and he was left with his own faction of the movement ZANU.

In 1979 the United African National Council (UANC) party was founded by Bishop Abel Muzorewa, who later became the first African Prime Minister of Zimbabwe-Rhodesia under the Internal Settlement of 1979 (Hatchard, 1993). After independence of 1980 ZANU and ZAPU emerged through the Unity Accord of 1987 to form the now ZANU PF. Afterwards in 1979 the Zimbabwe Unity Movement (ZUM) was formed by Edgar Tekere though shortly lived beyond 1995. This was then followed by the disillusionment and massive electoral apathy in 1995 paving way to a civil society organization for constitutional reform in 1997, leading to the birth of the Movement for Democratic Change (MDC).

As mentioned above Manicaland province became a force to reckon with in the Zimbabwean history. It is not a secret that, for two decades, voters in Manicaland have oscillated between the opposition Movement for Democratic Change (MDC) Alliance which is a coalition of six opposition parties and the ruling Zimbabwe African National Union-Patriotic Front (ZANU-PF). In 2000 and 2002 the MDC (opposition party) commanded overwhelming support in the general and presidential elections in Zimbabwe. Part of the remarkable history of Chimanimani opposition is in the 2000 Zimbabwean parliamentary election where they elected Mr. Roy Leslie Bennett as one of the three white parliamentarians despite the heavy intimidation against MDC voters by supporters of ZANU-PF. The fierce contestations have caused internal scars in many people of Chimanimani district and the pains live on. Also, of importance is to mention the rise of the former Deputy Prime Minister of Zimbabwe Prof. Arthur Mutambara who was also a known and reckoned force in the Zimbabwean political spheres. Prof. Mutambara was born and bred in Mutambara area in Chimanimani district of Manicaland province and he is known as a strong political activist. So, it is safe to say Manicaland and Chimanimani are not new to fierce political contestations and to date they are neither free of such. Political affiliation has been used as an intimidation weapon to achieve and forward agendas in the societies.

The above historicity can help us to understand Nyanyadzi community at large and its political tensions. It was interesting that when the farmers and the other participants from the neighbouring activity systems (ZINWA, AGRITEX, NVTC & NGOs) were asked to identify and prioritize the challenges they were faced with, political interference was reported by the two plenaries. As shown in Figure 5.7, political interference was listed as number 15 challenge and later prioritized as the 3rd challenge by the farmers while, the AGRITEX (Extension officers) prioritized it as the 5th challenge the AGRITEX and farmers are experiencing.

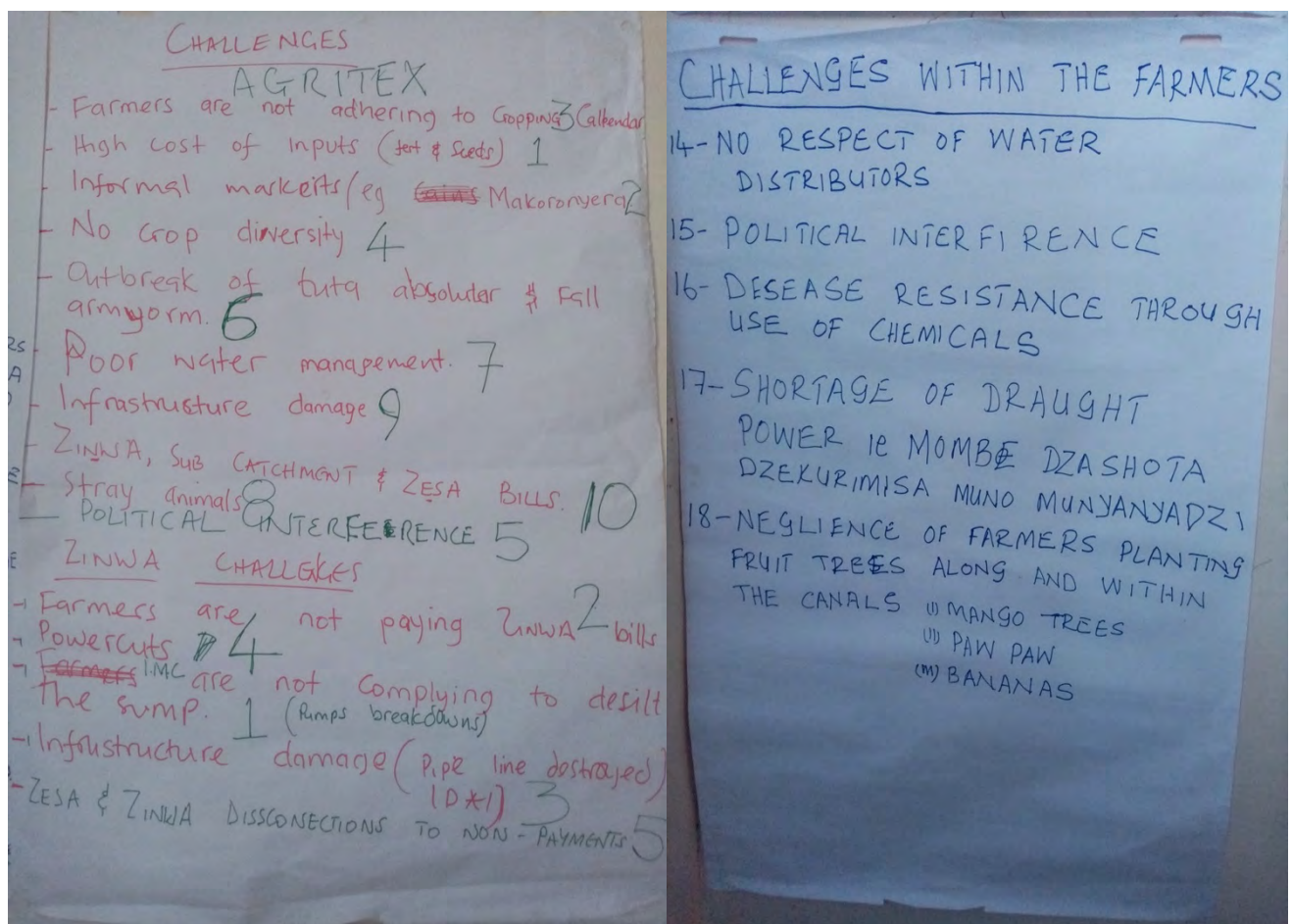


Figure 5.7: AGRITEX's priority on the challenges that affect the irrigation scheme.

Source: Author

Participant W6 reporting for the neighbouring activity systems says;

01:08:20: No.5. **Political inference.** There is political interreference in farming. 1. For example I want to refer to my own area of job specification at the pump house at ZINWA, the farmers are not paying their electrical bills to ZESA. So, the political figures would come and ask them, let's give an example to that period of Engineer Mutezo of ZANUPF. When he was the Member of Parliament (MP) of Chimanimani West the farmers never paid electricity bills for the pump house for more than a year but, after his term ended, ZESA disconnected the electricity supply because the bill was too high. This is how political interference can affect the irrigation scheme.

Participant F13, reporting on behalf of the farmers also mentioned political interference when he said,

*01:50:41: **Political interference**- there are some people or group of people among the farmers who are powerful than others because of their political affiliations and positions in political parties. When we engage in farming the overwhelming majority of us are interested in farming as a business but most of the times the political figures out speak affecting the entire irrigation scheme. For example, we used water under the Command Agriculture program and up to date there is a huge debt left by those farmers who were contracted under the program. So, you will find that the political figures come up with these programs to gain something from us and no one can refuse them because it may affect your individual being.*

The two narrations presented above show critical conflicts that the farmers are experiencing in attempts to reach their collective object. As one speaker said their target is to prioritise farming as a business and not a political movement or instrument to forward political mileage. As pointed out, political figures mostly with strong lineages to Nyanyadzi farming community come up with political initiatives such as exemption of electricity and water bills in order to gain support and be voted into power. Because of their political influence the parastatal departments are muted of the tenure period the figure is in power. Yet, the debt accumulates at the expense of the local community and no one speaks about it until the political figure's term in office ends. That's when the community wake up to be told they owe US\$60 000 for electricity over the past year. Any attempts for government interventions fail and the cost incurred would be rather better to pay off the debts. The political interference begins at the higher levels of authority where none of the farmers or the parastatal authorities may or can challenge in the end the burden is transferred to the poor farmers. There emerges a critical conflict on the object of the higher positioned political figures (power and be voted into power) and the object of the farmers (improve crop production and marketing). Resultant is a complex, paralysing situation that makes it even difficult to achieve the farmers' shared object, where abrupt power/electricity cut offs are experienced regardless of the time of season or the water demand of the irrigation scheme leading to crop failure and limitations in the irrigation scheme capacity. In the cases where Munyanyazi river discharge level falls below critical levels as well, food insecurity is imminent, and most people lose their means of livelihoods becoming more vulnerable to food insecurity before. This has happened several times more than I can still recall

over my 25years of practice in Nyanyadzi irrigation scheme.

In the same change laboratory workshop, when I was given the chance to reflect on the issue at hand, drawing from the critical engagement with literature and insights from the interviews with the three generations of the farmers and the focus group discussions I posted the following,

02:24:44 No.2; Researcher: the second challenge I found out besides financial management is the failure to disassociate politics and development. I think this is the root of your irrigation management challenge. We fail to differentiate the irrigation scheme and politics, the issue of IMC members' appointment vs selection. Sometimes you hear the farmers saying "they were appointed, and many of the farmers don't want them. This Committee was appointed, this one was selected by majority and it's the one we want." But the big issue is that farmers are failing to differentiate politics from development. What it simply means is that if I were to come and say I want to sink you a borehole to supplement your water, or I want to construct a pivot system for your irrigation scheme or just to say I want to scoop your dam to increase its water carrying capacity, it's not surprising to hear some of the farmers saying who sent him, what does he want from us in return and to which political party is he affiliated.

In my reflections I pinned down high political interference as toxic in a communal irrigation system also as shown in the chart in Figure 5.8. I don't by any chance say involvement of politics in communal projects is bad, but I argue that when the society fails to disassociate the two, the former become toxic to development. If politics becomes more central to developmental work in a society then its toxic. What has been happening in Nyanyadzi community is that there has been a strong contestation between the two dominant political parties ZANU PF and MDC. The people of Nyanyadzi became obsessed to an extent of engaging in series of political violence amongst own fellow farmers' families, as was witnessed in the 2008 primary elections and presidential elections together with the Presidential runoff election held in July 2008. These elections became political reference to how political violence can be extremely destructive. This is the year when ZANU PF unleashed violence against their own people and the communities lived in fear of being known to belong to the opposition party, followed by 2012 primary and presidential elections where similar cases of political intimidations were experienced.

I wouldn't want to describe much about these eras but shall jump to describe and explain how

such acts affected the irrigation scheme. First and foremost, I want to mention this again, Nyanyadzi is an agrarian community who solely depends on the irrigation scheme as the primary and main source of livelihood. Secondly, the community can be described as at the primary eutrophic level in the supply and demand chains meaning they are generally poor, and this has been well described and explained earlier. I won't spend much time discussing that either. I jump on to mention that whoever takes control of the irrigation scheme and whoever can provide farming support mostly in form of farming inputs touches the heart of many.

Bearing in mind the nature of the community we are discussing it is therefore common knowledge that because of their poverty levels they are subjected to political abuse. Because of the political violence scars the people bear, they are likely to give in to politically affiliated gimmicks. So what has been happening in Nyanyadzi irrigation scheme is that the farmers have held on to strong political affiliations and took these to the fields as the battling grounds. It's not surprisingly that political reconciliation is not easily achieved in low class societies. One reason being that poverty is taken advantage of as a converting point or revenge. Its either they used the farmers' poverty situation and household food insecurity to lure farmers into supporting their political movement or to punish those who fail or have shown resistance or little interest to political movements. This is what most political analysts and activist report as "votes buying." This vote buying is destructive by nature because what it does it further fragment the unity of purpose of the farmers and the farmers are rather described and distinguished by political affiliations. Secondly, it projects and centres political affiliation as an object within the irrigation scheme and this second object's motive normally collides with the primary object of the farming activity system.

There has been an outcry in the scheme because of political interference. I shall explain further by saying, the political capture of the irrigation scheme begins in the selection of the Irrigation Management Committee (IMC) chairperson. Normally when the farmers are voting for their IMC, they do so with deep political driving motives, *"so that they can put their own leader from their own political affiliation"* (Interviewee FGI 3). It thus makes sense to hear the farmers complaining of the imposed committees whereby, the local sitting Member of Parliament (MP) intervenes by suggesting his/her strong persons into the committee. What does this mean to the political movement? Those who are led by own political affiliated members benefit during that tenure because all the farming inputs coming from the government are disbursed by the Irrigation chairperson. In this case who is likely to benefit his own people, by own people I

mean farmers who share the same political movement. Then the irrigation scheme is run on the will and with the fellow farmers who support the same political movement and not the farming object. This is where the critical conflict arises, normally most farmers have tended to remain neutral when it comes to political affiliations, so that you can save your face and family's food security.

I remember coming out from the boarding school in 2003 having completed my Advance level. My father sat me down and carefully explained to me what was happening and how I can be easily connected and later inflicted. He strongly advised me to know my political affiliation and tell it to myself and never share with anyone in the community. He encouraged me not to volunteer for any political positions in the youth camps and remain vigilant of my political beliefs. Five years later when I was coming from my undergraduate degree there came a group of women to our house, they called for my fathers' attention. They wanted to speak to him about my political decision and instead he instead that, *"the kid is here you can talk to him, I can't say anything on his behalf."* When I arrived, they were so clear, they wanted me to share with them my political thinking and affiliation. They argued, *"this will help us to know of our own youths and help you find a job easily in the government and lastly, when our farming inputs and drought relief programmes begin, we prioritise our own first."* As advised by my father I insisted "I am still studying and very soon I will make a decision and you will learn where my heart belongs." The next few months they called for a Youths' meeting, I attended barely five days later the other Party called for a Youth's meeting and I attended again. This is how most farmers have and were able to keep going in the irrigation scheme. A few individuals have suffered a lot from unfair resources allocation including water because of their political affiliations and this is why sometimes farmers are heard claiming they don't have a committee in front of them. It's a radical stance to say either they are apolitical, or they are from the other party and whatever decision taken in the scheme is likely to exclude them based on their political positioning hence, they can do what they want whenever they want. What this surely means to the irrigation, it further shows the depth of fragmentation existing and how the situation is paralysing and difficult to move on towards achieving the shared object in the scheme.

I shall present a few narrations from the farmers and these may support or suggest otherwise to my personal reflections of the situation and the manifestations in the scheme. The above historicity should help us to clarify and understand some of the issues raised in these narrations

and conversations in the change laboratory workshop. Soon after my reflection Participant E3 went on to say the following;

The Researcher: I wanted to talk about the Irrigation leadership. I was thinking of this yester night, from the Land Reform era (Zimbabwe's Fast Track Land Reform Program (FTLRP) 2002-2003) going back to the year 2000 things were a bit better. Even the IMC was elected nicely but this time the IMC is now elected on political lines. If you closely and carefully look at the farmers who are elected to the IMC there is a time when only those from political party X are only elected to the committee. Another year you will find farmers affiliated to political party Y being elected to the committee and even those who are not knowledgeable on how the irrigation scheme is managed they are still elected simply because they are affiliated to the Irrigation Chairperson Mr. X's political party. So that mentality must go, we are supposed to elect the rightful personal who are knowledgeable and able to lead. Political affiliations are always there, but let's look and elect farmers that we know can help us. Because this problem of political interference is as a result of the fact that we are choosing our leaders on political lines.

Participant F10: Point taken.

Participant F22: Let me support what Participant E3 said. In the past political parties were there of course but, whenever they invited for a meeting politics was not allowed at all. Even when we would go into the fields to repair the perimeter fences, they would strongly advise us not to discuss politics. Even when we were leaving for our houses, we never talked about politics but nowadays it's too much.

I should say this so that we don't confuse much, the political environment of the past beyond 2002 was different. From the earlier historicity that I gave I didn't clearly describe the political climate that existed. Between 1980 after independence to around 1987 there were strong civil war which is believed to be characterised of heavy massacres of the non-ZANU supporters. This war is commonly known as the Gukurahundi and is believed to have wipe out many tribes in Matabeleland which were the strongholds of ZAPU. Until they signed Peace Accord of 1987 which formed the ZANU PF. Since then, there has been every effort to maintain a state of one political party until 1997, when there were constitutional reforms. It was only by 2002 when MDC was believed to have managed to victoriously challenge the ruling party ZANU PF that the communities became free to discuss politics. In the past no one would openly discuss or criticise the ruling party. Again, Participant F22's observation is very correct and helps us to understand the shifting political environment as well. Some of the issues raised by Participant

E3 I believe were also described well in my reflections and historicity.

Participant F16 further posit that,

Yes, I want to support Participant E3's points and it must be clearly understood amongst us the farmers. If you carefully look at it that's what I mentioned earlier on that sometimes the farmers do not attend the meetings called because of the siting councillors. Sometimes when people believe the councillor is the one calling for the meeting people don't attend. So, the farmers are involving politics in everything and it's no longer about farming. Nowadays the farmers first want to know, and they purposefully abscond certain meetings while, some local leaders (Councillors) want to take advantage of the Irrigation meetings and things are not going very well in Nyanyadzi irrigation scheme.

Participant F18 went on to say, *"Yes, on the same issue of leadership, there is also an element of power hungry. Such that those in the marketing positions in the IMC would be seen interested in chairing irrigation and sometimes they don't listen to the needs of those whom we deem are the lowest farmers in the scheme. They despise advise coming from those whom we call the least farmers in the scheme. Point number 2. Political interference has grown in Nyanyadzi and is now the topical issue here. Reporting on Chitinha side, you normally hear farmers labelling us and referring us as notorious farmers of Chitinha yet under the constitution we are all Nyanyadzi irrigation scheme. These politicians are dividing us they usually come to us promising us development but align it to a political party. If we are on developmental issues, leadership should desist to political alignment and stand for the development of the irrigation and farming in general. From my thinking they say "kuve mukuru unokudzwa newako, hainga rarami hove pasinga mvura" The issue of lack of leadership management skills it's also another big issue troubling us in the irrigation scheme.*

Participant F16 and F18 described exactly what is happening in the irrigation scheme and this is what has caused fragmentation of the irrigation scheme. Politics has moved to the central of the farming activity system and it has become an enabling instrument to access the mediation tools (water, farming inputs) that makes farmers realise their shared object. Another important issue raised by Participant F18 is on the relationship of co-existence that he described in two Shona metaphors as split as *"kuve mukuru unokudzwa newako,"* translated as *"for you to be an elder you must be respected by own people."* In this case it means for the leadership to be

regarded as leaders they have to first earn respect of the farmers. In other words, you can't be a successful leader if your own people don't recognise or respect you. This is basically referring to some of the normalities raised in leadership selection and leadership being political. The second metaphor used is "*hainga rarami hove pasinga mvura*" translated as "*the fish cannot survive without water.*" This is straight forward but together these idioms shows a need for the leadership team (IMC) to earn respect of the people and work together with the people. Their existence is mutually connected to the farmers and such collective existence must be maintained if they are to achieve the shared object. The use of strong metaphors is what (Engeström & Sanino 2011: 375) describe as a sign of a critical conflict. In this case the farmers are in critical conflict with the IMC wanting to use their positions to forward and set political scores while, the farmers expect the IMC to lead them towards achieving a shared object of crop production and marketing under irrigation farming. Some of the issues discussed above were also presented in the Change laboratory workshop plenary sessions and built into chart presented as Figure 5.8.

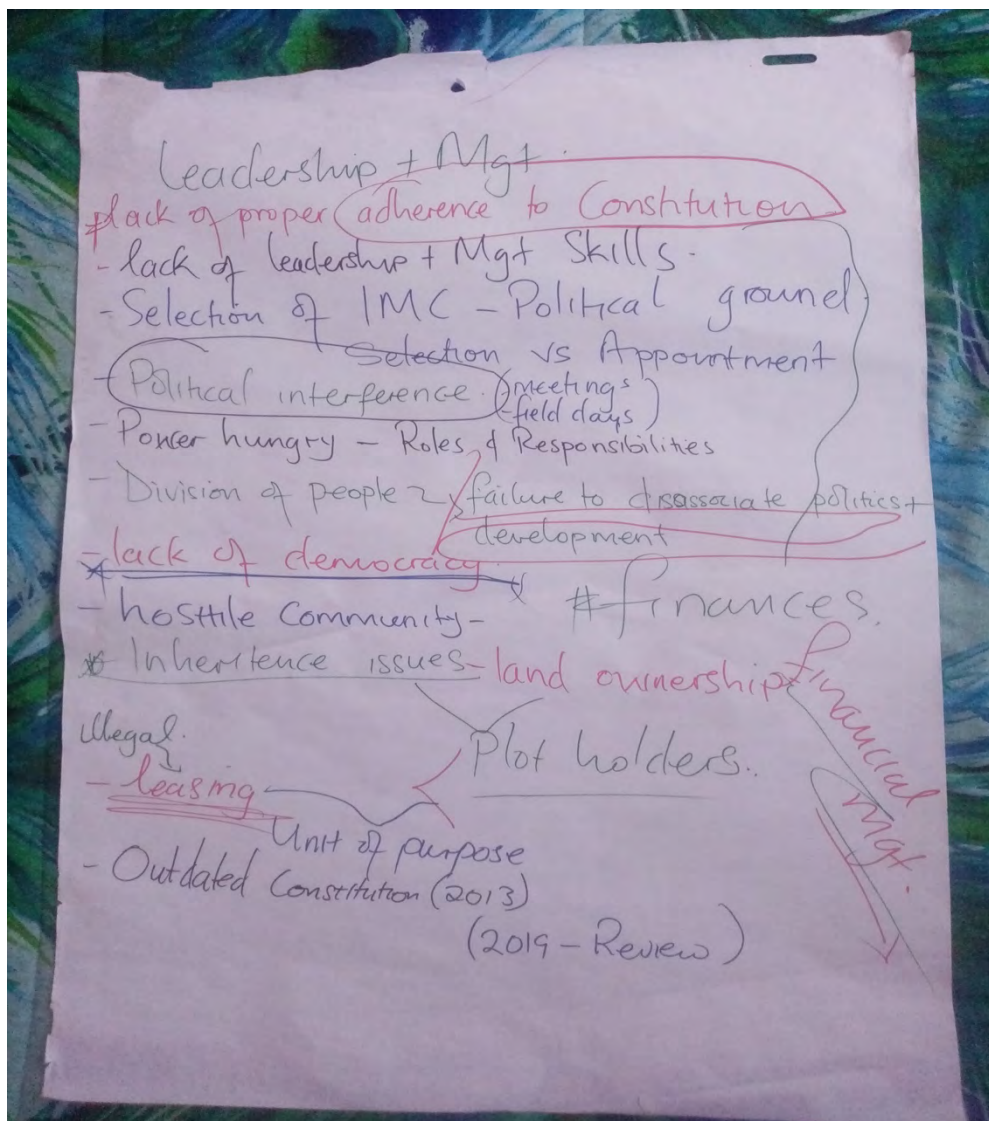


Figure 5.8 Challenges around the leadership (IMC) of the irrigation scheme

Source: Author

During the lunch time when the farmers were feeding, one of the audio recorders was kept running. The farmers were aware of this audio recorder since it has been used in recording previous sessions and was never stopped. There was no need for further consent negotiations. During the lunch recording there were very interesting discussions, but of interest to me is this particular conversation,

02:29:47: Participant F22: There is one thing that I have noted, we have changed so many committees in Nyanyadzi irrigation scheme. Why do we keep changing the committees are they wrong or it's because we don't appreciate our committees? Why did we remove the committee led by Mr. X? Mr. X was a better Chairperson because he

was apolitical. But it's because the farmers are much interested in the politics than farming.

Participant E3: That's the politics we are referring to.

Participant F16: No, he (Mr. X) was the one full of the politics. He was a politician, but he didn't want to show the farmers his true colour.

02:30:21: Participant F4: Do you know that the politics you are talking about its about positions in the IMC. Sometimes there is no politics but what happens now is that, when you are in the IMC there is also internal commotions and competitions for the positions. They say they also want to become the Chairperson because they can steal money from the farmers and for real, they divert funds for own personal use. So, it's sometimes not about the real politics but just the position (Chairperson) and everyone wants to occupy that position and some farmers also want to feel the position. So, there are also internal conflicts among the IMC wanting to rotate on the Chairperson position as well.

This conversation caught my attention because it is a true reflection of what is happening in the critical conflict among the IMC and between the farmers as well. As shown in this conversation there is a likely to change or rotate the IMC members based on the political grounds and because of the internal conflicts for positions. Competition is healthy but can be unhealthy sometimes especially when the motive is divergent to the farmers shared object. Within the IMC there are small factions which also cause dysfunction from within to destabilize and antagonise any positive progress in the name to shame the current IMC leadership. This further sub-divides the ordinary farmers and confusion erupts and negative behaviours such as absconding meetings, training workshops, paying of utility bills are also experienced among the farmers. Resultant the farmers' activity system is choked by complex and impeding movements that antagonise the unity of purpose and make it difficult to achieve the shared object.

5.2.3.2 A more advanced tertiary level contradiction manifesting as a critical conflict in form of poor management of the irrigation scheme.

As mentioned above, there is a more advanced tertiary level contradiction residing in the partially shared object of the IMC and Irrigation farmers' activity systems which manifested as a critical conflict paralyzing the activity systems and resulting in a poorly managed irrigation scheme. There is no doubt that ethnographic data generated in this study through the fifteen

interviews with the three generations of farmers pointed out clearly that they have witnessed good irrigation management and bad irrigation management (see Chapter 4), with the latter, being currently experienced in the irrigation scheme. It is also not a secret that in the Change laboratory workshop the contemporary data confirms that the management of the scheme has evolved over time with the better moments experienced during the first and part of the second generation (before 1965) and the worst experienced afterwards because of various reasons. It is important to realise that these contradictions don't happen in isolation, but they do happen in a nexus to other neighbouring activity systems. Sometimes one contradiction or manifestation leads to another one.

In this case irrigation management is interconnected to several issues and manifests in many ways. One thing for sure is that the ability of the IMC to fully and successfully deliver its role and mandate has nested and connected manifestations in the scheme so, has its failures. As discussed earlier on in the previous chapter, the IMC of the scheme has proven to be vital for the progression of the irrigation's object and in holding together all the important elements of the farmers' activity system including division of labour per se.

Historicity of the object as described in Chapter 4 (see summarise in Tables 4.2, 4.4 and 4.5) has shown how the leadership and management roles of the IMC has evolved over the three generation of farming. Furthermore, how the internal and external as opposing forces have expanded the irrigation's object both vertical and horizontally. In essence, the political and economic trajectories became essential double stimuli that have influenced and shaped the IMC object over time. In essence, what is required and expected from the IMC of 1931 and the IMC of 2018 are totally different.

However, what is also significant to this study is the realization that the successes of the scheme are heavily dependent on the vision, capacity and agency of individual and the collective or collaborative efforts of the subjects (farmers) and the IMC. In other words, we can safely say the success of the scheme over the three generations of farming has been partially shared between the subjects (farmers) and the IMC. It can also be safely said progression in the partially shared object has been heavily dependent on transformative agency and the expansive learning processes in the irrigations scheme. However, the fragmentation in the farmers' activity system has mainly been blamed to the IMC and has manifested mostly as a critical conflict in form of poor management of the irrigation scheme.

Poor management of the scheme has played out in various ways in the scheme, one of it is failure to maintain the irrigation perimeter fences resulting in crop failures due to stray animals (see Figure 5.5 and Figure 5.9). As presented by Participant F13 reporting for the farmers that, 01:11:43: No. 9. *Stray animals*- goats, cattle are straying into the fields.

Participant E3: And chickens as well,

Participant E3: And turkeys as well.

01:45:15: *Stray animals*- The protection of our crops is compromised. Our crops are destroyed by cattle and goats because the perimeter fence is damaged and not maintained. This is where we fail, we blame the farmers yet, we can as well call out to the government to help us with perimeter fences so that our crops won't be destroyed by stray animals.



Figure 5.9: Stray animals in Nyanyadzi irrigation scheme

Source: Author

The issue of stray animals as shown in Figure 5.9 above was further elaborated by Participant E3 who said,

... the issue of stray animals as I know it, it's cattle that is known of the owner which if you take it to the police it will be entrusted to the Kraalhead and if no one claims it after 3 months its auctioned. So, 99% of the cattle we call stray animals are known that they belong to Mr. Y or Mrs. Z and the goats are also known that they belong to Mr. X or grandmother M. But the biggest problem I learnt from one of the surveys conducted some years back, is that the majority of the cattle we call stray are not stray animals at all. It's just that the cattle owners are failing to manage their livestock. So, we should have policies to encourage the farmers to keep their livestock off the fields.

I agree with Participant E3's observations on the 99% of the stray animal problem. What I want to add is that every farmer knows the need to safely keep the livestock but the challenge at times is just complicated. My experience herding cattle in Nyanyadzi tells me that, most of the cattle are used for power draft in the irrigation scheme providing it with tilling power and drawing the scotch carts around the fields. So practically they spend much of their times in the fields and they enjoy the fresh and green grasses they eat during the work and at times at break times. I remember my father would say when we are breaking for tea mid-morning, we should leave the cattle to feed in the fields, on the road sides or on top of the canals. These cattle have also developed intimacy relationships with the fields to such a point that hardly 30 minutes after I would leave them in the nearby mountain to graze, they are attracted to the green vegetation in the fields and they just trek back to the fields. The biggest problem would be that these power drawing cattle understand the system in the fields but the accompanying 9 or 10 cattle don't. If the fields gates are left open, they get inside and they rampart on people's crops. The issue then moves slightly from livestock safe keeping to also well managed perimeter fences and gates to keep the livestock out of the fields. It also refers to farmers' responsibility to keep the gates closed all the times and employ herdsmen to keep the cattle safely.

What is now more paralysing is that there was a system in place, I remember as early as 1992 there was a yard just close to the dam area called Skit. This system was established to control and manage issues related to stray animal. There was a man employed to manage and safeguard the livestock reported astray. So, every day the farmers would move around the fields and if they find cattle roaming the perimeter fence late in the evening or in the fields the farmers would drive those cattle into the skit. They are recorded on date of arrival and kept safely. This was a form of punishment to the farmer who is the owner of the cattle. In essence, each cattle logged into the skit paid a fine daily. In the case that the cattle destroyed another farmers' crops

the cattle would be kept at the skit until the two farmers settled out and the cattle owner still has to pay the skit fees. Normally the challenge arose due to the double fining system where a farmer must pay the skit fees and compensate the farmer.

Several times the farmer in wrongdoing would argue that why didn't you brought the cattle to my house or keep them into your kraal for a settlement than to report them to the skit. In the beginning the system was applauded but with time farmers felt a contradiction within the fining system whereby, the wrongdoing farmer felt harshly fined, double fined and in some cases the farmers would claim that they were wrongly targeted. So much complication arose when the farmers thought AGRITEX was making lots of money out of the initiative and not the farmer hence the exercise was misunderstood from being a security measure system to fundraising for the AGRITEX. Another thing interesting is that the farmers started to develop resisting mechanisms like leaving the cattle at the Skit accumulating charges but knowing eventually they would have to release them because the fence couldn't accommodate too many cattle and because they didn't have food to feed the cattle. Another act known was to come and release the cattle at night and at times even physical assaulting the Skit attendant. Eventually the system was defeated and need for settlements took over with the Skit fence vandalised and the space allocated to home seekers despite being just less than 30m away from the main canal and the dam itself. All this shows how the irrigation IMC failed to maintain or adapt the system and farmers are continued faced repeatedly with the same challenge of crop damage by livestock.

Another visible sign of poor management of the scheme is heavy leaking canals and pipes. The IMC together with the farmers are failing to collectively maintain the leaking, canals, pipes and general maintenance of the pump house. The farmers blame the IMC of lacking the charisma, will and focus to manage the irrigations' infrastructure, they blame them for collecting funds and misusing the money instead of maintaining the irrigation's infrastructures. On the other hand, the IMC blames the farmers for not collaborating and paying up their monthly subscriptions. In the Change laboratory workshop when the farmers were asked to prioritise, they mentioned infrastructure maintenance as one of the challenges they are grappling with as shown in Figures 5.4 and 5.5. Participant F13 reporting for the farmers posit the following,

01:12:14: No.10. Infrastructure damages- In the fields we have damaged canals and the stray livestock which gets into our fields they sometimes end up damaging our infrastructure.

01:47:05: Repair and maintenance of the irrigation canals- Our canals are damaged, and they are damaged year in year out, yet we need to maintain them in time what shall we do?

Participant E3: We have livestock and the people as well damaging the canals and we know the people breaking the canals. Also, draught cattle cause canal breakages including trees grown close and along the canals and lastly, farmers are not banking soil onto the canals to support the canals from breaking.

Participant W6 reporting for both the AGRITEX and ZINWA also highlighted the following,

01:47:20: Maintenance of main pipeline- From the pump house to the dam the pipeline needs maintenance. If you look carefully these pipes, they leak starting from the pump house itself to the dam and some even fell off yet, the farmers fail to find time to maintain. Very soon it will be watering time and if the water levels are low what shall we do? This is a big challenge we are faced with.

The above presented narratives show how big infrastructure damage is to the irrigation scheme. The issue of leaking canals and pipes was discussed at length under Section 5.2.2 pertaining to the central secondary level contradiction between the subjects and the mediation tools. I may just add that the intensity of infrastructure damage has even increased because of the Cyclone Idai experienced last year in May 2019 which left the main pipeline broken and swept downstream along Munyanyazi river (part of the damage shown in Figure 5.10).



Figure 5.10: Nyanyadzi irrigation pipeline and the situation after the Cyclone *Idai*

Source: Author

In relation to the pipeline damages Participant W6 reporting on behalf of the ZINWA department clarified when he said, 01:18:07: “*Infrastructure damage- ...But on the side of ZINWA we say the pump house and the pipeline belongs to the farmers.*” This means that ZINWA is not liable for any maintenance costs of the pump including maintenance of the pump house. Another area of concern the IMC have reported lacking is on pump house maintenance as reported by Participant W6 that,

01:13:38: Pump maintenance- IMC there is an issue of the sump service. The sump sometime suck in sand, so the sand must be scooped out. If the sand remains and when we are pumping water the imperial is worn out quickly. Meaning that the volume of water pumped is also reduced comparing to the original capacity of the pump. To add on, you will be billed the original capacity of water drawn by ZINWA, yet the water

volume will be less. Number 2. Even ZESA will bill you in relation to power drawn and not water pumped. So, if I ask you to come and desilt the sump please come because I will be trying to prevent this problem. The sand also normally causes the pump to overheat affecting the conducts. Each conduct will cost Z\$5000 so if they all break it means you need to replace 3 and that's \$15 000. So, it means you should constantly come to maintain the pump house.

And now that we were hit by Cyclone Idai there are more sands in the sump. It's unfortunate that it happened as soon we have finished to desilt, we scooped on Wednesday and the following Friday Cyclone Idai came. So, as we speak the sump is filled by sand. So, we can discuss with the IMC to invite the farmers so that we can desilt so that you can pump water without any problems. So, as I speak the pumps are in sand. One more thing to worry about is this moist sand, it causes corrosion and rust on the pumps. And how does this happen, it happen this way, when we left the pumps they were in good state and because of the moist sand they now corrode and by the time we want to pump the water the pump seizes and broke. That's why we encourage that our sump must be kept desilted. We are inviting you to come and desilt the sump, but you keep on saying we will come, but right now we are doing some maintenance work since last week to the past two days and they will come again on Thursday and Friday. So, you need to understand that you were supposed to come and scoop the sump to keep the pump free of sand as soon as you switched off the pumps.

It was interesting in the Change laboratory that immediately after Participant W6 presented the groups' challenges Participant F14 retaliate with a denial and upset conscience. He said,

Don't support the bad reporting, he must just say farmers without mentioning that the IMC is not bringing farmers to maintain the pump house. He was just supposed to present the problems, just to say there is silting and stop there, not in the way he said, I want to correct him for future purposes. He was just supposed to say there is a need to desilt the sump house.

Participant W6 went on to clarify stating that,

you are correct Mr.G, but the way I reported is to highlight that the I advised the IMC and they know what I am talking about. So, I am saying that the IMC knows what I am reporting back, and this is not my first time to mention this to them. All I am saying is

if you can do something so that the pumps can be in a good condition.

The above long narrations by Participant W6 elaborates on the maintenance work that is expected at the pump house. However, that is a deep salient reserve that suggest there are challenges between the ZINWA and the IMC over maintenance of the scheme. As highlighted by the opening statement the pump house and the pipeline belong to the farmers and lastly, when he mentions that he has been calling farmers to come and desilt but they kept promising to come. This shows things are not moving in the right direction and the fact that the pump was still in moist sand called for urgent attention considering all the problems that are likely to happen. While the quick denial and upset by Participant F14 further hint on the existing relations between the IMC and the ZINWA over maintenance issues.

Added to the poor maintenance of the pump house is the failure to settle ZINWA-ZESA bills on time. As reported by Participant W6 on behalf of the neighbouring activity systems in the change laboratory workshop and he said that, “01:10:22: No. 8. ZINWA-ZESA bills- I think you can elaborate.” Participant E3 went on to elaborate saying,

we are saying in Nyanyadzi irrigation scheme we have these important utility suppliers ZESA, Odzi Catchment and ZINWA they all want payments., It seems as if you the farmers you don't care. But if you want to be realistic on how the irrigation scheme was designed, it was designed knowing that sometime gravitational water from Munyanyazi river maybe insufficient. That's why they complement with the hydro-electro water pumped from Odzi river to augment gravitational water Munyanyazi river. So, these utility services need to be paid on time.

In addition to the above Participant W6 reporting on behalf of the ZINWA also posit that,

01:17:08: IMC is not paying ZINWA debts- ...it's always good for you to know that you owe ZINWA some money. You can go and pay even though that you have an outstanding debt. It was better if you can pay in instalments as you can, not to fail to pay the water utility bills at all. It's not good to come to a time when we disconnect water for you in the irrigation.

Important issues raised were that the IMC owes ZINWA water utility payments and ZESA electricity utility payments. He further encourages the IMC to at least pay current months although they have long outstanding debts. The issue of utility bills' debts is a major one in an

irrigation scheme that heavily relies on Odzi electro-powered water to supplement the little gravitational water coming from Munyanyazi river. Being cut-off from the two utilities water and electricity means a famine and food insecurity is imminent. In response to the above presentations the farmers were enlightened, and it seems they were unaware of these debts in detail. As shown by the gesture and gratitude by Participant F10 who said,

Thank you, Mr. Water, for letting us know that the IMC is not paying water monthly bills to ZINWA, we were not aware of and we were of the thinking that all things are progressing.

Participant W6 further added that, "Still on the same issue, I want to assure you that we circulated the water monthly statements and some of you should have received their own domestic water monthly statements.

Participant E7: Yes, we received them last week.

Participant W6: Yes, unfortunately for this month the irrigation scheme's statement hasn't come but I requested it. Of all the statements delivered there isn't even one paid, they only paid \$500 in January 2019.

Participant F10; F9: Ha thank you, excellent you have finished. Thank you once again for letting us know.

Participant F14: How much money are we paying on water?

Participant F16: Farmers I don't understand, but we are paying the electricity bills every month and the irrigation maintenance fees including the ZESA debt.

Participant W6: So, there would be a challenge when you want water from Odzi river. Because ZINWA can cut you off its supply stating that you have used up your quota already. By the time electricity has been restored and the pipes maintained ZINWA will simply say we can't allocate you any water without the payments. Did I make it clear?

The above narrations shows that the farmers were shocked upon hearing that they are still owing and are in heavy water bill debts. It looks like this information is not or hasn't been communicated to them. Hence, there could be a broken line in terms of communication between the IMC and the farmers and this may also raise eyebrows in terms of transparency and communication skills of the IMC. These two principles are easily linked to poor or mismanagement. Later in the change laboratory discussion, Participant W6 explained that,

02:32:33: Listen Mr. X the problem is your IMC because they are not paying water utility bills. I wanted the IMC to ask me why I am saying they are not paying water utility bills. Yes, ZESA knows the cycle that you will have to pay them and as ZINWA

we are also aware that. ZESA came with the intention to cut off its power supply and later in the same month they came again wanting to cut off their power supply. This shows that you haven't paid ZESA as well. Same applies to ZINWA they are not paying they only paid Z\$20 and it was it until now, they are not paying. So, when we speak, we are rest assured that your payments are not worthy.

Again, this clarity leaves little doubt to understand and conclude that the IMC is failing to maintain the irrigation scheme's utility bills despite the farmers being astonished and insisting that they are paying up their monthly utility bills. Many complaints were also heard in the interviews, interviewees complaining that the IMC diverts their money for personal use and in this change laboratory Participant F4 also mentioned that every farmer would want to be in the IMC and be the chairperson because they believe there is lots of money and indeed it is there, money is diverted for individual gains.

Added to the outstanding water bills, Participant F13, reporting for the farmers also raised an issue on electricity bills when he said,

*01:45:50: **High cost of electricity-** Electricity is expensive. If we fail to get enough water supply from Munyanyazi river we rely on Odzi river. There are times when we can go for 3-4years without paying up ZESA electricity bills and now the debt is huge, and we can't clear it.*

I would want to correct the sub-title of the challenge as high electricity debt instead of mentioning the cost, even know the cost is something we shall discuss in detail later. But here the issue is on the outstanding high ZESA bills and the last time I checked on it was slightly above US\$60 000. How the bill has accumulated was discussed earlier in the discussing on how the Political figures in the form of Member of Parliament and the Government programs have for example the Command Agriculture, have left debts accumulating in the scheme. But there is also a good reason of mismanagement of the funds as noted by the farmers which has also led to these ridiculous debts. The fact mentioned above that ZESA came twice wanting to disconnect its power supply to the irrigation scheme means the IMC is not paying. This shows a critical conflict between the farmers' expectation and the kind of management they want against the priorities of the IMC and from these conversations may imply personal financial benefit. This conflict has ended up in the irrigation scheme owing several thousands of dollars to the two utility suppliers. I personally had never heard of Odzi catchment abstraction funds

until this workshop and I wasn't the only one hearing of this for the first time. The overwhelming majority of the farmers present in the workshop looked puzzled and if the farmers are not aware of and not making follow up efforts it means Odzi catchment hasn't been paid for years. This all together raises questions on the type of leadership and management team that makes up the IMC, and the integrity of such team.

5.2.3.3 A more advanced tertiary level contradiction manifesting as a critical conflict in the form of poor marketing in the irrigation scheme.

As mentioned above, there is a more advanced tertiary level contradiction residing in the partially shared object of the IMC and Irrigation farmers' activity systems which manifested as a critical conflict paralyzing the activity systems and resulting in a poorly marketed irrigation scheme. There is no doubt that marketing is an integral part of the success of any business. It is even more critical with horticulture where the produce is perishable and must be distributed or sold urgently. But in the absence of a coordinated marketing 412ha produce of tomatoes can be seen perishing and farmers becoming disheartened by the losses considering the high costs of the inputs and the cost of the intensive labour. To give a true picture of what can happen when there is poor marketing Participant NV11 said, *"Last time I felt pity when the farmers were barter trading a 20l bucket of tomatoes for a bundle of firewood."* There are so many reasons to why this is happening in Nyanyadzi irrigation scheme.

Tracking back to the historicity of the object based on the ethnographic data gathered from fifteen interviews with three generations of farmers, it is not a secret that when the irrigation scheme began there was no readily available market. In the period 1931-1960s there wasn't crop diversity and they said even the market was poor. They instead focused on subsistence farming to meet household food security. Around 1949 is when they started to find variety of crops trickling in and by 1960s the market had enormously improved. As indicated in Section 4.2.1 during this period the irrigation scheme was under the management and leadership of the LDO under the colonial rule. Farmers were primary producers; all they knew was to farm and marketing was a coordinated effort through the LDO. Much of farming in this period was contract farming and the market was both local meaning countrywide and international. This means that most of the produce was exported and produce such as the pawpaw, green beans, sweet beans, tomatoes, egg plant were all export type while maize was sold to the Grain Marketing Board (GMB) and National Foods which were the biggest parastatal companies that

ensured national grain stocks are maintained.

Things changed as of 1969 onwards when the LDO (Rev. Alvord) left for Mt Selinda after a failed attempt to dislocate Nyanyadzi farmers under the Land Tenure Act (No. 54/69) of 1969 which replaced the long-standing Land Apportionment Act of 1930. The Land Tenure Act of 1969 ensured that, *“each race shall have its own area... the interests of each race shall be paramount in its own area ... neither race may own or occupy land in the area, except by permit, which shall be issued by a Minister of Government when it seems in his opinion desirable”* (Cary and Mitchell, 1977). Also, the 1965 Court Ruling led to the 99-year lease meant that the farmers had to manage the irrigation scheme themselves. The coordinated marketing process was lost.

This period had its own political limiting environment resulting from the announcement of the Unilateral Declaration of Independence (UDI) by Ian Smith in 1965. UDI was a statement adopted by the Cabinet of Rhodesia on 11 November, 1965, announcing that Rhodesia, a British territory in Southern Africa that had governed itself since 1923, now regarded itself as an independent sovereign state (Watts, 2012). This was followed by fifteen years of international ostracism, economic sanctions, and civil war leading to independence as the state of Zimbabwe in 1980. From 1965 the market collapsed and later also saw the disappearance of the export market because of the 1965 sanctions to Ian Smith. What followed was also a chaotic period after independence between 1980-1987 which also saw Zimbabwe experiencing a civil war which was a detriment for any economic development and agricultural business at large. Ever since to date we never recovered well due to political-economic unrest in the country which has seen economic decline time with the ever-highest inflation at one point. This was exacerbated by sporadic droughts and international sanctions that were served to the Former President of Zimbabwe R.G. Mugabe. The aftermath is still felt to date. It is in this insecure political-economic environment that Nyanyadzi irrigation scheme still operates. Without a coordinated marketing effort by an able IMC, the dream of realising the shared object appears exceedingly difficult.

Data drawn from the Change laboratory workshop shows that when the farmers and neighbouring activity systems' participants were asked to identify the challenges faced by their respective activity systems and interacting with the neighbouring activity systems and to prioritise them, the following emerged.

*Participant W6: 01:06:15: No. 2. **Informal Market.** Informal traders are the ones dominating as our produce buyers. So, their purchases are low, unless we could find some formal markets or companies, we can engage in contract farming with the likes of Cains company maybe they will offer better prices.*

*Participant F13: 01:44:44: **Marketing of crops-** tomatoes, beans and other crops. There has been a growth in informal traders and middlemen ship because we lack a proper market, we can sell our produce on time. Let's say I have grown my bean plants and I fail to sell the beans because of various factors including lack of formal buyers, lack of government marketing support. So, what can we do, we are just being abused and this is one of the challenges we are faced with as farmers?*

Poor marketing is the issue being raised above by the two respondents presented above. One issue is the low purchase prices which the farmers are feeling is abusive since they also must break even. The farmers face critical conflict between wanting to meet household food security by crop production, yet the market is poor and normally drive them into a loss.

Participant E3; explained the issue of poor marketing stating that,

...I think the issue of informal markets is one of the biggest challenges. I think in the time of Mr. M.K, in the first generation there was the Midlands buyers, Gloria, Victoria foods, Blue ribbon and there were less informal traders. By that time, the farmers would transport their farm produce (beans) by scotch carts to the companies stands and the farmers were given their money. I think this is one of the issues we have forgot all along, the issue of cash shortage in Zimbabwe. Because, of the shortage of cash you end up selling just because there is no option because electronic money is difficult to transact in rural setup.

Then the issue raised about the informal traders has paralysed the irrigation scheme, but I am happy because it's now a bit better. For example, we knew the likes of Wallace and Grant they used to come and buy from the farmers until the farmers decide to send their own produce straight to Mutare marketing centre. All the same the farmers are losing out because for example on tomatoes the farmer has to; 1. hire people to harvest the tomatoes; 2. buy the card boxes to put the tomatoes in; 3. hire a scotch cart to ferry the tomatoes from the field to the bus stop; 4. At the bust stop they have to hire trucks to ferry the boxes of the tomatoes to Mutare Sakubva market. At Mutare Sakubva market there are market marshals who also control, so they become your middlemen or Sales

Representative and they don't allow you to touch anything. Afterwards they charge you a fee let's say Z\$5 per box. They even tell you the price to sell your produce and they take part of their representative charge per box without much effort. So, the farmer is even on loss before selling his produce. The middleman or sales representatives make money because they don't have any expenses yet after selling your boxes of tomatoes let's say 20 boxes x \$5 = \$100 for free.

That's why we say by the period of Cains foods company, farmers knew that once you send in your boxes of tomatoes to their camping it's all from your side and just wait to be paid. So, I strongly urge the government to call upon those companies again to support the local farmers because the farmers are making losses.

The above narrations show how the farmers are struggling to break even because of the prevailing political-economy situation. But also need to be understood is the difference between individual versus collective marketing. The researcher asked the following critical questions to the farmers,

So, in the situation that the government has failed to support the farmers, you as a farmer what are you doing to improve your marketing situation? What I am trying to ask is that if Wallace and Grant manage to place themselves as your Sales Representatives in Mutare Sakubva marketplace it's because they do all in their means to protect their market. Remember, this is their source of livelihood, so they jealously protect it. So, you as a farmer what are you doing to make sure you won't end up going to Mutare to sell own produce. Because the work of the farmer is in the field am, I am lying Mr. MK. The farmers are supposed to produce and put on the available close to market and get paid like in the case of Cains foods. You knew as a farmer you were just supposed to produce your products and send to market what happens thereafter is none of your business. So, my question is as a farmer what you are doing on the ground that's where my biggest question lies.

Participant F16: Can I please speak on that, as farmers we formed a Marketing Committee. The Marketing Committee represents us in meetings, it is visual in meetings only, but I don't know if there was any time, they were reported to have come with a buyer. Right now, there are some buyers who came from Mozambique, but the Marketing Committee failed to negotiate with the Formal traders on behalf of Nyanyadzi irrigation scheme. Because it's just 100km from Mutare to Nyanyadzi, they don't even want so much fuel to come and buy our tomatoes and send them to Mozambique, but the

Marketing Committee failed. The Marketing Committee was formed there hasn't been much time.

Researcher: Can you see where the problem lies?

Participant F16: Yes, it's on us as farmers we are not doing anything just a big number. But we highly look forward to the Marketing Committee because if you are selected into the committee it means you are representing the whole community in every negotiations. So, the Marketing Committee members are not communicating it's just a group of farmers brought together into a committee.

Participant E3: Yes, Mr. H. you said it very well give me a chance to say something as well. This Marketing Committee as I know it, it's not the farmers who selected this committee. It was appointed by an individual as a political move and the appointees were selected out of political alignment so as long it's an appointment based on political alignment it doesn't work. Committee members are supposed to be selected through democratic means like voting under our big tree at AGRITEX. Committee members must be voted for as we normally do under the tree and it shows that those are the people we want. If you want to see how people boycott look at the cooperative building, it is dilapidating whilst the Marketing Committee is there but can't do anything. So, it has been asked by the researcher that what are you doing as farmers since, your Marketing Committee is not functional. If it's not functional why not remove it and select a new Marketing Committee.

Participant F4: From my own perspectives it is not the problem of the Marketing Committee but it's the current IMC that is affecting us. I realised that in Nyanyadzi irrigation scheme, if a formal trader/buyer comes by the end of the day he/she would have a team of people (middlemen) who would advise him/her wrongly including low buying prices. I want to believe that the Mozambicans you mentioned if they come here with their own boxes, they can offer me better prices but when they are moving to the next farmer Mr. C I am on the forefront advising them to offer lower prices. That's what they do, buyers do come with better prices but by the time they reach other farmers the prices would have changed drastically. So, the farmers in Nyanyadzi irrigation scheme play witchcraft in the daylight, and that same jealousy and cruelty is used in water allocation as well as in livestock-crop damages. The farmers can open for the cattle to graze in someone's field. You will see a farmer breaking the perimeter fence knowing that farmer Mr. C has beautiful maize crop and would drive the cattle into Mr. C's field. Nyanyadzi is full of witchcraft that's why nothing progress. We are well knowledgeable

of these acts if the informal traders were not advised of low prices and we stick to the same price as a scheme we were going to make profits.

The narrations presented above are enlightening. The researcher provided critical questioning which triggered the farmers into higher order reasoning and reflexivity. From the discussions above it shows that the formation of the Marketing Committee wasn't enough. Participant F16 was quick to highlight that the committee is dysfunctional and Participant E3 was critical to realise that the motive in the formation of the committee was at fault. Again, we see how political interference has paralysed the farmers activities, in this case it seems as if the committee lack relevance because it is not accepted by the farmers themselves. Secondly, it was chosen to forward political mileage not marketing the farmers' produce. These are kind of the critical conflicts farmers are faced with. Participant offers a divergent reason when it comes to the problem sources and blames the IMC together with the attitude of fellow farmers. She is of the view that the members of IMC who meet with the formal traders poised the buyers with wrong information that favours their individualistic gain and not collective bargain. This is the reason why they are failing as a scheme to break even and profit from their entrepreneurship.

Participant F13 adds that,

the problem I have seen is that, of course market is poor, but the problem is with the farmer. For instance, I grow my own tomatoes and take them to Mutare alone without involving the IMC or Marketing Committee which is responsible of marketing our produce. I am busy looking for a ready market where I can sell my produce, I transport my produce to the market and when I get there the buyers say we don't buy the riogard tomatoes type yet, it's the type of tomatoes I grew. I might not have the enough capital hence, I may only afford the riogard type because it's the only type of seed I have.

Researcher: Right now, you are coming back to the point raised earlier by the Extension officer that the problem of the farmers is that they experiment first then consult later.

Participant F13: Yes, because I grew up in this irrigation scheme and I learnt that whatever, planted and harvested would be sent to the market at once than to say individual farmer grows his own plant.

Researcher: In short you are coming back to what the Extension officer said about the farmers doing own little experiments and turn up for assistance when things go wrong. One farmer does his own crop and another farmer grow tomatoes and the issue is on

competition, you want to be the first to produce tomatoes in the whole scheme. Marketing becomes a problem if you do collective or group farming it's easy to market. I think there are some farmers I were discussing with and I said as a group its even to tap into big supermarkets' market for example OK, yet you always complain that there is no market. If you go to OK supermarket, they will tell you that we want registered farmers to supply us with various products. So, I don't see any challenge, if you are organised and you produce your 3 tonnes of tomatoes and you go to OK supermarket and say can we supply you we have 3 tonnes of tomatoes they will accept and tell you where to deliver and your money is deposited into your account.

Participant F13: The standards of our products vary that's another problem. We don't farm at the same levels. What is happening in the irrigation scheme is that when we grow tomatoes for example one farmer apply 2 bags of fertilizer and another farmer doesn't have the fertilizer, but the product is the same at the end of the day, but the quality and output differ. Cains company was good in that they bought from every farmer whether you have 2 boxes, or you have 4 boxes they were mostly interested in the crop samples. Now it's difficult, for some of us because we don't want to go far to market our produce, we just want to harvest and put our tomatoes in the boxes and transport them to the bus stop simple. If it means going as far as Mutare its individual marketing and it's not good for the progress of the scheme,

Participant NV 11: Again, on the same issue of marketing, I have also realised something that the overwhelming majority of Nyanyadzi farmers just grow crops because other farmers have grown that crop. We can't do a market research, that since I want to grow some tomatoes where I will market these tomatoes, but the farmers will think of the market after harvesting and that's when they would want to search for a market. Last time I felt pity for most farmers when a 20l bucket of tomatoes was barter traded with a bundle of firewood. People would bring bundles of firewood from Mugomo area and exchange for tomatoes. So, in terms of marketing a real farmer must do a market search before growing the crops. Most of the farmers are blind to this issue and just grow the crops blindly without figuring out the future market and we want to react on the last minute.

The major issues raised in the narrations above include lack of market research. The farmers are critical of the issue that in order to have a successful irrigation scheme the farmers must engage in market research. This is the critical conflict being faced, farmers are just engaging

in crop farming not because there is a viable market but because they grew up knowing that in October, they used to grow maize and in May they used to grow tomatoes. But the time has moved there has been high competition for market and it calls for collective effort, rather than the current individualistic nature of farming reported above. Some of the opposing forces raised that compromise the shared object are varying socio-economic characteristics of the society. Hence, quality and quantity of produce vary making it difficult to do collective marketing, but not saying it's impossible.

In addition to the above issues, Participants reiterated that,

Participant F4: On marketing we must realise that in the past we had the formal market like the Cains, National foods, Victoria foods they used to come to Nyanyadzi but now it's gone we must rely on the informal traders. Also remember things won't be the same again because most of these formal traders have shut down or downscale productions.

Researcher: So, there is no more contract farming plus the economic and political environment is not eased to do business.

Participant F14: Plus, I have also realised that we no longer have exporters as well who used to make our marketing much easier.

Participant F4, opened a new horizon of accepting the reality and work out solutions from those difficult situations. She accepts that the political economy as it is now, and we have to devise ways to operate in these uncertain situations. These are the critical conflict the farmers are dealing with. In essence, she conscientized fellow farmers to accept the reality and find better ways to deal with the informal traders as they may be the main market for now and in the near future. But there could also be other factors to consider in such a working environment and contract farming is also a possibility. However, in contrast Participant F6, raised a critical issue that must be resolved by the farmers if the current reality should be turned into a working solution. She said,

let me take you a little bit back, what makes contract farming impossible is the issue of poor Irrigation management discussed earlier on. Remember, we were once involved in the Command Agriculture and farmers harvested well but the truth is, they didn't pay back or honour the principal agreements. Our farmers are dishonest that's the problem, the Cains company you mentioned was duped here in Nyanyadzi irrigation. After supplying the farmers with fertilizers, seed of sweet beans and agreed with the farmers that after they harvest, they will sell them their produce. But, after the harvest instead

the farmers sold to Grain Marketing Board (GMB), so this is where our major challenge lie...

Participant E3: Yes, you have said the truth. I remember there was one formal trader who approached us at our office, we discussed with them and we said to them you are interested in buying our beans, but most of our farmers are failing to afford and secure enough inputs. They were quick to dismiss us saying, Nyanyadzi no if we supply the inputs it's a total loss because instead of the farmers selling to us, they will sell to other traders. So, in short, farmers in Nyanyadzi have to be honest first and it's not Nyanyadzi only but, most of the small-scale farmers are not yet honest.

Participant F6, questioned the honesty and integrity of the farmers as the main challenge. As long the farmers are not honest very few companies are willing to engage them in meaningful contract farming. This is where diversity in the subjects becomes a source of dissonance and it calls for collective and individual mindful acts to stay relevant to the governing principles. The issue on farmers individual characteristics as a hindrance has been mentioned quite a lot in this study. That's why Participant F6 refer this to poor management, because without a strong, principled and well organised management team it is difficult to collectively achieve the shared object.

However, it is important for us to understand the opposing factors to contract farming and how they play out in the scheme. Participant F14 took some time to explain how and why they normally fail in the contract farming pursuit. He said the following,

I want to say marketing is not an end itself there are issue that we also need to consider in the process. Let's say Mr. Majoni comes and supply me with seed of sweet beans to plant in my field and he says he will buy the beans at \$5 per kg then Mr. Mukwambo comes to the irrigation scheme during the post-harvest time and he is offering \$8 per kg. Mr. Majoni gave me seed of beans to plant but profit would I make from the \$5 per kg he offered me, and the current economic situation might not be profitable hence, I may send to another buyer who didn't give me anything but profiting in the process. The budget won't break even, because what we would have agreed is no longer the same there is no longer a win-win situation but the contractor profits at my expense.

Researcher: I didn't understand..

Participant E3: I want to ask Mr. X, my friend who spoke about contract farming, I want to give an example, there was a company called Agroseeds that is owned by Dr.

Cain. The Agroseeds came and we sat with the IMC and they said they shall supply the farmers with certified seed, but the agreement being that if I give you one bag (50kg) of sweet beans seed you shall return my one bag of sweet beans (50kg) then the rest you will sell me. By then it was about \$2.10 per kg and the economy was a bit stable it was around year 2000. Then there came a company offering \$2.50 per kg and what the farmers were doing now is that they returned one bag of sweet beans to Agroseeds then sell the other 18 bags to this other company. So, Agroseeds left and farmers are very forgetful just after snubbing Dr Cains the next they came to our offices and requested us to engage Dr Cain so that they may be supplied with sweet beans seed again. We telephoned Dr Cain and he said Nyanyadzi not again. The problem is that farmers are not trustworthy if you engage in contract farming and you would have agreed to a price (\$2.10) let it be.

The above conversations show that there is a critical conflict, and it lies on the farmer trying to break even between the cost of production and the net profit. The issue I realise above is the unstable economy that has made it exceedingly difficult to work in. There is no doubt the farmers are poor and may continue being vulnerable despite having access to a livelihood strategy that can enhance their household food security through irrigation farming. One thing to note from these narrations is how the farmer plays the victim of unstable economics. A contract is a legally binding agreement but if the farmer realises that there is nothing in it for them after these 3 months of labour and all other expenses incurred, they are left with no choice other than engaging in double play as a means of breaking even. Resultantly, the farmers become dishonest and untrustworthy and may fail to achieve the desired shared object in the near future. This is one of the critical conflicts that farmers are faced with and have to constantly work on so that they may achieve their shared object in Nyanyadzi irrigation scheme.

5.2.3.4 A more advanced tertiary level contradiction manifesting as a critical conflict in form of poor financial management structures in the irrigation scheme.

As mentioned above, there is a more advanced tertiary level contradiction residing in the partially shared object of the IMC and Irrigation farmers' activity systems which manifested as a critical conflict paralyzing the activity systems and resulting in poor financial management structures in the irrigation scheme. In this study learning from previously discussed issues poor financial management is one of the most mentioned. Several times in the ethnographical data

generated through three focus group discussions as well as the fifteen interviews with the three generations of the farmers and the contemporary data generated in the Change laboratory workshop farmers have shown to be desperate and, in some cases, even puzzled and emotional whenever issues of finances were discussed. The farmers strongly believe that the ever-changing IMC's are mis-using their funds and resultantly the farmers are seated with a ±US\$ 60 000 electricity debt and unmentioned ZINWA water abstraction fees as well as Odzi Catchment water abstraction fees. The IMC always fall shorts of accountability when it comes to their financial expenditures.

This challenge is interconnected to many contradictions discussed and that shall be discussed as well. This seem to be the most paralysing critical conflict in the whole irrigation scheme. All the other concerns and issues raised cannot be achieved when there is no financial support worse if the finances lack close monitoring. This will see the continued instability in the IMC because farmers also want to get a share of the farmers' treasury for individualistic advancements. In the historicity of Nyanyadzi irrigation it was so hard to find any literature or narratives on what exactly happens or how the finances have been monitored in the past and present. All I managed to pick was that the farmers paid their monthly services fees even in the past though it was little, ½ a Shilling - £5 a year and it was towards their leases and maintenance of the scheme. Beginning from 1965 onwards farmers had to manage everything and what you hear are stories of disgruntlement on how the funds were abused, misused and disappeared from the coffers until to date. Now the farmers even claim exorbitant charges which sometimes are difficult to profit and ever-increasing debts to utility suppliers.

In the Change laboratory workshop, I asked critical questions to the farmers and the deliberations were as follows;

Researcher: ... Let's get back to the management (IMC) how does it manage the finances especially in terms of utility bills payments (water & electricity)? What does your constitution say about the management of the finances in this irrigation scheme? How are the finances held and used? Then the other question is that do you have a bank account as Nyanyadzi irrigation scheme and are the accounts audited? So, the financial management structures I mentioned includes the measures to ensure your finances are monitored frequently such as quarterly financial audits so that we can learn and understand our financial movements and we should be able to know how much we have.

Also, a plan to say every utility bill is paid on which dates and cut off times. If there any outstanding payments you have to know which dates are they paid if is on every 28th of every month be it that there is an instruction to your bank that on the 28th of every month a transaction of so much has to be moved and make sure every month the money is transferred to let's say ZINWA. Do we have such financial structures?

Participant F16: No, what I just know is that there is high corruption in Nyanyadzi irrigation scheme when it comes to finance issues.

Researcher: No, let me correct you there is no corruption you lack proper financial management structures.

Participant E3: There is no corruption.

Participant F16: No, they steal from us that's the biggest issue we have.

Participant F10: You have just wake us up, when we are selecting people into the IMC we must not just select based on facial presentations or the clothes or assets it doesn't mean anything. Nyanyadzi is blessed because it has educated people who have a clear understanding of financial management. They know finances and some of them are pensioners and they can help us to manage our finances. But, because we are foolish, we as plot holders we are clueless when we are selecting the IMC members, we select them because they are talkative and normally say things we want to hear and laugh. Those are the kind of people we want to entrust with our 1 million dollars to go and transact in Mutare town. Do you understand what I am trying to say, we don't even have a single breakdown on what monies are we paying monthly, where is the ¼ of the money going and where is the remainder going. There is not one ordinary farmer among us which knows anything about our finances and the committee is quiet. The committee just organise and may agree to divert some funds to own personal uses without the knowledge of the farmer. So, there is no proper financial management system, they are just misusing our finances. We asked the ZINWA personnel yesterday and he said IMC is not paying anything to ZINWA, so we are just losing our money as farmers. The IMC just say utility bills are paid off to ZINWA & ZESA, yet nothing is being paid.

Participant F18: Mr Researcher I asked Mr. G yesterday we hear we have outstanding debts with ZINWA, ZESA and Odzi Catchment where is the utility payments going or used for and Mr. G never gave a clear answer but because it was lunch time, I thought we could raise it again later. This is what has come up again today, financial management is a challenge. We do pay \$8 per Acre for ZESA power bills and how much is the debt? And how has that debt become so huge? We normally forget the Odzi

catchment bills, but target ZESA power bills only and fortnight or weekly power utility bills we are paying for ZESA and ZINWA, how much is it and how much is also allocated to the Odzi catchment? That's why Mr. Water yesterday advised us to pay ZESA power bills. There is no problem, when it comes to ZINWA, you won't get any water because we are just paying one side forgetting other bills yet ZINWA, ZESA and Odzi catchment provide us with essential services and can't be separable. So, what can we do? This is poor financial management indeed. The farmer has managed to pay his utility payments and the IMC are failing to pay the appropriate authorities at the end of the day zero.

The narrations presented above show that there are no appropriate financial control structures in Nyanyadzi irrigation scheme. My questioning become an important double stimulation instrument that triggered the farmers' higher order thinking and reasoning. The farmers became more critical of own practices and questioned own financial management structures. Participant F10 saw my questioning as an eye opener and further suggested a way forward. The farmers show that they are in deep critical conflict as they struggle to break even in their farming and are constantly haunted by ever increasing utility debts despite paying up. There is also no financial auditing happening in the irrigation scheme. The farmers became more critical to own financial control systems as shown in the following conversations.

Participant E3: I wanted to answer to the issue you raised on financial management, some of the things I won't be able to say them here because you will quote me later on but on finances things are not okay, because,

1. The farmers must be the ones pushing because the Constitution states that after every 3 months there is supposed to be a financial reporting. The farmers must at least after the 3 months refuse or boycott paying the monthly financial utility bills until the IMC release the Quarterly financial report. The financial report must be presented with farmers taking notes and it will be easier now to question and critique how the money has been used. I want to give you an example on proper financial control and management and if you don't follow, they will misuse or divert your monies. The IMC is supposed to float a tender if there is any need for repairs or maintenance jobs. For example, it must float the tender that we are looking for people to repair our gates and people have to apply for the tender, submitting all relevant papers and quotations. Currently you just hear the committee advising us that they have called Mr. Katsaura from Rufaro and he has charged us Z\$300 and he brings three exceedingly small gates for Z\$300. This is how your money is being misused and diverted yet, you remain quiet.

These are some of the issues that must be critiqued on the financial reporting meetings. You have to ask them if they have floated a tender and request the tender documents. Then you can question the tendering process if you are not happy with whoever was awarded the tender and they must explain why they awarded that person the tender based on the tender documents reviewed.

Participant F16: Yes, it's true that's how they are stealing our money.

Participant F18: Mr. Extension officer lets go back to the constitution and amend these recommendations because it is not touching those specific issues.

In the narratives above, Participant E3 did a great job of explaining how and when the farmers' finances are being diverted for personal use. One thing that has come out clearly in this narration is the fact that Nyanyadzi irrigation scheme lacks financial control structures and Participant E3 even hinted out some means to push for financial reports and the issue of tender in the scheme. It is important to realise that the farmers' finances under the Zimbabwean constitution are recorded as public funds and any procurement process has to follow the stipulated procurement procedures and tender is one of them. These are some of the structures used in managing and controlling public funds. This also shows a trace of reliable and authentic procurement procedures. Services of any sort, as long as it involves public funds are also included on tender processes. These are some of the structures missing in Nyanyadzi and can be easily implemented if they are to manage their finances well.

Another question asked by the Researcher was that,

... farmers how do you communicate? Do you have a communication group which you use let's say the IMC can post call for tenders? A group where one message sent can reach everyone.

Participant F4: No, we don't have.

Researcher: Because if you had such a communication group even the financial reports were easily distributed every month and every farmer on the group can easily access such important electronic information.

Participant F22: Right, Mr. Researcher your coming has been a blessing to us and we want to thank you a lot. There is a Shona proverb that says, zvivana zvembwa hatuoni twese (translated as, puppies don't open eyes at the same time) meaning we can't all be at the same level of knowledge and understanding. Yes, it's true and the truth shall always stand, if these financial reports that they refuse with, if let's say it was a call to

pick fertilizers this classroom was going to be small with the IMC members.

Yes, there is an issue that was raised by Mr. C. that we elect some IMC members based on valueless things. I want to give an example of the Nyanyadzi marketplace, we paid monies to the IMC for them to repair the marketplace so that people can sell from there but instead nothing was done and people are continuing selling under the tree destroying the fence and cattle are getting through the same post... the committee members are taking the positions as jobs and they think they should raise money from us, yet that cent they are diverting is destroying our irrigation scheme. You will realise that; in workshops of this nature the committee members should have been present and get such good teachings so that the irrigation can move forward. I think we need smart phones (cell phones) with WhatsApp so that we can create farming groups then we can distribute and circulate information. We avoid unnecessary issues like paying \$300 for a small gate and you hear that a person went to Mutare town to do a \$1000 payment. Participant E3: They send two people to Mutare town to pay out a \$1000.

Participant F22: Yet you are say you have bank accounts and Ecocash why not transferring the money than to spend more money on bus fares to go and do a payment of \$1000.

The above presented narratives show the farmers are faced with critical conflict, communication dissemination is a challenge. Even if they were to adopt some of the structures, they are not accommodative to all, because of the diversity in socio-economic characteristics some of the farmers do not have gadgets that ease communication. Cell phones are still a far-fetched gadgetry and worse more difficult to acquire smartphones as not all the farmers can afford or own one. Another issue raised is the conflict of motive explained earlier on. The farmers want to progress, yet the committee members want to enrich their pockets. Financial reporting remains a big challenge to Nyanyadzi irrigation scheme. However, in the change laboratory workshop the farmers asked my honest reflection on financial management in the irrigation scheme.

I said the following,

it is because you don't have financial management structures that pulls up all your finances. Financial structures mean standards and strategies you use to monitor and control your finances let's say if you have audits as structure. Quarterly financial audit reports should simply tell you how much money was banked; how much money was

paid through a transfer to so and so and the bank charges were so much and now there is so much balance in the account. That's why some people up to date are still on run after audits reveals that they misused around 80 million. It's not that, the money was stolen or diverted in one day, but these are monies diverted and misused over a long period and after forensic audits then you hear these high figures and that's why companies conduct annual financial audits as well. And you are supposed to have monthly reports and financial monthly reports. So that you can truly audit that we have contributed so much and ZESA has been paid so much and receipts and bank statements are attached together. If they are invoices, they must be booked including the invoice numbers including the descriptions of expenditures. Payments to individuals has to be properly booked money as well paid to Mr. X is so much, the contact numbers, descriptions of the services and the three accompanying quotations, the invoice number. On petty cash you need, to have an accurate record, how much do we have as petty cash you can't just say today, we want to buy chalk a person rush to the shops and buy the chalks and come without receipts or a cash sale. As a policy you should have money that stays at the office called petty cash this is the money used for the refreshments (drinks, wines or beers) and teas in meetings. It is allowed, it's not a problem to have refreshments paid for by petty cash as long as that money is fully accounted. We would want to see the confirming receipts that it was used for refreshments or was used for a function.

The quarterly reports are important, and the first quarter starts from January up to the end of three months and we can easily follow up where have we made payments and where are we owing and where should we prioritise. Why am I emphasizing on these financial structures it's because when you have finally found a functional Marketing Committee, they can use these documents. Let's they go to Malawi or Zambia they can freely introduce themselves as representatives of Nyanyadzi irrigation accompanied with their Irrigation constitution, certificate of registration, VAT clearance. So, we also need to start think of these documents such as VAT clearance, CR14, CR7 they are all important legal binding documents which you can use as Nyanyadzi irrigation scheme to negotiate contracts. Once, your representative has all those documents it authenticates them and they can freely open contract talk, "as Nyanyadzi irrigation scheme we can produce and supply you with 10 tonnes of tomatoes and this coming season we grow so and so, we can also have another plant X which might be of your interest. Here are our financial statements we can generate so much per year and we

contribute so much to the first quarter after selling our beans” that’s if you want to buy something on credit from the corporates. You can use the same documents to negotiate inputs on credit from companies and you can pay back on agreed terms. So, you can also use those accounts for surety purposes and the moment you produce CR14 you have now start to become an authentic organization which can also bid for other government food supply tenders because you are now a recognized irrigation scheme.

In my personal reflections which I did in the change laboratory workshop I raised the importance of having sound financial management structures such as audits, petty cash system, bank statements and gathering of other legal binding documents. In essence I argued for Nyanyadzi irrigation scheme to formalise and this has its own advantages as explained above. They can use the documents to negotiate contract farming, input deals, and they can also bid for food supply tenders with the leading food companies. This is the only way the farmers can monitor their finances, and this can boost their confidence and make debt management easy.

In conclusion, it is not a secret that farmers are faced with a more advanced tertiary level contradiction which resides in the partially shared object of the IMC and Irrigation farmers’ activity systems. Evidence provided in this study shows that this advanced tertiary contradiction has manifested itself as a critical conflict and has paralyzed both the IMC and the farmers’ activity systems compromising efforts to achieve the partially shared object. In essence, there are four ways in which the farmers are witnessing and experiencing the critical conflicts namely, high political interference, poor management of the irrigation scheme, poor marketing and lack of financial management structures in the irrigation scheme. These four critical conflicts have left the farmers’ activity system further fragmented and realising the shared object becomes a far-fetched dream unless some drastic measures are taken.

5.2.4 A quaternary contradiction deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs (AGRITEX & NVTC).

There is a quaternary level contradiction that is deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs namely, the AGRITEX and NVTC which has manifested as a dilemma and double bind comprising the formation of a concrete shared object. The contradiction has resulted in fragmentation of the

intersecting activity systems resulting in the displacement of the technical advisory roles of the AGRITEX and NVTC leading to poor farmer education and crop failure in the irrigation system. The quaternary contradiction is represented by the orange shade in between the three interacting activity systems representing in Figure 5.11 that follows.

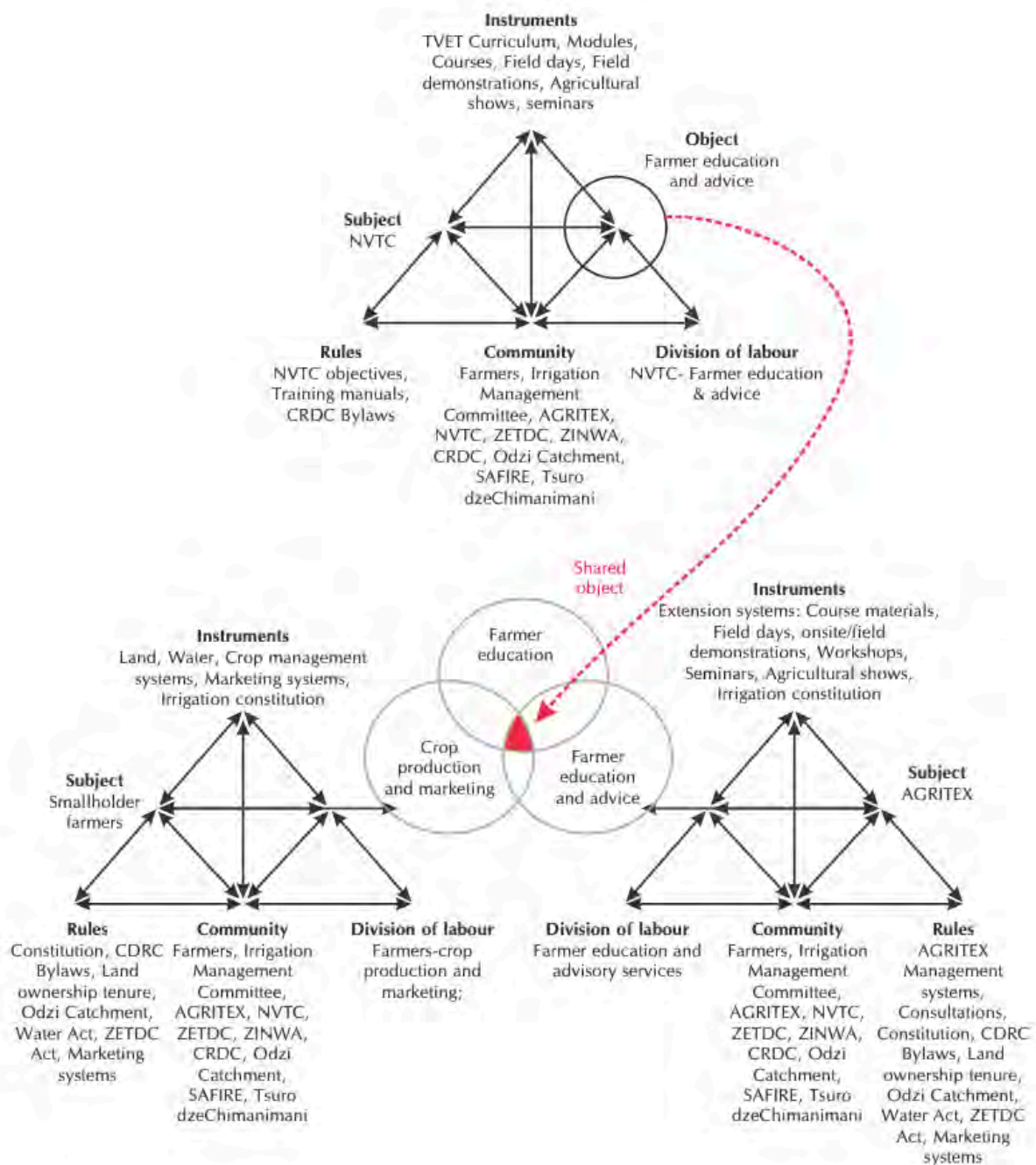


Figure 5.11: Showing a quaternary contradiction between the intersecting complex object(s) of the farmers and the technical advisory organs (AGRITEX & NVTC).

Source: Author

A deep engagement with data has shown that there is a fragmentation within and between the farmers' activity system and its neighbouring intersecting activity systems (AGRITEX and NVTC) shown above in Figure 5.11 above. This fragmentation has manifested as either dilemma or double bind situation to the farmers in trying to interact with the neighbouring activity systems. The dilemma or double bind has predominantly emerged in two ways namely, poor farmer education and crop failure (due to non-adherence to cropping calendar and disease and pest control calendars) in the irrigation scheme system. These two emergent themes shall be discussed in detail in the sections to follow.

In a nutshell, the study realised that there is an absence of a fluent relationship and workmanship between the Irrigation Farmers, AGRITEX and the NVTC. It seems as if there is a fragmented relationships and workmanship between these three intersecting activity systems. Their relationship and workmanship are characterized by neglect, blame or suspicion. In order to have a clear understanding of the dilemma and/or double bind that exist within and between the farmers' activity system and the intersecting NVTC and AGRITEX activity systems respectively, to begin with, I shall historicize the object of NVTC in relation to the historicity of Nyanyadzi irrigation scheme. The Nyanyadzi Vocational Training Centre (NVTC) (formerly known as the Nyanyadzi Training Centre) was established in the early 1930s as a Training Centre for Extension Officers. As narrated by interviewee FGI 3, “... *demonstration plots were there at the Training Centre, this is where the Extension Officers who came from Domboshava would complete their certificates by practice before graduating and qualifying.*” Therefore, the Training Centre was an integral part of the irrigation scheme both as a mediation tool for the Extension Officers and the subjects (irrigation farmers).



Figure 5.12: Nyanyadzi Vocational Training Centre (NVTC)

Source: Author

However, the mutual co-existence that was lived in the first generation of farming was never passed successfully to the third generation of farmers. The relationship and workmanship between the Farmers, Extension Officers and NVTC fragmented over time. It is safe to point out that after the failed attempt in 1964 to dispossess Nyanyadzi community out of the Irrigation scheme and relocate them to *Gokwe* area in the Midlands province of Zimbabwe. Rev. Alvord (the former Land Development Officer (LDO)) relocated further east to *Chirinda* now known as Mt. Selinda abandoning both Nyanyadzi Training Centre and Nyanyadzi irrigation scheme. He left his position as the LDO vacant although it was later filled up by a Black Zimbabwean LDO. But the workmanship and fluid relationship that existed between the three activity systems namely Farmers, Extension Officers and the NVTC fragmented. One

point to note is that, when Rev. Alvord the LDO was still in charge he was the overall head of all the three activity systems mentioned above and all the respective Head of Administration of the three activity systems reported to him. Remember Rev. Alvord established the Training Centre (NVTC) as an extension of Domboshava Training Centre, and he trained all the extension officers who were later deployed in Nyanyadzi irrigation scheme or further east to *Chirinda* and(or) *Chikore* irrigation schemes. This historicity is important for us to clearly understand the deep-seated dilemmas and double bind the communities involved are faced with.

A clear-cut period was in 1965 when the Zimbabwean High Court ruled against Rev. Alvord and granted the people of Nyanyadzi a 99-year lease ownership. This 99-year lease up to now is misunderstood. In my three Focus Group Discussions (as explained in **Section 3.2.2**), some of the participants were unaware of the 99-year lease or were ignorant of the type of land tenure ownership they held. The majority of the participants mistook the High Court judgement to mean life-time ownership. I also believed in the latter, because I grew up in Nyanyadzi community and participated in the irrigation farming for 25 years, I only came to understand the type of land tenure now (during my study) when I was 34 years. This could be because of lack of awareness and the longevity of the lease period, that blinded most of the farmers to believe they owned the land forever. Although the farmers had a different understanding of the terms of the lease in place but one thing for sure is that, after 1965 they were no-longer led by the Rev. Alvord) and they were free people. Also remember that during this time it was the time of British colonial rule.

After the 1965 High court decree, both the Nyanyadzi Training Centre and the AGRITEX were adopted and managed by the Government of Rhodesia. But at this moment in time the Colonial Government passed on the Irrigation scheme to be self-run under the stewardship of the District Administrator (DA) who further entrusted the Chiefs with the stewardship role. Literally, this meant that the three intersecting activity systems were untangled and became self-reliant and self-defined. Their objects evolved, expanded and were redefined accordingly to the new developments as well. Although these three activity systems were defined as independent activity systems, the truth is that they still had a partially shared complex object that is to improve household food security and marketing in Nyanyadzi.

Focusing the emergent trajectories in this historicity can help us to understand the emanating

contradictions better. In the following sections I will discuss the three predominant emergent manifestations of the above contradiction. The focus is on describing and explaining how the quaternary contradiction manifests itself as a dilemma and/or double bind. I shall draw evidence from the historicity of the object and change laboratory (CLW) empirical data to understand how these contradictions are manifesting and have become to be. The discussions shall be centred on the two emergent trajectories namely, poor farmer education and crop failure in the irrigation scheme system. The two manifestations are discussed below as:

5.2.4.1 A dilemma and/or double bind deep seated in the partially shared complex objects of the NVTC's and the Farmers' activity systems.

The study noted that there is a dilemma that is deep seated in the NVTC's activity system and it further cause a double bind situation between the NVTC and the Irrigation Farmers resulting in lack of farmer education in Nyanyadzi irrigation scheme. The departing point is to realize the National objective of Training Centres in Zimbabwe that is to; increase the number of entrepreneurs in rural areas as well as to absorb most youths who cannot enrolled into the formal tertiary education institutions due to a number of reasons, including failure to obtain five 'O' level subjects. The more localized object of NVTC being to impart entrepreneur knowledge and skills to the community. Lastly, the primary object of the Agricultural Department at NVTC is to promote farmer education and entrepreneurship. The latter is more focused in promoting the broader partially shared object between the host society and the NVTC, in this case, to promote household food security and marketing in Nyanyadzi irrigation scheme. In the change laboratory during the three plenary sessions as explained in Section 3.2.3 when the Government organs were asked to explore and prioritize the challenges they are faced with, and against neighbouring intersecting activity systems, the NVTC raised the following,

01:36:45: ***Lack of support by the community** for example, Command farming inputs. I am saying our challenge as NVTC is that the support we get from the community is inadequate. If there is any program and participants (farmers) are being given farming inputs, we as an Institute we are not allocated anything. Maybe it's because they say we should buy our own, we are not sure, but we have noted this several times. So, we are not sure of our relationship with the community, we don't understand if they recognize us as their own Training Centre or mistake us for any other Training Centre maybe from Bocha area. But we are Nyanyadzi Training Centre, so in other words I am saying if there is any program to give out farming inputs you should not forget your own Training Centre (Participant NV11).*

Drawing from the above call by Participant NV11, it seems as if there are deep seated tensions between Nyanyadzi Vocational Training Centre object (provide farmer education and advice) and Nyanyadzi community's understanding and embracing of the Training Centre creating a dilemma situation. The historicity of the object has indeed shown a long history of neglect and side lining of the NVTC from any community development initiatives happening in Nyanyadzi by the community. In the process of neglect, NVTC has lost its importance as trainers of the extension officers and in certifying farmers as well as an advisory organ to the scheme. This is because either the farmers are unaware, ignorant or just arrogant to appreciate and relate the purpose and object of the NVTC to their scheme. Participant NV11 further elaborated that,

01:32:02: Farmers are not giving trainees to the NVTC especially to the Agriculture department.

Here at Nyanyadzi Training Centre our work is to impart and train entrepreneur skills. So we would be targeting our local community, so as to reduce unemployment, so that in our community the problem of idle children becoming thieves can be reduced. We assume that if the child does one of the courses and even if he/she fails to be employed he/she can be self-employed and create more employment and jobs. But, it's not like that, because most of the parents here in Nyanyadzi prefer to stay with the children at home even if they have failed to attain O' level certification and are idle at home. As a result, this has caused us more problems as a community.

I'm currently teaching Horticulture at Nyanyadzi Training Centre. In the horticulture department that I teach, the students come from far places and not here in Nyanyadzi. Yet, Nyanyadzi community's core business is farming, so you will find that like presented earlier on by colleagues here, the farmers are ignorant. In short, the solution is that the present parents you should pass on the word to those at home. Encourage them to send their children to the Training Centre to study agriculture and we have other several courses that include clothing, carpentry, building and motor mechanics. So please don't stay with idle children at home because it affects our enrolment.

Adding to the previous dilemma situation discussed above, it is also safe to say that it seems there are deep seated tensions between the broader community that is the National TVET object that is to reduce unemployment and increase entrepreneurs through Vocational Training Centres like Nyanyadzi Vocational Training Centre and Nyanyadzi parents' preferences to professional courses over entrepreneurship and practical training courses. It looks like the

tension is a deep social construct that renders and perceives practical subjects or courses useless and valueless compared to professional courses like nursing, teaching, among others. This scenario further causes a dilemma between the localized purpose and object of NVTC and the parents' preferences for professional courses yet, the community is primarily labelled and described as an agricultural community. As a result, NVTC has experienced low enrolments but, there are many unemployed youths in Nyanyadzi who even venture into agricultural entrepreneur opportunities without the agricultural educational exposure. In response to the above NVTC's call for more recognition and increased local enrolments in the agricultural department, a farmer from the third-generation era asked the following critical questions:

... have you ever done a research to understand the reasons why the children from Nyanyadzi are not enrolling with your Training Centre? Is it not because of the high fees? Is it not that the fees you are charging are unaffordable to the local farmers? Are you also considering the community, or you are just charging so that people can enrol as farmers? Because, we are interested in enrolling, but we are failing to pay fees because of the high fees? (Participant F12).

It is important to note that, Participant F12 posit four critical and desperate rhetoric questions which suggest a further move from dilemma situation into a more advanced double bind situation. As a third-generation farmer he critically moves from the social construct tension (abstract) into a more real situation. He raised issues such as the cost of the Training course and the affordability by the youths in Nyanyadzi. On affordability he further questions if the NVTC is also considerate of the kind of the community it is serving. Lastly, he explains the wish and interest to enrol by the youths but that they can't afford to. As a result, it seems as if the youths are in a double bind, they want to enrol into NVTC agricultural department, but the fees are too expensive, and they can't afford to do so, thereby, further lowering the potential of local enrolments into the NVTC agricultural department.

An honest reading of the situation shows a true example of a living double bind in most communities where an initiative is established and meant to locally benefit the immediate population, but because of the political-economy characteristics of the population they cannot afford to participate. Resultantly, distant populations with better socio-political and economic characteristics benefit at the expense of the locals. Here the point I argue is that, in most instances there are deep internal and external forces that act upon or against the subjects disadvantaging them from full benefit and driving the host community into double bind

situations. In Nyanyadzi's scenario, despite the establishment of the Vocational and Training Centre in Nyanyadzi there are rules and regulations producing mechanisms that guide and influence the NVTC activity system. For example, the National TVET rules and regulations make departments that produce the Vocational and Training Courses' tuition fee and levies. Normally, these departments are independent and external to the host communities like Nyanyadzi community. As a result, relevant courses may be offered but, since agricultural communities are described as primary producers meaning they are the lowest on the eutrophic level or the goods-supply chain value.

In other words, being a primary producer means the community is poor hence, affordability is an issue. In this case, affordability becomes an internal constraint that presses the local farming community into both dilemma and double bind situation. Therefore, I argue that, if an initiative is put in place and fails to understand and consider its primary target then it is just a mere white elephant and double bind is imminent. On the other hand, the double binds the community are experiencing defeats the purpose and idea of common good hence, moving from "our" to "your Training Centre" as evident in Participant F12's declare. At the same time, the double bind jeopardizes the potential transformative agency and expansive learning situated in the activity of the former (NVTC) and the intersecting shared object with the farmers. Resultantly, farmers suffer lack of farmer education whilst the NVTC experiences low local enrolments defeating both the National and local objectives of the Vocational Training Centres (VTCs).

However, there were strong voices both from the NVTC and the AGRITEX discarding affordability as an issue of concern but preference being the real issue. Participant NV11 argued that,

... the biggest issue that came out was that most of the parents don't want their children to do practical courses they prefer their children to spend 7 years supplementing the failed subjects at O' level so that he/she may go into college and do a professional course like teaching. Then on the fees I disagree I have many children from Nyanyadzi I know who are enrolled at Magamba VTC and yet, Magamba VTC it's our Provincial Training Centre. The fees at Magamba VTC are even higher than ours. For example, there is a boy who from here (Nyanyadzi) who is doing motor mechanics at Magamba VTC, same syllabus but, paying more.

In support to the above, Participant E3 also posit that, *"I want to add on that, the children from*

Nyanyadzi community don't want to enrol at NVTC because its near they are afraid to be mocked and laughed that they are learning at NVTC. That's why they prefer to enrol at Magamba or Chipinge which are even more expensive." The above objections bring forth a critical question on what exactly is happening in Nyanyadzi.

If the above two participants' observations are correct, then it seems there is a dilemma the community is experiencing. The dilemma shifts from what the NVTC offers and what the parents prefer to the child's preference. At this juncture we can't rule out the issue of affordability based on few minority families who have better political and socio-economic advantage over the majority. As argued earlier on the majority are a poor community and affordability becomes an internal factor.

The above observations by the NVTC and AGRITEX shows how a diverse community brings on dissonance and opportunities for fruitful expansive learning processes. There is a shift from the object of the activity systems to more localized dissonance within the subjects. In this case the third generation of farmers are at pole position contradicting the partially shared object between the NVTC and the Irrigation farmers. This causes a double bind and calls for further and careful understanding of the history and characteristics of the third generation of farmers. This may also explain why the irrigation scheme has failed to fully and successfully integrate the third generation of farmers into the scheme. This emergent theme shall be discussed further in the last chapter of this thesis (chapter 6) as an emergent spearhead that is shaping and advancing the Expansive Learning (EL), the Zonal of Proximal Development (ZPD) and Transformative Agency Pathways. The above scenario points out the reality of how the third-generation farmers remain disadvantaged and lack the proper farming education that can help make them function successfully in the system. As a result, the future success of the irrigation farming remains oblique and the gap between the farmers and the NVTC continue widening and the two activity systems' partially shared object remain fragmented and compromised.

To add to the above dissonance, one third-generation farmer cautioned against the above raised claim that against the youths in in Nyanyadzi irrigation scheme do not want to enrol at NVTC. He posits that,

I personally think the marketing of the Institution (NVTC) is ineffective. Have you ever marketed the Training Centre in other places like Birchenough, Chipinge, Chimanmani and even local, here in Nyanyadzi? Because we want this Training Centre to be

productive and the Irrigation scheme to be productive as well, but we first need to be aware of what you offer (Participant F13).

Added to the complexity of the trajectory is the above critical rhetorical question by Participant F13 which further shows some dissonance deep-seated between the NVTC activity system and the Irrigation Farmers' activity system which is also manifesting as a double bind situation. In essence, Participant F13 blames the poor marketing strategies of NVTC that is creating a gap between knowing and doing/practice. In other words, the community claims to be unaware of NVTC activities and programs but, NVTC is expecting them to send their children or enrol with NVTC. Participant F13, further claims that as farmers they wish to concurrently see both the NVTC and the irrigation scheme productive. Participant F13 is not short of sight on the possibility of the two finding ways to be productive together but demands to be made aware of what the NVTC is offering before acting.

I somehow find this point of view valid and sustained considering that of my 25 years of existence and practicing irrigation farming in Nyanyadzi I have never heard of the NVTC as a possible career pathway nor engaged in any sort of training or heard of any farmer training the NVTC was doing in Nyanyadzi. To make matters worse, I was shocked by the several booking demands and exorbitant charges from NVTC when I was doing the booking of the NVTC facilities to conduct the 3-day workshop with the farmers. This clearly showed me the disjuncture between the NVTC and the farmers. Honestly, the NVTC is closed for farmers' activities and it is true for the farmers to say that they were unaware of the NVTC business since they resort to the open space at the AGRITEX office for meetings and other gatherings for free. Hence, the issue of awareness is valid, and this even further complicates the relationship between the community and the Training Centre (NVTC). It becomes difficult to work in and out of this situation. There is no doubt that the NVTC is an important integral part of the whole irrigation farming activity as discussed earlier but, the fragmentation that currently exists between the community and the NVTC is unproductive. Although, it provided us emblem space for expansive learning process and transformative agency in the change laboratory workshop process, as discussed in the next chapter.

Secondly, there is a dilemma deep seated in NVTC's object which paralyses both its internal and external object(s) and manifest in poor farmer education. Nationwide the VTC's were mandated to grow their own food, limit food expenditures and expose the trainees to practical

farmer education yet, practically NVTC has no land for both the farmer education demonstrations and for growing trainees' food. As narrated by Participant NV11 that,

01:34:25: Little land for crop production & demonstrations at the NVTC: our demonstration plot is small. As a Government institute we are not allowed to buy food for our trainees who are in our boarding residents. We are a boarding school, so we are not expected to buy food for the boarders they expect us to farm for our own consumptions, but because the land we are entitled to is exceedingly small we end up buying food. Yet, the Government policy doesn't allow us to do so. We are only allowed to purchase things like sugar and cooking oil which we can't grow as an institute. But things like sadza we are expected to farm our own maize.

The roots of the above-mentioned dilemma trajectory can be tracked back to 1964 when Rev. Alvord relocated to Mt. Selinda as discussed earlier in Section 5.2.4. Nyanyadzi Training Centre was left exposed and most of the demonstration plots were grabbed from NVTC and approximately 30 ha was redistributed to the farmers as narrated by Interviewee FG1 3, in Section 4.2.2. This left NVTC in a dilemma, to fulfil the Government mandate to feed its own trainees, limit expenditure on food and at the same time achieve the educational purpose and needs. The critical question is how an agriculture training institute can achieve the object of training farming and entrepreneurship without the land to demonstrate with the trainees and/or visiting farmers? As a result, the gap between the farmers and the NVTC activity systems widened because the NVTC blame the farmers for taking their land and the farmers don't see much use and purpose of the NVTC without the demonstration plots. To add on, the NVTC lost its role as a Trainers of Agricultural extension officers, the farmers and as the advisor to the irrigation farmers thereby further diminishing farmer education program was in the scheme.

In the face of the dilemma and double bind situations explained above Nyanyadzi irrigation farmers have to rely on inter-generational farming knowledge that has been passed on through three generations of farming (1931-2019). However, this farming education is sometimes inadequate, outdated and limited to tackle new challenges the farmers are faced with to fulfil their object. Such persistent challenges include pest and diseases outbreaks which further cause crop failure and threatens household food security of the people. Constantly, the farmers are entrapped in these critical real situations and they resort to continued trial and error solutions to come out of these persistent, devastating and livelihood threatening situations.

Thirdly, there is a dilemma that resides in the division of labour of the Farmers' activity system between the farmers expectations of the Extension workers and the transformed role and extension work of the modern Extension officers (AGRITEX). It seems as if the farmers are still stuck with the role and extension work activity of the Extension worker of 1931 yet, the modern Extension work system has transformed over time, as shown in the exchange discussion between Participant F13 and Participant E3 in the change laboratory workshop. Participant F13 posited the following,

01:46:14: **Lack of communication between farmers and the Extension officers, ZINWA & ZESA-** *there is no longer transparency. Sometimes, when the farmers are faced with pest and disease outbreaks you seek assistance from the Extension Officers, they don't come to ground truth and verify. They don't come and it will mean that the disease will remain untreated because the farmer who identified, reported it to the Extension officers doesn't get response on time or at all...*

Participant E3: *Yes, point taken. But maybe it's not true, but what you have said is good but on the same issue we want you also to understand our Extension work. I will give an example, if the farmer wants to cultivate a new crop you are supposed to come first to your Extension Officers and discuss the possibilities of the new crop and its requirements. But modern farmers start by experimenting and when they face challenges that's when they will come back to us. This is where the challenge lies. I want to give another example, of Nyanyadzi primary when they started their banana project... So, we are saying sometimes when you have done your own plan, we just look at you. That's where there is a Shona idiom that says "mujahwo wemujecha ndewe kutangira pamwe chete" (meaning if you decide to start something you are unsure of, you better consult and start together.) We are saying farmer if you have something that you want assistance to tell us, if we don't know we will do some research then we can help.*

The above discussions show a dilemma that resides in the transformed extension work system and the needs of the farmers. The farmers perceive it as a lack of transparency and timeous response to their livelihood threatening situations. But, according to Participant E3 what the farmers are failing to understand is that the extension work has transformed over time. In essence, he claims that with the transformation in the farmers' object with both vertical and horizontal dimensions, (see summary in Chapter 4) so did the Extension work's system actually change, the main reason being that over the time (1931-2018), the farmers' knowledge and

exposure to farming systems has significantly improved. They have been exposed to several farming demonstrations, workshops, seminars and other learning processes including inter-generational farming knowledge (learning by doing). This means the type of subjects (farmers) being dealt with have also evolved over time hence, the working systems and the approaches being implemented to transfer knowledge by the Extension officers have also changed.

According to Participant E3, the extension work system has moved from teaching and demonstrations to more of facilitation, workshops and consultations. They are no longer using force to enforce the practice but persuasion. One of the most important transformations has been from teaching to facilitation and consultation. However, one point to note raised here is the attitude and approach by the farmer when it comes to consultation. The farmers are reported to be failing to observe the sequence in consultation, which is consult first then farm rather than their experiment first and then consult approach. It seems as if the latter approach is problematic to the extension officers and they may opt for wait and see approach if the farmers do otherwise, as the second example of Nyanyadzi primary school Banana plantation narrated earlier by Participant E3. And this approach is what farmers see as non-transparent and non-responsive. Additionally, it looks as if the AGRITEX is also faced with the dilemma of persuasion when it comes to execution of their extension work as shown in the below extract, where Participant E3 posits that,

... so, you want the Extension Officer to come and clear the field for you? My work as an Extension Officer is to agree, if we agree that you can burn them burn if you don't it's your own issue. So, we are saying what we have agreed as the Extension Officers and the farmers we are supposed to put into practice because today's Extension work system is different from that of late. The late extension work's system that was practiced by the old Mr. Mushiri was real extension work because they forced you to do. But now we have to beg you and convince you to do so that you may succeed.

In the above extract, it seems as if the Extension officers have a dilemma around enforcement. He claims that the modern extension work is based on a mutual agreement between the farmer and the extension officer. It is then the choice of the farmer to put into practice. But there has to be an agreement into the practice or else the farmer may suffer from his/her own trajectory as told in the *Shona* idiom. The *Shona* idiom “*mujahwo wemujecha ndewe kutangira pamwe chete*” simply means when you engage in uncertainty venture it is better to engage with others. From the extension work perspective this seems to suggest that farmers should consult from

the beginning, the extension officers can stay with the farmers and encourage them until the end or else failure to do so will leave the farmers risk failing alone. Hence, the support provision has a condition for consultation first. In search of clarity to better understand the modern extension work approach I further asked the following:

Researcher: *I have one question. What has changed in the old Extension work system and the modern Extension work?*

Participant E3: *Oooh, alright, I may just say from the history I know, in the late Extension officers we were not referred to as Demonstrators because they were said to be teaching ignorant farmers. But today's farmer can even tell you pesticides which we don't know ... they will tell you that this is the new pesticide that is working for this disease, so they are advanced more than us. So, the modern farmers are literate, some of them have Ordinary level qualifications, some are technicians, and some are mechanics. They are more advanced, so the farmers we are training are knowledgeable. What I do for example, if there is a new crop variety, I call for a block meeting at Jambaya's plot and I report back on the recent field day I would have attended in Harare and I introduce the new variety let's say SC529 and I encourage them to try it out and we see if it does well for us. Number two (2) we have what we call demonstrations, where we have Seed houses who give us seeds to experiment in our fields if the seeds do well in our irrigation scheme. I think you have noticed when I went out to Mr. X's field there is a pilot project by the Agricultural Research Institute of Zimbabwe. They certify if the SC529 seed do well because there are some seed varieties which have been reported to change characteristics when planted in different places. So, they will come and teach on the field site. So how I understand extension work is that demonstration and extension work is different. Extension work is about adding knowledge. Like what I am saying right now, if we advised them to remove all the maize stalks by 30 June, come 30 June they must remove the stalks if they fail it's their problem.*

The above extract shows a different perspective of understanding modern extension work where it's about adding knowledge to already knowledgeable farmers, where modern extension work involves facilitation to learning rather than teaching. It is, therefore, important to understand this fragmentation that exists between the farmers' interpretation and understanding of extension work as a social construct over time, that has a long history in the transformation of the object in the farmers' activity system. It is also important to realise that, historically the first generation of farming era (1931-1964) was the beginning of a new era of irrigation

farming. Most of the farmers during this era came from various dry parts of Zimbabwe and had no or little irrigation farming experience as described in **Section 4.2**. This was also the time of colonial rule where the white minority commanded authority and power over the black African majority. Hence, extension work was understood in the real frame of teaching and was constituted with demonstrations. It is also understandable to say during this period the farmers were treated with little respect and freedom hence, the extension officers had much authority and exercised their power in executing their roles. The nature of earlier extension work can be understood from the narratives of most first-generation farmers interviewed in this study. Some interview extracts are presented below;

We learnt a lot, we would be taught how to apply manure, fertilizer and how to space the holes to plant onions ... (Interviewee, FGI 1). Extension officers would come to inspect and supervise the planting furrows and would teach us how to space them. There were specific Extension Officers who would come for that and in each Block, there was an Extension Officer assigned to teach and monitor (Interviewee, FGI). ...During planting they would call all the farmers and advise all the farmers who would want to grow a certain crop. But they used to call all the interested farmers onto a plot which was solely for demonstrations and they would demonstrate (Interviewee FGI1). ... to be smart, utilise the water wisely and manage the water well within the irrigatable land. All the learning process was very educative and smart. When we were in the fields it was like we were in the school, you couldn't separate the educated from non-educated. We were all civilised, it was a school on its own, it was very smart, and we all learnt from the irrigation scheme (Interviewee FGI 2). We were also taught in groups on how to plant, with some sort of internship during the group lessons (Interviewee FGI 4). Interviewee FGI 3 posit that, "yes the demonstration plots were there at the Training centre, this is where the Extension officers who would have come from Domboshava completed their certificates by practice before graduating and qualifying."

All the above extracts describe and confirms the methods employed in the expansive learning process that is by teaching and demonstrations at large during the so-called old extension work. It is also important to confirm that indeed the farmers' knowledge improved over time as argued by Participant E3. An interviewee from the first generation of farmers Participant FG1 also confirmed that,

Yes, we were taught once you got your plot. But as time goes on it was different, they preferred to allocate the plots to the farmers who would have been trained through the Nyanyadzi Training Centre. However, our pioneering group of farmers we were just

given without any form of training and we were later taught by the Extension officers how to do proper farming.

This means that after gaining such intensive training at Nyanyadzi Training Centre and being certified with the Certificate of Master Farmer and the extensive demonstrations at the demonstrations plots the irrigation farmers became knowledgeable and dynamic in terms of farming knowledge. However, in trying to shed more light on our understanding of the learning during the early extension work and now, I during an interviewee with an interviewee from the first generation asked the following;

Researcher: Comparing the extension work during the colonial era and specifically to the initial early days of the irrigation farming and now (2018) as a farmer are you still learning?

FGI 1: Yes, we are learning. Yaah now, there is an element of learning let's say there is a new seed variety the Extension officer will teach you about that seed and its requirements. We are now working with the Extension officers plus they sometimes call us in our respective blocks and teach us of new seed varieties and how they are grown. For example, if it's a new maize seed variety, the maize seed house will be there together with the Extension officers teaching us and if there are new pesticides that should be used they also teach us about them.

In the above extract Interviewee FG1 confirms to the earlier claims by Participant E3 that the extension work has transformed to more of consultation and facilitation basis. Interviewee FG1 claims that they are now working with the extension officer which gives a slight shift from the teacher-student relationship that existed long time ago to a more partnership process where every party contributes to the co-engagement in the expansive learning process.

It is not a secret that the above discussion and evidence provided shows a dissonance between the farmers' understanding and interpretation of extension work and as compared to the modern AGRITEX extension work systems. The evidence has shown a transformation in the farmers' object and the mediation tools and mechanisms of the extension work activity system. The understanding is that the modern farmers are advanced and have accumulated farming knowledge and backgrounds hence, the early farming teaching methods are no longer valid or effective. However, this transformation was never properly explained to the farmers. That's

why the farmers think it is an issue of transparency and response between the two activity systems especially in their deepest moments like when there are pest and diseases outbreaks. This tension has a ripple effect on farmer education and training.

Another dilemma was also noted not only between transformation in the mediation tools of the Extension officers but also lack of appropriate and efficient instruments and tools to educate farmers and provide substantiated advice to the farmers. In essence, in as much as the Extension officers would want to conduct proper farming consultations to the farmers, they lacked the adequate and proper mediation tools and instruments such as the demonstration plots, refresher courses, research work, transport, and human resources to fulfil the object of their activity. In the change laboratory a more grounded understanding of the matter was illuminated when the researcher asked the following;

Researcher: ... But I have another question, in our irrigation scheme we have the elderly and children who have just completed Ordinary level. This population I mentioned have never been trained in agriculture, but they are now in full farming. So, if you don't demonstrate in your new extension work system as you have just explained, how will they learn professional farming?"

Participant E7: Yes, I understand the point you forwarded but what is happening in our department is that, long back we were given the instruments to use in the demonstrations. So now it's an issue of us visiting the farmer asking them when do they wish to plant their maize seed and which variety do you want to plan? Can you please allow me to gather people at your plot on the day you wish to plant so that I may give some demonstrations? This will be the only method available because, as Extension Officers there are no supporting resources we get. We don't have anything even a book and a pen.

Researcher: But don't you have demonstration plots?

Participant E7: Not at the moment.

Researcher: Where did they go?

Participant E7: We used to have them close by, but they were repossessed by the community during the Land Reform Programme.

In the plenary session, the farmers also complained that they have not been engaged in any form of workshop recently, emphasizing on the neglect claims and blaming the Extension officers for the lack of such initiatives. The Extension officers were quick to dismiss the claim

saying they have also not been engaged in any form of refresher courses, seminars, workshops and research work of recent. The above complex situation leaves us wondering how the Extension officers can conduct their activities and fulfil the shared object if they don't have demonstration plots, they are not exposed to new technologies and knowledge through refresher courses and research and if the AGRITEX is not supplying any form of material support and they have to rely on personal or farmers transport to get to their designated areas of duty. This is the dilemma the Extension officers are faced with. However, during the same plenary discussion in the change laboratory workshop, the researcher was left astonished by the claims that there was no workshop to happen soon because it has also been a while the Extension officers had such learning opportunities. The researcher interrogated further into the issue by asking the following;

Researcher: So, who is responsible for organizing workshops for the farmers? Are they the farmers themselves, the Extension officers or the Nyanyadzi Training Centre?

Participant E3: Wait a moment I will answer you because you have asked. In our department of AGRITEX when things were still superb not now, there was a branch called the Training Branch. The branch starts from the Head Office with Chief Training officer up to Provincial level, where we were led by the late Mr. Jukwere. I think you may know him the son in law to Mr. Mbano. When he died nothing ever transpired so the training branch is now just a name especially with the current economic situation in the country. Long-time back, I want to refer to the time I joined AGRITEX in 1993 we used to spend most of our time at Ruwa Training Centre. We used to visit approximately 6 times per year, and we used to go to Domboshava as well, Kadoma Training Centre and, Dorongwe Training Centre we used to visit. In addition, we used to go to EU training workshops especially when they started Gudyanga Irrigation scheme. The EU together with other various NGOs would send us to Mapari Resort Centre for training workshops. So, on the Government's part, the Training Branch is non-functional yet, it is the one responsible for organizing workshops for the Extension officers so that they may upgrade their knowledge through these trainings and we normally refer to them as refresher courses. For example, they can say we want to train Extension officers about fall armyworm then they take us to Ruwa Training Centre for five days engaging with Specialists. The specialists would train us, we did practical going into Zimunya farming areas doing the demonstrations. We would be verifying the fall armyworm from the fields I think Mr. C knows exactly what I mean. When he went to Kadoma Training Centre he should have experienced the practical experience of

going into the fields in search of the stogofitier, the eggs of the fall armyworm. By the time you return you would have gained the practical experience because the theoretical experience is not enough. You will be told in theory that the egg of the fall armyworm is blue, yet, you don't even know the blue. So, we are saying the Government should return to the old way of practice so that our Training Branch can resume its purpose of organizing training workshops for the Extension officers on crop, livestock production, conservation farming. So, some of the issues we are at the same level with the farmers because it has been long since we had such trainings...

So, this is the dilemma the Extension officer are faced with. It is between providing adequate, current and proper farmer education to the farmers in the face of the new advent of pests and diseases outbreaks yet, the Extension officers themselves lack the proper and current training in such issues. This becomes a blind man leading another blind man situation. How to come out of this situation, how can you best function and be productive in such a situation is the critical questions the Extension workers are faced with. This situation has also been long lived by the Extension officers threatening successful fulfilment of their partially shared object of providing farming education and advice to the farmers in Nyanyadzi irrigation scheme.

The last dilemma the Extension officers are faced is deep seated in the shared object of the AGRITEX object and the farmers object. The AGRITEX Extension officers deem to fulfil their object that is to provide farmer education and advise to the farmers yet on the other hand the farmers are not attending the block or onsite/on field meetings. This has paralyzed the object of the Extension officer's activity thereby, leaving the farmers with little knowledge or understanding of the pressing issues of concern.

5.2.4.2 Quaternary contradiction between the partially shared objects of the AGRITEX, NVTC activity systems and the Farmers' activity system.

There is a quaternary level contradiction between the farmers, AGRITEX and NVTC's partially share object and has manifested as a double bind in form of crop failure in Nyanyadzi irrigation scheme. The fragmentation in the partially shared objects of the farmers and the neighbouring activity systems namely, NVTC and AGRITEX has compromised the farmers from accessing current, appropriate, effective farming knowledge to timeously respond to testing times of pest and diseases outbreaks resulting in crop failure double bind. The farmers in Nyanyadzi

irrigation scheme are trapped by the persistent crop failure double bind caused by pest and diseases outbreaks threatening household livelihood and food security.

In the change laboratory workshop, the farmers, NVTC and AGRITEX prioritized pest and disease outbreaks as one of the persistent threatening situations they are faced with. It is not surprising considering that Nyanyadzi irrigation scheme has suffered three consecutive years of maize crop failure (2016-2018). Hence, pest and disease outbreaks become a priority as presented below by Participant F13 who represented the farmers that, one of the challenges is,

01:43:22: Pests and Diseases outbreaks – pests and diseases outbreaks in our fields that includes tuta absoluta, four army worms in the maize and tomatoes have given us a real big challenge and we are failing to control them timeously. From season to season we suffer the same diseases or the same pest.

Participant W6 reporting on behalf of the other interacting activity systems namely, AGRITEX, ZINWA, ZETDC, NVTC also posited that; “01:09:6: No. 6. Outbreak of tuta absoluta and Fall armyworm- affects the tomatoes and maize plants.” There is no doubt that the above extracts show that the farmers are in a dilemma because of the maize and tomato crop failures experienced in the recent past years because of the outbreak of tuta abusoluta and fall armyworm pests. The *tuta absoluta* is a specie of moth in the family *Gelechiidae*- commonly known as the tomato leaf miner, tomato pinworm, South American tomato moth. While the fall armyworm (*Spodoptera frugiperda*) is a species in the order *Lepidoptera* and is the larval life stage of a fall armyworm moth. The term "armyworm" can refer to several species, often describing the large-scale invasive behaviour of the species' larval stage. The images of the two notorious pests are shown in figure 5.12.

The *tuta absoluta* tomato leafminer or the South American tomato moth

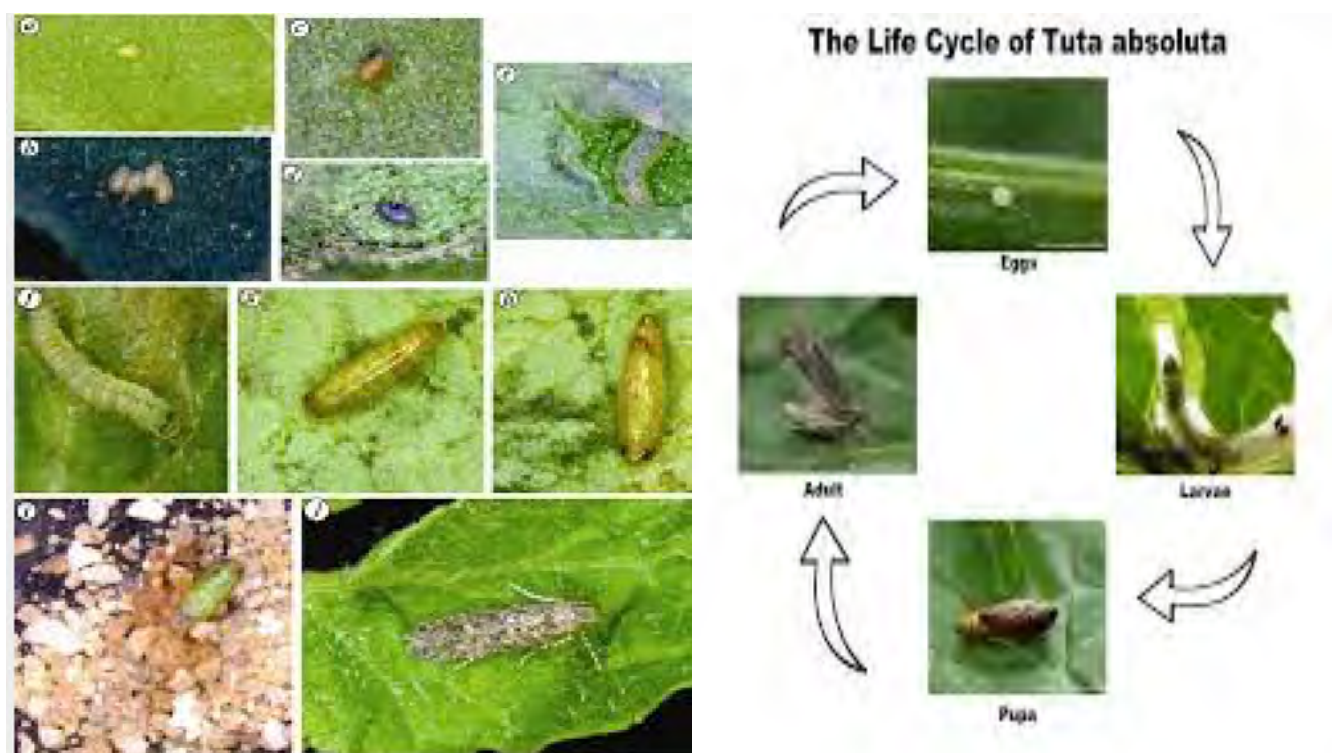


Figure 5.12: The *tuta absoluta* also known as the tomato leaf miner.

Source: Author

What sends the Nyanyadzi farmers into a dilemma is the fact that these pest outbreaks are repetitive in nature, and for the past three farming seasons the farmers have failed to effectively and timeously contain these pest outbreaks resulting in crop failures as explained by Participant F13 above. In addition, the farmers are losing subsequent income from these pest outbreaks either through buying of the pesticides or through the poor harvest from the pests' savage. The crop failures induced by pests and disease outbreaks have put the farmers in a double bind year in and out, weighing up whether to continue crop farming or venture into other less risky entrepreneurial activity.

Another double bind situation arises from the natural characteristics of the pests involved for instance the *tuta absoluta* which is poisonous to the birds hence, it's a not preyed by any natural biological controls as in the case of the fall armyworm. The larva of the notorious *tuta absoluta*, feeds voraciously on tomato plants producing large galleries in leaves, burrowing in stalks and consuming apical buds and the tomato. The worst part is that the pest also feeds on chlorophyll taking away the life of the plant. Hence, the pest can cause a yield loss of 100%. additionally,

the pest does not only thrive on the tomato plant but can be destructive to crops of the nightshade family including the potato, eggplant, pepper and tobacco. Also as mentioned above, fall armyworm has been tolerant to pesticides and is becoming resistant with the continued overuse of the pesticides. But what also make most pesticide control fails is because part of its (tuta absoluta) development takes place inside the plant or in the soil, out of reach of pesticides. The fall armyworm *Spodoptera frugiperda* is shown below in Figure 5.13.



Figure 5.13: The Fall armyworm (*Spodoptera frugiperda*).

Source: Author

The fall armyworm first detected in some of the Southern African states in 2017 it has been reported to cause devastation. The FAO (2017) approximated that of 130 000 ha of maize and corn in Zimbabwe, 90 000 ha in Zambia and 50 000ha in Namibia were destroyed by the fall

armyworm. The other thing is that the fall armyworm is also high tolerant to pesticides and has heavy reproductive systems which leave millions of eggs in the soil that will hatch into fierce armies of larva. In the intermediate phase of the invasions there were strong suggestions of introducing biological control such as the lacewing, ladybirds, minute pirate bugs, parasitic wasps, and flies which feed on the fall armyworm eggs. But these biological controls showed to be insufficient to contain these fall armyworm outbreaks and invasions. Another cause of the double bind is that the fall armyworm is also a known heavy leaf eater destroying most of the leaf plants like, maize, sorghum, millet, among others. Yet, Zimbabwe' household basket is constituted mostly by the mealie meal from the maize plant. Failure of the maize crop is imminent household food insecurity. Lastly, the above discussed pests are nomadic by nature, they have the tendency of laying their millions of eggs in the soil for the next season's hatch and they invade other further territories. Their level of destruction is unbelievable.

In the change laboratory workshop, Participant F13 posit that,

01:51:24: ***Pest & Disease resistance to pesticides and chemicals-*** *what is happening is that some of the farmers that we have in the irrigation scheme, have the money to buy pesticides but the pesticides they are buying are sometimes overused to the extent that the pests and the disease may become resistant to the pesticides. This is one of the challenges we now face. Because if you refer to our records you will realize the same pests and diseases outbreaks occur repeatedly every year. So, we end up not sure if the pesticides are impotent.*

Added to the complex nature of the pests discussed is another dissonance caused by the extensive use of pesticides which is creating a further problem of pest resistance. It is, therefore, safe to say the farmers are experiencing a further double bind from failing to contain the repeated pests and diseases outbreaks and the reported resistance the pests are believed to be developing due to over-use of pesticides by individual farmers. However, this situation is more complex than we could ever have thought of, and a deeper engagement into the farmers' activity system and further engagement into the history of the object can help us to understand how has this challenge of crop failure has come to be and the persuasive forces that accelerates the rate of crop failure. Historically, as discussed in Chapter 4 and its sub-sections, irrigation farming in Nyanyadzi was done in a more systematically organized manner. There are several narrations by the farmers in the interviews and focus group discussions mentioning that they used to follow a specific cropping calendar. The calendar was practically manned by the

Extension officers and the farmers themselves. From the data, it is noted that the Extension officers would announce and call upon the farmers to follow the dates of planting and advise them of the available varieties of seeds to consider.

Another important practice was the mid-year farming break which began early to late July just after the last beans harvest. The plots were left to renew themselves and this practice was an important way to manage the cycles of pests. During these planting breaks the pests starved since most of the vegetation would have been cleared, removed and in some cases burnt. The fields were ploughed and left idle until the early rainy season that is early October when the maize planting season began. So, it was also ease for the beds of prey to pick most edible pests like the locusts during this period. Recalling my experience as a farmer who grew up and practiced farming in Nyanyadzi irrigation scheme the first planting date for before the rainy season was 15 October, and no one could plant before this date.

Besides controlling the pest cycles the farm-break period was also done to preserve the water so that we would have enough gravitational water coming from Munyanyazi river for the planting season. This was because Nyanyadzi is situated on the leeward side of the eastern highlands meaning we didn't have the winter rains instead we benefited from the water collected from the winter rains from the far north catchments. Hence, during the winter period our main river Munyanyazi would have critically low water levels which were not enough to serve the whole irrigation scheme. Because of that only one Acre per plot holder could cultivate wheat and sometimes winter green maize. Most farmers wanted to grow the latter because of the lucrative market for the green maize but many of the farmers surrendered due to the high outbreaks of stalk borer and the fall armyworm that destroyed the maize plants and the cob. The winter maize cropping was also highly criticized for continuing and harbouring several pests and diseases which were later problematic in the main maize season.

These new invasive pests have become a nightmare to Nyanyadzi irrigation farmers. The failure to contain the pests has further agitated the blame game and dissonance between the farmers and the Extension workers. This is a true sign of a double bind situation in which both the farmers and the Extension workers are clueless on how to work outwards of their current situations. As mentioned earlier on, the farmers blame the Extension officers for neglecting them and not responding timeously to the pest and disease outbreaks while, among other reasons the Extension workers blame the failure in their own Training branch, and blame the

farmers for failing to consult, lacking coordinated efforts, not following the cropping calendar and observing the pest and disease control calendar. It may also be interesting to explore different narrations, understanding and educational praxis between the farmers and Extension workers during the change laboratory workshop process (see Chapter 6).

In conclusion, based on the historical and empirical data analysis there is a quaternary level contradiction that is deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs namely, the AGRITEX and NVTC which has manifest as a dilemma and double bind compromising the formation of a concrete shared object. The dilemma and double bind has manifested in the form of fragmentation of the intersecting activity systems leading to the displacement of the technical advisory roles of the AGRITEX and NVTC resulting in poor farmer education and crop failure in the irrigation scheme system. The farmers are now faced with either a dilemma or double bind as they try to interact with the other critical technical and advisory activity systems in the irrigation scheme. In essence, the farmers are deprived of decent access to farmer education because of their financial characteristics causing a dilemma and at the same time they are in a double bind because of their crop failure, which is mostly, linked to non-adherence to cropping calendar and disease and pest control calendars in the irrigation scheme system. The dilemma and double bind have also fragmented the existing relationships and workmanship between these three intersecting activity systems. The prime assumption here is that if the farmers can access decent and productive farmer education, timeously response to pest and diseases outbreaks they should be able to deal with these testing moments.

5.2.5 A close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object compromising the formation of a shared object.

There is a close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifest as a dilemma and double bind compromising the formation of a shared object resulting in the Third Generation of farmers being dislocated from the main irrigation scheme. This contradiction is a close contradiction to the one described above, but what is slightly different is that the economic characteristics of the subjects and the object and rulemaking organ of the NVTC together with the AGRITEX's object are failing to intersect. This contradiction is not

deep seated in the partially shared objects but it's between the subject's economic characteristics which limit them from acquiring the necessary farmer education training from the NVTC.

On the other hand, the NVTC's object and set up is designed to provide farmer education and training targeting the local community as the primary beneficiaries. Yet, NVTC's rulemaking organ, that gazette tuition fees and levies is a national and centralised activity, hence, doesn't recognise or accommodate particular local community's economic characteristic. Hence, the community and the youths are left in a dilemma they can't afford because they are a primary producer. This means that according to the economic eutrophics, the primary producers are the less profit making, meaning they are generally poor whilst, the secondary producers (like food processing companies like Cains, Victoria foods, National Foods) profit better than their predecessors. While the tertiary producers like the retailers make much profit margins as they don't use lots of capital in producing and they don't have much waiting periods hence, their loss margins are lower and turnover period is high. The other thing that drives the community into a dilemma and double bind is that the NVTC is a profit-making organisation that provides services and advices. On the other hand, Nyanyadzi community is a primary producer meaning they make least profit according to then economic eutrophic levels. Hence, they accrue wealth through excess crop sales. However, the profit margins are small, seasonal and risky. As a result, they may fall short of the needed financial support towards their children to undertake agricultural courses at NVTC.

As this issue has been discussed earlier on, I shall not dwell much on it but for the sake of a better understanding I shall draw on the same empirical narratives drawn earlier to emphasis this finding. So what is different now is the financial characteristics of the community because of the small profit margins they accrue as primary producers, somehow their wealth accumulates in the form of livestock. This is problematic because the *Shona* culture values livestock, especially cattle. Few families would approve or afford to sale some cattle to pay for the fees of their children, worse if the children are schooling at a Vocational and Training Centre. This is because Vocational and Training centres were established to reduce unemployment among the youths and increase entrepreneurship among rural communities. The Vocational and Training centres targets academically non-gifted, dropouts or the youths who would have failed to attain 5 subjects at Ordinary level. Parents do not wish to sell his/her valuable livestock to pay fees for a child at the Vocational and Training centre.

How this dilemma manifests, is when the NVTC reports poor community support and under enrolment as shown below,

01:36:45: ***Lack of support by the community...*** *I am saying our challenge as NVTC is that the support we get from the community is inadequate... So, we are not sure of our relationship with the community, we don't understand if they recognize us as their own Training Centre or mistake us for any other Training Centre maybe from Bocha area. But we are Nyanyadzi Training Centre... (Participant NV11).*

This shows a dilemma by the NVTC, and they are not getting the support they need from the community. This also shows disassociation between the NVTC and the community itself. Secondly, Participant NV11 further repeats the dilemma stating that,

01:32:02: ***Farmers are not giving trainees to the NVTC especially to the Agriculture department.***

Here at Nyanyadzi Training Centre our work is to impart and train entrepreneur skills. So we would be targeting our local community, so as to reduce unemployment. So that in our community the problem of idle children becoming thieves can be reduced. We assume that if the child does one of the courses and even if he/she fails to be employed he/she can be self-employed and create more employment and jobs. It's not like that, because most of the parents here in Nyanyadzi prefer to stay with the children at home even if they have failed to attain O' level certification and are idle at home. As a result, this has caused us more problems as a community.

I'm currently teaching Horticulture at Nyanyadzi Training Centre. In the horticulture department that I teach, the students come from far places and not here in Nyanyadzi. Yet, Nyanyadzi community's core business is farming, so you will find that like presented earlier on by colleagues here, the farmers are ignorant. So, in short, the solution is that the present parents you should pass on the word to those at home. Encourage them to send their children to the Training Centre to do agriculture and we have other several courses that include clothing, carpentry, building and motor mechanics. So please don't stay with idle children at home because it affects our enrolment.

Again, as said before, the above narrative shows a dilemma and double bind that resides in the NVTC's object of the activity and the outcome. The outcome is not obtained because of the poor community support dilemma and the under enrolment double bind compromising their

intended object. Yet, the farmers and the youths on the other hand are viewing it differently,

... have you ever done a research to understand the reasons why the children from Nyanyadzi are not enrolling with your Training Centre? Is it not because of the high fees? Is it not that the fees you are charging are unaffordable to the local farmers? Are you also considering the community, or you are just charging so that people can enrol as farmers? Because, we are interested in enrolling, but we are failing to pay fees because of the high fees? (Participant F12).

The farmers and the youths in Nyanyadzi community feels neglected, and are in a double bind situation, as Participant 12 said they are interested but cannot afford. Hence, the community despite the interest they have to support NVTC object and provide enrolment which also improves the farmers; mostly the newly integrated farmers' (third generation) object, (crop production and marketing under irrigation farming) they are limited by their financial characteristics. This then compromises the potential of meeting the partially shared object by the two activity systems and the integration of the third generation of farmers is compromised resulting in further dislodge of the third generation of farmers from the irrigation scheme. A deeper understanding on how the NVTC functions, shows that it is a project of the Zimbabwean TVET hence, it is a parastatal organ whose functions are in line with the government directives including the funding system and the Vocational and Training Courses' tuition fee and levies system. Meaning there is little that the NVTC can do as a department to accommodate the local community and in the end communities from further away with better resources benefit whilst manifestations of poor farmer education continue to loom in the farmers' activity and further compromise the potentially shared object.

In other words, being a primary producer means the community is poor hence, affordability is an issue. In this case, affordability dilemma becomes an internal constraint that presses the local farming community into a double bind situation as well. Therefore, I argue that, as long as an initiative and fail to understand and consider their primary target then a double bind is imminent. On the other hand, the double binds the community are experiencing defeats the purpose and idea of common good hence, moving from "our" to "your Training Centre" as evident in Participant F12's discourse. At the same time, the double bind jeopardizes the potential transformative agency, expansion of the object and the activity.

On the other hand, the changing of AGRITEX's extension work systems (discussed earlier on

in the previous sections), from primarily demonstrators to consultation and technical advisory work has further compromised the formulation of the shared object. This has dislodged the third generation of farmers who have inherited plots but lack the agricultural knowledge to fully participate and be productive in the irrigation scheme. Notable in the study is that when the third generation runs out of ideas or is faced with double binds explained earlier on, they turn to plot leasing as a means of survival. In the worst scenario they abandon the plots leaving them unmanned and unproductive, and they become pest and disease harbours. All these contradictions have a detrimental effect to the functioning of the irrigation scheme if they are left unattended or resolved, which will leave the farmers in the dilemmic and double bind situation. The close quaternary level contradiction is presented diagrammatically in Figure 5.14.

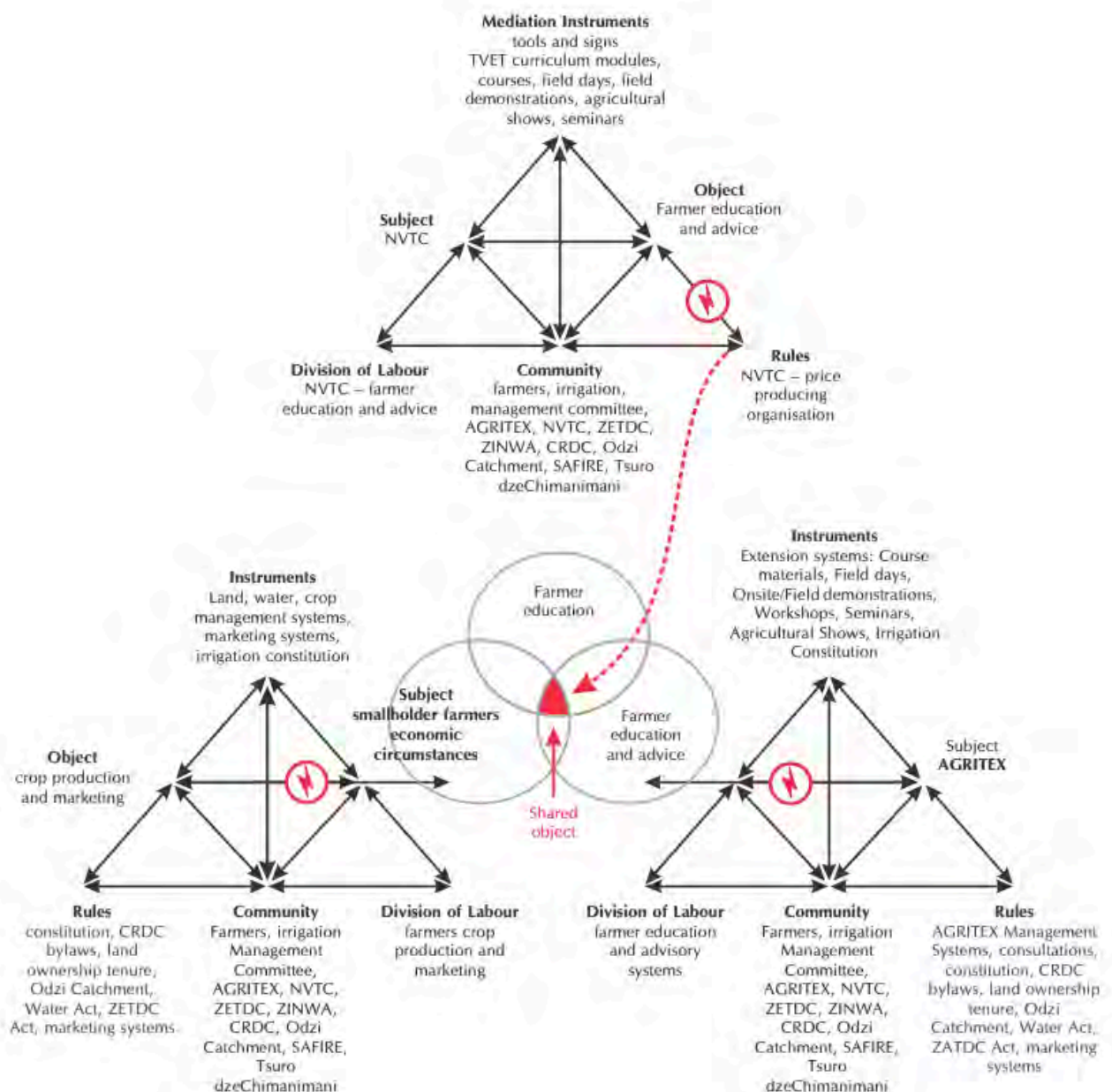


Figure 5.14: A quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object compromising the formation of a shared object.

Source: Author

In conclusion, as stated earlier on and as diagrammatically represented in Figure 5.14, there is a close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifested as a dilemma and double bind compromising the formation of a shared object resulting in the

Third Generation of farmers being dislocated from the main irrigation scheme activity system. Evidence drawn from the empirical data shows that the farmers and youths (third generation of farmers) are in a dilemma as they are desperate in need of decent farmer education and training but cannot afford the tuition fees and levies charged at the NVTC. At the same time, the NVTC is also in a dilemma of under enrolment and they can't change any tuition fees and levies to accommodate the local poor community since pricing is done at government level. On the other hand, the third generation are also in a dilemma they seek more engaging learning approaches from the AGRITEX, yet the extension and advisory service parastatal has changed teaching and learning approaches to consultative and advisory approaches assuming the farmers are now well equipped and knowledgeable with farming knowledge. Resultantly, mostly the youths are in a double bind of poor farming knowledge and diseases and pest outbreaks, and crop failure, leading them to feel ill-equipped with inadequate knowledge. This resort to plot abandonment or plot leasing as a coping mechanism thereby creating more challenges for the irrigation scheme as discussed earlier on. In essence, the third generation of farmers are dislodged from the main irrigation activity. There is need to support the expansion of the farming ZPD of the farmers and mostly the third generation and devise ways to fully integrate them into the large irrigation activity if the irrigation scheme is to function properly and progression failure.

Below is the summary of the contradictions in Nyanyadzi smallholder farmers' activity.

Table 5.4: Summary of the contradictions in Nyanyadzi smallholder farmers' activity

Locating the contradiction	Manifestation of the contradiction	Evidence from the data sources
A primary contradiction within the Rules: the farmers' inheritance rules over the three generations of farming	• Double bind • Complex Land tenure system (multiple plot holding and plot leasing) • Superficial water shortages Deceased Estates Succession Act Section 3(A) -gives the right to inheritance to all surviving children of the deceased encouraging multiple plot holder system. Political-economic environment-worsened the poverty levels resulting in emergent of illegal	Ethnographical data from the interviews and focus group discussions with three generation of farmers and contemporary data from the Change Laboratory workshop show complex land tenure system (multiple plot holder system and in illegal leasing) and superficial water shortage. Complex land tenure systems • Multiple plot holders- the irrigation inheritance rule in First generation of farmers encouraged single plot holding. - <u>Deceased Estates Succession Act Section 3(A)</u> encouraged fragmentation of plots_ -multiple plot holding- made it difficult to maintain unity of purpose, crop and pest management cycles, water rosters, complicated input allocations.

	leasing to generate income and meet household food security thereby creating multiple plot holders (illegal tenants)	<u>Illegal leasing</u>- most inherited plots are illegally leased because the farmers lack farming knowledge; inputs & ready market. -Illegal leasing cause fragmentation of plots; distort unity of purpose and complicates object of the activity. Superficial Water Shortages -<u>inheritance rules</u>- multiple plots holding -complicates water management practice, poor irrigation infrastructure maintenance - high water leakages (pipes/canals)
A central secondary level contradiction between the subjects and the mediation tool (water)	• <u>Conflict-</u> • unwise water use; poor water management • sabotage- infrastructure damage, stealing or removal of canal gates and locks; • syndicates on illegal watering (night)	<u>Superficial water shortages</u> Ethnographical data generated from the interviews and focus group discussion and contemporary empirical data is evident that there is a dissonance between farmers' water use vs water need causing superficial water crisis. • poor irrigation infrastructure- earth canals; leaking main pipelines, canals and broken gate locks.
A more advanced tertiary level contradiction residing in the partially shared object of the Irrigation Management Committee (IMC) and Irrigation farmers' activity systems.	• <u>Critical conflict</u> • paralyze the partially shared motive of the interacting farmers' and IMC's activity systems.	Ethnographical data generated from the interviews and focus group discussion and contemporary empirical data show evidence of high political interference; poor irrigation scheme management; poor marketing and lack of financial management structures. -this fragment farmers' object of activity. - high ZINWA (water); Odzi Catchment (water rights) & ZESA-ZETDC (electricity utility) debts. - abuse and misuse of irrigation scheme's finances
A quaternary contradiction deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs (AGRITEX & NVTC).	• <u>Dilemma and double bind</u> • compromise the formation of a concrete shared object.- • NVTC- high course fees; • Extension Officers' work principles (teacher-learner relationship) consultations based • Poor farmer education	Ethnographical data generated from the interviews and focus group discussion and contemporary empirical data show evidence that there is poor farmer education and crop failure in the irrigation scheme system. <u>Poor farmer education-</u> -lack of farmer education processes (farmer courses, workshops, seminars). - shift in Extension Officers' outreach methods from demonstrators to consultants <u>Crop failure-</u> -poor farmer education (farmers, AGRITEX, NVTC) t -uncoordinated farming systems (cropping; diseases & pest control calendars); poor water use and management, -superficial water shortages

A close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifested a dilemma and double bind compromising the formation of a shared object resulting in the Third Generation of farmers being dislocated from the main irrigation scheme.	• <u>Dilemma and double bind</u> • Compromise the formation of a shared object resulting in the failure to fully integrate the Third Generation of farmers • Dilemma -lack of decent farmer education and training because youths cannot afford the tuition fees and levies of NVTC. • NVTC is under enrolment. • Double bind – failure to fully integrate the third generation of farmers into the irrigation scheme's activity system.	<u>Failure to integrate the Third generation into the main irrigation activity</u> Ethnographic and empirical data analysis show failure to successfully integrate Third Generation of farmers into the main irrigation scheme's activity system.

Source: Author

5.4 CHAPTER CONCLUSION

In conclusion, this chapter presented five contradictions that are faced by the farmers and other key stakeholders as they work towards crop production and marketing in Nyanyadzi irrigation scheme. These are a primary contradiction within the farmers' inheritance rules over the three generations of farming which has manifested as double bind in form of complex land tenure system (multiple plot holding and plot leasing) and superficial water shortages. Secondly, a central secondary level contradiction between the subjects and the mediation tool (water) which has manifested as conflict in the form of superficial water shortages. Thirdly, a more advanced tertiary level contradiction residing in the partially shared object of the Irrigation Management Committee (IMC) and Irrigation farmers' activity systems that manifests as a critical conflict paralyzing the partially shared motive of the interacting farmers' and IMC's activity systems. Fourthly, a quaternary contradiction deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs (AGRITEX & NVTC) manifesting as a dilemma or/and double bind compromising the formation of a concrete shared object causing poor farmer education and crop failure. Lastly, a close quaternary level

contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifested as a dilemma and double bind compromising the formation of a shared object resulting in the Third Generation of farmers being dislocated from the main irrigation scheme.

There has been a smooth and careful transition from the historical and empirical descriptions of the activity systems in the previous chapter and how these activity systems have interacted with the farmers' activity system over the years. It was realised that through the long history of the object, dissonance, conflicts, and tensions have manifested in the form of primary, secondary, tertiary and quaternary level contradictions as described above. These levels of contradictions have manifested differently in the context of the main activity system and how this related to the other interacting activity systems. Conflicts, dilemma, double bind and critical conflict have all been experienced in the irrigation scheme as described and discussed in this chapter and Table 5.4. The five contradictions presented in Table 5.4 formed part of the mirror data that was used as double stimulation tool for prioritising the contradictions in the CLW, the process of the expansive learning associated with these contradictions are presented in the next chapter (Chapter 6).

Chapter Six: EXPANSIVE LEARNING, TRANSFORMATIVE AGENCY PATHWAYS AND ADVANCING THE ZPD

6.0: INTRODUCTION

In the previous chapter I presented emerging contradictions and their historicity in Nyanyadzi irrigation scheme. There are five level of contradictions I presented and described in the previous chapter and their manifestations were further described and discussed. Therefore, in this chapter I shall satisfy the second research question of this study:

2. How can the multidimensional complexities (outlined in Question 1) be mobilised as a source of expansive learning via mediation in a formative interventionist expansive learning process to enhance food security (into the future)?

I shall further integrate the above-mentioned research question together with the specific objective:

4. To use the contradictions as a source for expanding farmers and other stakeholders' learning to collectively tackle the multidimensional complexities arising in the irrigation scheme using a mediated expansive learning process.

In this chapter a description and discussion is provided of the expansive learning processes together with an explanation of how the contradictions were mobilised into transformative agency pathways and the leading three spear heads focused on expanding the collective learning of farmers and other stakeholders, expanding their ZPD.

6.1 EXPANSIVE LEARNING PROCESS IN THE CHANGE LABORATORY WORKSHOP

The Expansive Learning Cycle shown in Figure 6 is used to analyse and describe the Expansive Learning Processes (ELP) the farmers and I went through together with members of the intersecting activity systems.

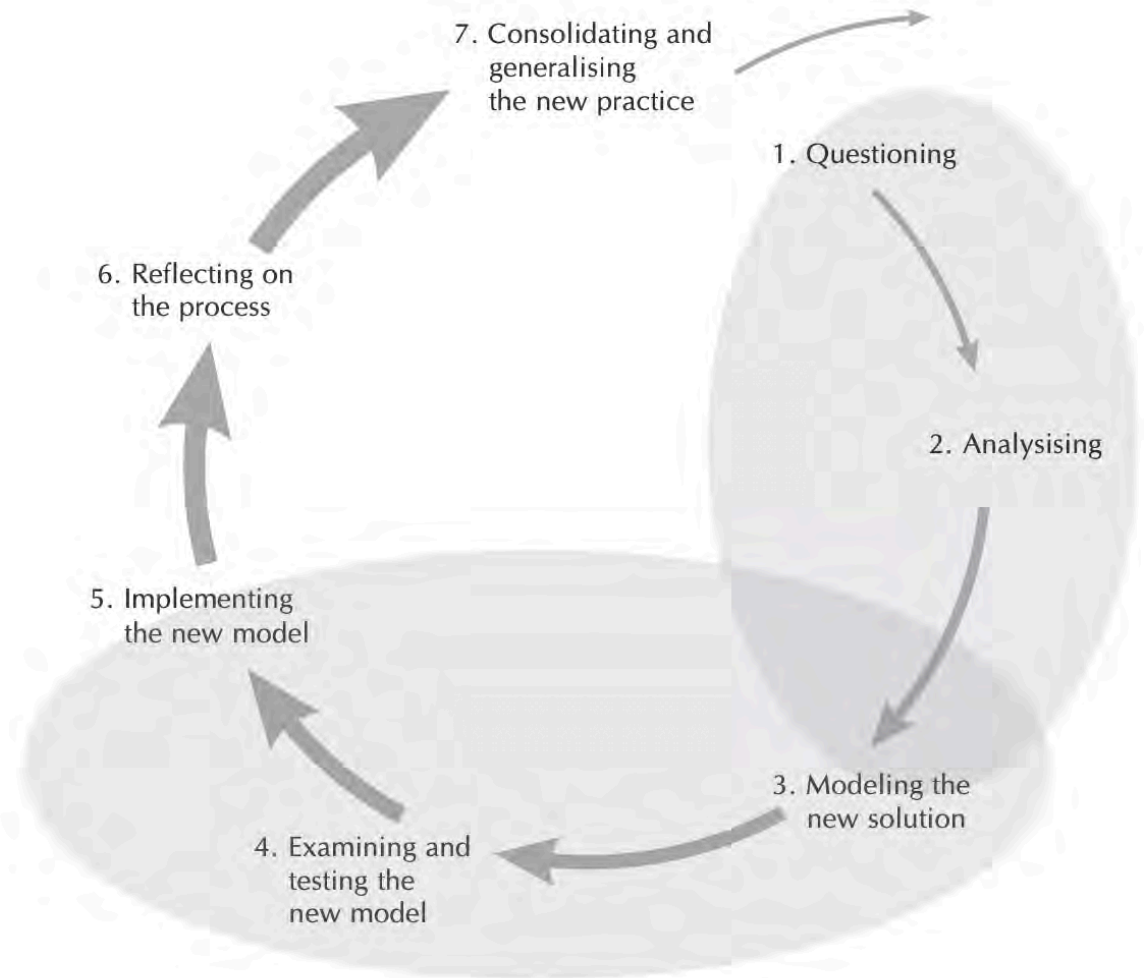


Figure. 6.1: Expansive Learning Process with Seven Learning Actions

Source: Engeström and Sannino (see Section 2.1.1.3)

In the first plenary (Plenary 1) of the third day of the Change Laboratory Workshop Nyanaydzi Irrigation farmers and other stakeholders (AGRITEX, ZINWA, NVTC, RDC, Tsuru Dzechimanamani, ZETDC) were asked to prioritize the contradictions and model the new solutions. The following were pointed:

Participant F16: *Leadership and management.*

Participant F8: *Marketing*

Participant F10: *Farmer education.*

These three contradictions were further discussed and reformulated as Poor Leadership and Management, Poor Farmer Education, and Poor Marketing. The farmers and other stakeholders

were further engaged in an expansive learning process and I shall discribed the process and explain below.

6.1.1 Expansive Learning Process (ELP) on Poor Leadership and Management Contradiction

In the plenary one, after we revisited, prioritised and refomulated the major contradictions, the farmers and other stakeholders were engaged in an expansive learning process to further deliberate, understand and model solutions to the Poor Leadership and Management contradiction. 03:00:41 Leadership management- I used the previous days' charts as double stimuli one (see figure 6.2) as we moved into Learning Action 2 in the Expanzive Learning Cycle: 2: Analysing (see Figure 6.1) which were co-constructed by the participantsin the questioning work that I reported on in Chapter 5 (Learning Action 1 of the Expansive Learning Cycle).

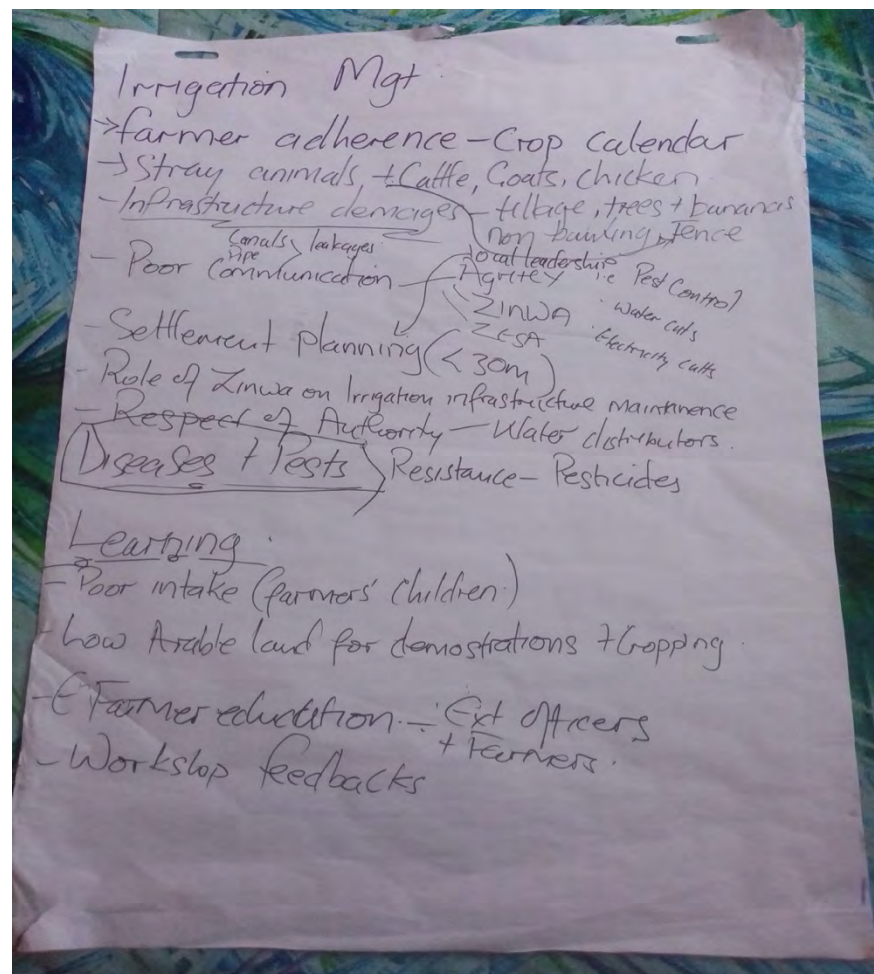


Figure 6.2: Double Stimuli 1, used in Learning Action 2 of the Expansive Learning Cycle.

Source: Author

Double stimuli 1 was used as a playback to re-engage the participants in reflexive mode and recall as well bring forth past histories into the discussions. As Engeström *et al.* (1995) noted, the change laboratory provided work practices on the job in the room and the farmers together with the other relevant stakeholders and practitioners did the analysis and development of new practices. Notable in the process is that the participants were open and reflexive and this allowed for in-depth analysis of the tensions and contradictions surfaced by double stimulation. Reflecting on the first stimulus allowed the farmers and other stakeholders to question and analyze the real contradiction further and they were able to reformulate the contradiction as summarised below by the Researcher;

03:00:41: We have discussed and mentioned so much evidence (manifestations) on leadership and the management of the scheme. So, what is the way forward? Participant F16; *"I would say our biggest challenge (manifestation) is (a) failure to differentiate politics from development"*. Participant F10; (b) *"its poor financial management,"* Participant, F4, *"there is also the issue of (c) high political interference,"* Participant F22, (d) *"non-adherence to the Irrigation constitution"* and Participant F18, *"another major issue we talked about is the issue of (e) illegal leasing then the issue of democracy which is highly linked to the issue of political interference."* Participant E3, *"linked to democracy we were more concerned with the selection of the committee members (selection vs appointment) and also political affiliation as a prerequisite/ticket for selection into the committee"*.

As the discussions were going on we managed to work on the stimuli number two which was a summary and further analysis of the contradiction also as part of Learning Action 2: Analysis in the ELP Cycle. The second double stimuli (2) chart was further used to trigger the upper reasoning and envisioning the future we want in the irrigation scheme in order to move towards Learning Action 3. As also shown in the chart we further realised some linkages between and among some manifestations. For example non-adherence to the irrigation constitution was further connected to lack of democracy and the latter was linked to some being power hungry as the major cause. It was also interesting how the farmers were quick to realise that their constitution was outdated and they need to undertake another review as a follow up to the 2018-2019 review. Furthermore, it was also interesting to realise how the linkages emerged as a pathway towards our envisioning of the future we want in the irrigation scheme (Learning Action 3). For instance, it was quick for the participants to realise that they lacked committee members with the appropriate leadership and management skills. From poor leadership and

management the participants were now concerned about the relevant qualities and skills for specific positions. The second double stimulant is shown Figure 6.3.

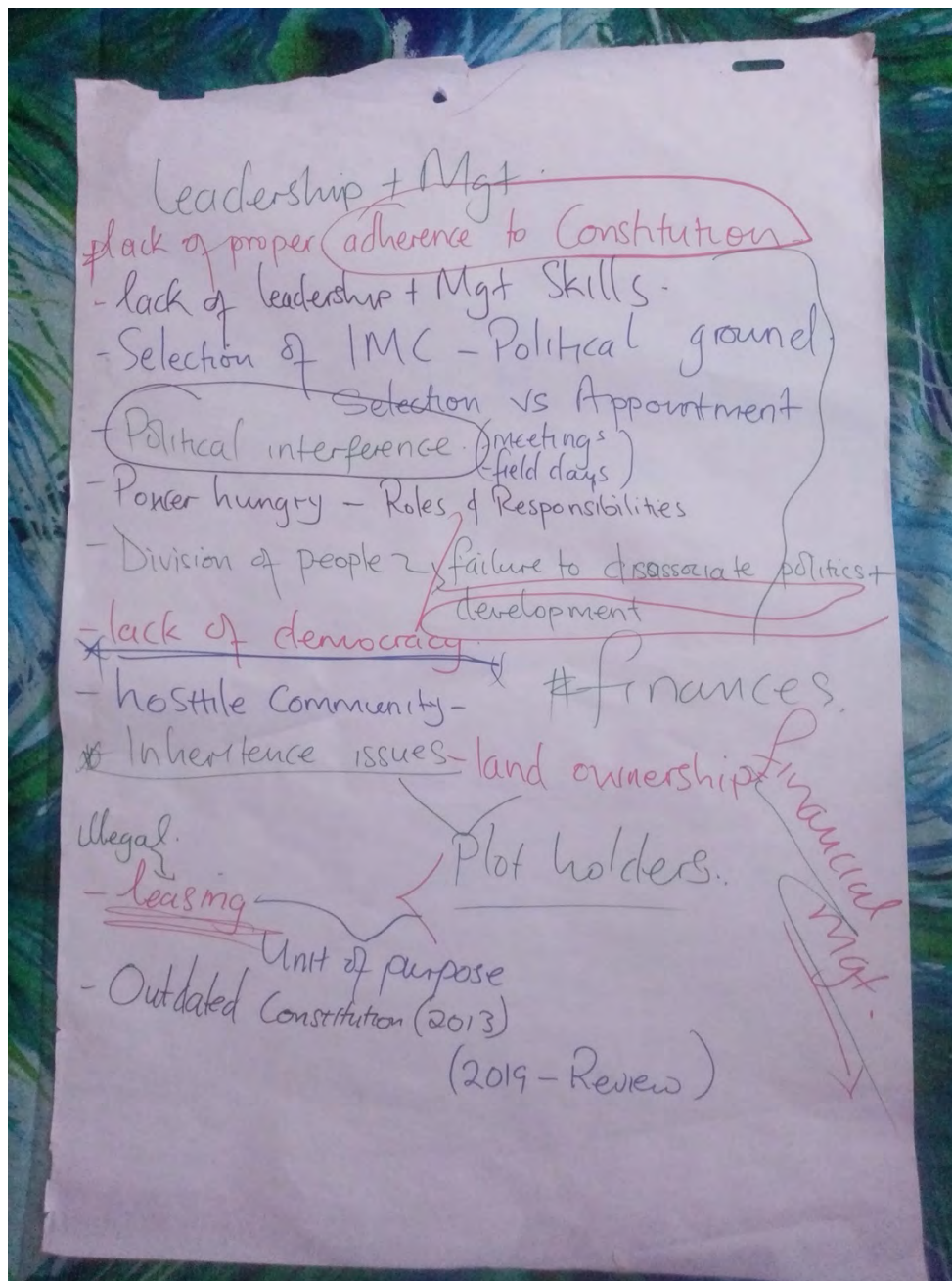


Figure 6.3 The second Double stimuli (DST2) used in Learning Action 2 of the Expansive Learning Cycle.

Source: Author

Working from the second stimuli that was co-developed with them, the farmers and the stakeholders were able to collectively formulate a Way Forward Plan. The Way Forward Plan

can be defined as the modeling of the solutions as described in expansive learning process literature (Engeström & Sannino, 2011) (Learning Action 3). During the Way Forward session I as formative interventionist researcher, jotted down all the main or key reflections for further deliberations and future reference. Stimuli 2 produced the following reflections:

Participant F10: *“First and foremost there are some qualities we should expect as farmers on the type of committee members we want and we elect. And even at block level, we should have a frame of qualities we expect our nominees to possess and as farmers justify if the block’s nominee(s) is/are suitable and meet all the expectations. 1. He./she must be a plot holder, a capable farmer and committed to irrigation farming. 2. A person who is reachable/accessible, accommodative, and considerate to our old aged farmers. Not a person who is unrespectful and inconsiderate to the elders. 3. A church goer not a drunkard... because much of the challenges we have are engineered in the beerhalls.”*

Participant F16: *“I want to add on the way we select the committee members. People are elected from the block level then into the committee. I want to propose that there are some positions at committee level which should be reserved for practitioners serving in important government departments (AGRITEX & NVTC). We want to elect educated personal on the Chairman/chairperson positions, the person must be knowledgeable, authoritative and that way I see our irrigation scheme moving forward.*

The first speakers mentioned above, stepped up to propose changes and modifications with the aim to change some elements of the activity. Agentive talk was also realised in the form of envisioning the new parterns of the activity. In this case Participant F10 suggested an addition of minimum personal qualities and skills the nominees into the IMC committee should possess. The first quality, being a plot holder, knowledgeable and concerned with farming focused mostly on the deeper discussions in the questioning system and also tracks and aligns to past practices in the first generation farming where only the plot holders partake in the proceedings of the irrigation scheme management. Lastly, it responded and ruled out to the complexities involved in illegal leasing. The second quality promotes respect and oneness among the farmers and deals with the common good and stewardship concerns. The third quality eliminates corruption and other unsobor behaviours. Participant F16, also proposed to reserve critical positions in the IMC for practitioners in the AGRITEX and NVTC with the intention to balance farmers and practitioners who are educated, knowledgeable and who have proven leadership and managerial skills in the IMC, facilitating links to critical supporting activity systems.

Personally I also saw this stance wise and professional since it does away with various issues like political affiliations. Also important was a personal reflection by Participant F18:

I personally feel that what we were doing wrong in the past is that, the four blocks were selecting their norminees and from those norminees its where the chairman was elected by the committee members. We as farmers must nominate the chairman of the IMC.

This is what Engeström (2011) described as “*explicating new possibilities or potentials in the activity, relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges.*” Participant F18, tracks into the historicity of the object and figured out how their practice has been incomplete and has to be revised and co-modified into a new activity. He also spread some collective commitment and responsibility to all the farmers in electing the chairman. From his perspective it is the dilligent task of the farmers at this moment in time the second double stimulant (Figure 6.3) facilitated promising solutions towards the leadership and management contradiction the farmers are faced with. It also promised two parallel activities in which Participant 16 proposed to reserve critical positions in the IMC for practitioners at AGRITEX and NVTC. On the other hand, Participant F18 spread the responsibility to elect the chairman/person solely on the farmers themselves.

However, the tracking back into historicity and figuring out how the farmers have been doing wrong in the past by Participant F18 was an important moment in the modelling of solution process. It became a critical and decisive moment for the reformulation of the activity, working with more informed positioning. Critical questioning and careful analysis and reflections into the past helped the farmers to figure out the rightful direction.

Researcher: *How did you end up electing representatives without desired qualities into the committee? Because by nominating your candidates at Block level you would have created a pool where the relevant authorities elect the IMC from, so whom to blame here?*

Participant F16: *This is what I have been explaining, farmers are asked to choose representatives from their blocks to the IMC, we just elect but we don't know the positions they are going to be given in the IMC and this is where the problem is.*

Participant E3: *Mr. Researcher let me explain how the system works. We invite the farmers to select their representatives block by block. For example, Block A North and A South are invited to select and nominate, so Block A North gather at Mrs. Jambaya's*

and elect their representatives to IMC. Block A south does the same in Block B north and Block B south. So. every Block nominates 2 candidates to the IMC then after that it's a secret ballot. Those nominated are invited to nominate eight names they wish for IMC chairperson position. The names of the eight nominated are printed on the paper and all the farmers (IMC nominees) together with the Extension Officers are asked to nominate the candidate of their choice by printing the name on a small piece of paper. Afterwards the votes are recorded and based on the nominee who get majority votes/nominations becomes the chairperson and is asked to go out then we move to the next positions until all positions have been filled up. This way we expect everyone nominated from his/her respective block can be the chairperson. So, I think sadza racho rinenge ratokanganiswa kutangira pakubikwa kwacho umbodza hwacho. (a strong metaphor meaning; the process would have been messed in the initial stages/phases).

At this moment, the farmers and other stakeholders were convinced that the IMC selection process is wronged from the beginning, as expressed by the strong metaphor by Participant E3. Following the selection process, Participant E3 in agreement with many of the participants in the change laboratory workshop, suggested that no matter how good and democratic the selection process is at the top (AGRITEX office) as long as the grassroots process of selection is malicious there is nothing good about it. In essence, they realized that the real problem is on the selection procedure which lacked a real framework of expected qualities.

Further historical analysis of the selection process revealed that, *"potential candidates' campaigns to be the next IMC chairperson and they gang up for that purpose. They used to bring many supporters to the nomination meetings and because he has majority of support, he/she is nominated into the IMC. This has been the major problem that has destroyed our selection system and its not representative of the interest of the irrigation scheme (Participant F16).* In addition, the historical analysis also showed that, *"mostly the people voted into IMC its either they are vocal... they don't have the rightful qualities... So maybe the constitution should explicitly relate the qualities a chairman must have... (Participant F22).* A further questioning of the rule organ (constitution) revealed that, *"the constitution doesn't mention the qualities expected of the chairman/chairperson, it just mentions that there shall be a chairman/chairperson, treasurer and so on, five or 6 committee members (Participant F22).* Participant F18, *"when we reviewed the constitution, we were just removing lease agreement clause... Mr. Researcher all these other issues are enlightened as we engage..."*

Because of the critical historical analysis of the contradiction of selection the farmers further engaged in the actual-empirical analysis of their own practices (Learning Action 2). The questioning was particularly important at this stage as it opened up various aspects including those never thought of. In this session the farmers realized the absence of a framework of the expected qualities for every position in the IMC in the irrigation constitution. Faced with such an absence, farmers and other stakeholders started to envision new solutions. As suggested by Participant F15 that, *“I have realized that we are always complaining committee after committee, I suggest that what if we invite the Extension Officers to be part of the IMC. They can even supervise and advise us on the candidates to select into the IMC as well starting at Block level.”* Referring to the chart in Figure 6.3, I questioned the issue they raised earlier on, “democracy”. I personally thought it was improper for the Extension Officers to select the committee members by themselves as this may question whose interests are served, *“what if the Extension Officer select his girlfriend?”* (Participant E3).

The questioned also opened further challenges as farmers further engaged in actual-empirical analysis. Of interest in the discussions is how the constitution was mentioned as the central mediation tool and an important guiding rule. Participant F8: agreed with other farmers actual-empirical analysis but, questions the will to turn “words into action” when he said, *“yes, but what are you saying is good but when we get there no one will do it. Our constitution can be read in disapproval of candidate Mr. X, but farmers will support against the constitution that Mr. X be selected into the IMC and it happened very soon. Mr. X is still on the position and the irrigation constitution was read but farmers found it necessary for Mr. X to continue serving the IMC and this is my main worry to what we are discussing here.”* It was interesting how ideas fly and if not carefully mediated, may end up with many ideas but few or no concrete action plan. Interestingly, at this moment there was an abrupt shift from what was promising on the contradiction in the selection of IMC to focus on the constitution. The actual-empirical analysis by Participant F8 questioning commitment of words into action opened a can of worms related to the constitution. Participant F12 felt that, *“the farmers are not understanding the irrigation’s constitution”* while, Participant F16 argued otherwise stating that, *“the constitution they know but they turn a blind eye for personal gains.”* Participant F22 explaining that,

Mr. Researcher, the biggest problem is to finger point an individual wrongdoing is not possible... so I suggest the use of suggestion boxes can be helpful and the suggestions be read in the meetings as an additional agenda... the issue of framework on qualities is helpful but must be backed up by the constitution. Some farmers do not even know

the constitution we are referring to, whether it's a national or irrigation? and when was it enacted?

Again, Participant F22 is also in agreement to adoption of the framework on qualities but further questions farmers' knowledge of the constitution. Importantly, he also suggested the use of suggestion boxes to keep a check on adherence to the constitution. Interestingly, I left the discussion to flow, and I quickly realized how the expansive learning process was engaging the participant in a more open and educative process. Unexpectedly, Participant F16 refocused the discussion and brought the participants back to the unresolved issue of selection of the IMC. This became the turning point to this learning action. Participant F16 posit that,

I think especially on leadership lets go back to where we said we want the AGRITEX & NVTC practitioners in the IMC. Otherwise, the AGRITEX Supervisor must be the Chairman of the IMC. Because he is in overall charge of the whole irrigation scheme. So, he has the qualities to be the Chairman of the IMC and vice by one of the farmers. So that he can be overseeing our financial management with the help of the farmers... so what we want is to agree that on leadership and management, the Chairman position is not contested but reserved and obvious the chairman is the sitting Supervisor of AGRITEX. This way I see the system of the irrigation moving forward.

Participant F22, opened a possibility of change by shaping the activity on the rules of selection. He suggested the chairman position remain uncontested and reserved for the AGRITEX Supervisor. However, the proposition was faced with high resistance and heated discussion which involving some critical historical analysis and actual-empirical analysis of the activity as well. Participant E3: suggested that,

the National labour law doesn't allow Extension Officers (government employees) to handle community". He went on to suggest the following, "let me help you to get a solution, we are supposed to describe the qualities of the leader we want. Because Extension officers come and go, but the irrigation scheme is your legacy, so look for a leader who can manage your scheme better and you know them.

Participant F8: *Right Mr. E please allow me to question you, you said you are not allowed, how different are you from the government school setups because in schools there is a Chairman, Secretary and their vices then other committee members including the headmaster and the deputy in the committee members. So how different are you from these other setups?*

Participant E3: Its different in that at AGRITEX we are not allowed to handle communal funds, it is a punishable offense you can be arrested or expelled.

Researcher: But they have not requested or invited you to hold their finances, chairman does not handle any finances.

Participant E3: you see what, when the IMC sit ZINWA or ZESA meetings concerning their debts of financial plans and even when they do their end of year celebrations, they don't invite us. Now we heard from rumors that they want to buy tractor trailer.

An important thing to point out is that expansive learning process is a not cyclical as represented in the ELP cycle (Engeström & Sannino, 2010) but what is important as shown by the two circle shades in Figure 6.1, it involves moving within, between and across the 7 steps or learning actions in ELP cycle. To collectively find a solution to the leadership and management contradiction, we moved between and across these steps and it was never a linear process. We moved from modelling of solution back to actual-empirical analysis again. Participant E3 showed some strong resistance to the proposition of reserving the IMC chairperson position to the siting AGRITEX Supervisor. In the above presented conversation, it is clear that the Participant F8 stepped up to confront and navigate the power relations and voice out by likening the irrigation activity system to the government school activity systems but the Head and deputy still allowed to participate and sit in the School Management Committee. When I realised that we are almost getting stuck, I introduced the third double stimulation aimed at reconceptualising the irrigation's committee organogram. Double stimulant 3 is a 5-day workshop minutes entitled “**Why water cut?**” It was a 5 day-workshop held in 1995, in Manesa Chipinge, for all the Supervisors and Extension Officers from all the irrigation schemes in Manicaland. Of interest to this study and the Change laboratory workshop was the organogram diagram and in the organogram of Nyanyadzi irrigation scheme of 1995, it was interesting to realize that the District Officer (DAEO) was the head followed by the Irrigation Officer (AEO), Irrigation manager (AES) then the IMC, Extension workers, clerks and drivers. The organogram is shown in Figure 6.4 and was presented as double stimulation 3.

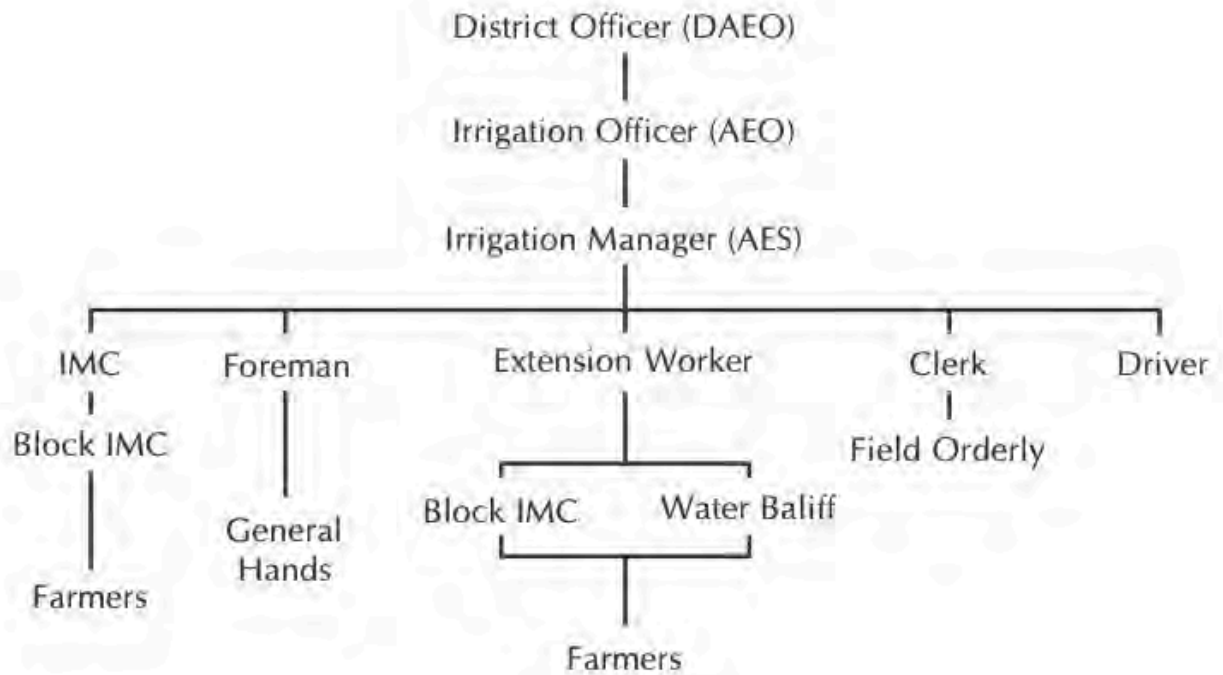


Figure 6.4: Double stimulant 3-Nyanyadzi irrigation scheme’s Organogram

Source: Nyanyadzi Archival files (Accessed, 2019)

Notable, in the organogram the AGRITEX featured prominently occupying the three important positions in the Irrigation scheme, DAEO, AEO, AES and they were even leading the Irrigation IMC. The double stimulant 3 ushered us into historical analysis phase again but unlocked the potential to resolve the leadership and management contradiction. The farmers and other stakeholders welcomed the 1995 management structures as stated by Participant F16 that, “Yes. *Kana yakadaro inenge yakagwinya management committee yacho*” (if that was the organogram setup it was fine, the management committee will be functional). This means that the farmers and other stakeholders present found the 1995 irrigation management committee set up effective and were hopeful if a similar IMC organogram was adopted would bring the needed change in Nyanyadzi irrigation scheme. After further discussion Participant E3 agreed stating that,

I agree with you the Researcher, but things has changed. Let me give you an example I guess you know that in the past you are referring to the AEO and the vice, the Supervisor was the Irrigation Manager just after independence (1980). They replaced the Whites’ positions with AGRITEX Supervisors as the Irrigation Managers. Yet, by

the law the AGRITEX Supervisor should help the IMC to manage the irrigation scheme but the problem now is that the IMC act independent. We are in constant disagreement with the Supervisor because for example, yesterday we talked with the IMC funds requested for the show but they are refusing and the IMC doesn't respect the Irrigation Supervisor.

The double stimulant 3 reminded participants of the late structures that never limited the inclusion and participation of the Extension Officers in the irrigation activity system. After such exposure to historical structures Participant E3 agreed and even shed more light on the structures. Interestingly, he moved from prohibition by the law to argue that, “*by law the AGRITEX Supervisor should help the IMC.*” This shows conflicting ideas and further raises questions on the true nature of Participant E3's denial claims. In addition, he piled blame on the IMC after lately claiming that the IMC excludes the AGRITEX Officers now he claims that the “*IMC doesn't respect the Irrigation Supervisor.*” However, the claims were further supported by Participant F22 who also explained that,

the IMC became more independent after the fertilizer allocations which used to come through the AGRITEX and since then AGRITEX and NVTC are excluded. The IMC also blamed the Extension Officers for the scientific expectations per Acre... I think if we respect the Extension Officers and AGRITEX we can find our solutions to leadership and management contradiction.

Participant F16: *lets go back to what Participant F22, has said, do you still remember where we mentioned the issue of political interference. If you carefully observe when the fertilizers are distributed by the Extension Officers every farmer receives something. But, if it is distributed through the IMC you will realise that a person who doesn't know anything about farming receives but the real farmers don't receive and that what has destroyed our irrigation scheme's system.*

In the process of historicity we managed to also track how the IMC has become independent and the motive behind this, in this case the motive was pinpointed as the need to control and manage farm input distributions in the irrigation scheme. In the quest, relations with the AGRITEX were strained and the AGRITEX and the NVTC were further displaced and excluded in the IMC activity system. This historicity provided an important space to deliberate and more towards a way forward plan. As part of the envisioning and modelling of the solution which the participants referred to as a Way Forward Plan, Participant F10 suggested that,

On the way forward plan, I want to personally encourage that as Participant F16 stated the only person we can respect in this irrigation scheme, is the person who spent 4 years studying management... lets reserve the position for the Extension Officers so that our irrigation scheme may progress again.

Participant F16: Yes, I agree so that our irrigation can prosper again.

Participant F18: I want to second... we were now discouraged... but part of the way forward is to reconcile with the AGRITEX and NVTC, they are our important government departments.

There was strong endorsement of the ideal to reconcile the AGRITEX and NVTC and reserve important posts for the two departments but of major concern was the Chairperson of the IMC who was strongly linked and reserved to the Irrigation Supervisor from the AGRITEX. Most importantly, the expansive learning process gave the participants space to critically reflect on all important details in the bid to co-create a solution. It was interesting to realise that when everyone felt they have reached to an agreement to reserve the chairperson position to the sitting Irrigation Supervisor (AGRITEX), Participant F15 was still stuck with an inner contradiction of the activity. In his thinking there wasn't a solution yet and offered a way to circle the inner contradiction to come up with a complete activity. He said that, *"I want us to deal with the issue raised by Participant E3 that they are not allowed to be involved in the IMC or to take the lead role. So what if we elect a committee and take that committee through leadership training..."*

This is what the expansive learning process can do, challenge the participants and open new horizons to think beyond a challenge. The inner contradiction challenged Participant F15 to think out of the box and explicate a new activity aimed at circumventing the first activity's inner contradiction. So Participant F15 suggested leadership training as the best option which can benefit the whole of the leadership committee and this can become a new activity aimed at improving the leadership and management activity. This is in line with Engeström (2011) transformative *"committing"* to concrete actions aimed at changing the activity also regarded as commissive speech acts. The idea of training raised above was also welcomed by the farmers and the other stakeholders including the NVTC as highlighted by Participant NVTC who posit that, *"I totally agree with the point raised by Participant F15 on putting the selected management committee leadership and management skills' training..."* assumingly, they also want to partake in the training process.

Added was also the suggestion by Participant E3 that, “... we should set standards... at least a farmer who has reached O’level... who can also attend meetings and write feedback notes...” However, after I realised that we were stuck in the activity I provided critical summary on what we have covered, what has emerged and further posited a critical question as what I would call the fourth double stimulant to help us reach a desired way forward or concret solution to the leadership and management contradiction. I engaged the participant through my fourth double stimulant as follow:

Researcher: Can we relate what has just happened? Someone first suggested to come up with important qualities framework we should consider when choosing the IMC. Then another participant suggested we positions and involve the AGRITEX and NVTC, as important partners which makes much sense to me. And now lets realise that each irrigation scheme’s block has a Block supervisor from AGRITEX and this is where they work 100%. Overall, the irrigation scheme has one Supervisor who supervises all the blocks in the irrigation. As far as I am concerned the irrigation Supervisor is above the IMC and the structures have shown that the post has always been above the IMC. One more thing the irrigation Supervisor is in charge of supervising the whole irrigation right? So what I fail to understand is that, what role does the AGRITEX Supervisor play in the irrigation scheme then?

Participant E3: It’s to manage the irrigation scheme with the help of the IMC.

Researcher: So, if his role is to manage the irrigation scheme with the help of the IMC so what’s wrong with the AGRITEX Supervisor heading the IMC chairperson since his role and qualification allows?

Participant E3: Aaah the statutory instruments I have come across state that in the long run the irrigation must be handed over to the farmers only that its still in the process. In the long run thorough IFAD program water canals must be repaired and lots of fixing to be done then the irrigation scheme will be handed over to the farmers.

Notable, the fourth double stimuli had a motive to confront and trigger ripple effect and was more of sense making avtitiy. There was just a need to draw a line between reality and the truth. In my own thinking I felt that the AGRITEX practitioners were hiding the truth and didn’t want to be involved in the leadership and management activity. That’s why I confronted as explained by Kachilonda (2015) I was also navigating through the power relations terrain in search of the truth, taking the consenquential action and commit this towards a change in the Leadership and management actvity. My reading of the situation was correct, and I went on with another

confrontational action and asked, *Researcher: Right, in the meantime before IFAD comes what will happen? Participant E3: In the mean-time we will work with the IMC.* This became the turning point and it turned out that Participant E3 wanted to be conservatory to the current system and the farmers and other stakeholders were open to the model. The leadership and management structural model was further discussed and remodelled and the principle ideal was to learn from the 1995 model which Participant E3 shed more light stating that,

you are now confusing the existed structure (1995), there was only one supervisor heading the irrigation scheme (AEO), who reported to the DEO. But, when the IMC met with the Supervisor(AEO), the Supervisor(AEO) was the Chairperson.

Participant F15: *“Yes, that’s why I asked that time the difference with the school setup... but you refused...now you agreed, but if they (Extension Officers) think they may be overwhelmed because of what they see please bear with us zuva rimwe hariodzi nyemba* (Shona metaphor- translated as one day cannot make cowpeas go bad, meaning change can not be an over night thing. *Most of the times the Supervisor can chair and only when he is on leave you may chair as for that only month.*

The above conversation is not only in agreement but also confrontational transformative agentive action. The strong metaphor was also in a way acceptance of previous laid complains againsts the IMC and revealing the need of time to amend the broken lines of communication but welcoming the invite to work together again with AGRITEX. I feel like, this conversation is deeply immersed with self confessionary and pleading on behalf of the others. Where Participant F15 as former IMC member is faced with high self actualization and open up to a new activity even if it is aimed at changing the previous activity. On the other hand, it confronting Participant E3 at personal level and whoering off the fears that might arise of chairing the IMC on the Supervisor’s leave days. This then make sense to say my earlier feelings that, Participant E3 was defensive and hiding the truth. As a matter of fact it is now clear that the defense given earlier own were just denial makings fearing to be Chairing the IMC in the absence of the Supervisor based on his daily experiences in the irrigation scheme as mentioned by Participant F15. Participant W6 said, *“thank you I want to also give a quick reference, its not unique to us but a Manesa irrigation scheme the AGRITEX Supervisor is the chairperson of the IMC and they are up to date with their ZESA and ZINWA payments...”*

In essence, the Leadership and management manifestation was dealt with as described above. We quickly moved to the other manifestation of poor leadership and management that is lack of financial management structures.

03:56:14: Financial management structures

I reintroduced the second manifestation that is a lack of financial management structures with a recap and opening question which served as my first double stimulation tool. I started as follows: *Researcher: we agreed that one of our biggest challenges is a lack of financial management structures. So what can we do?* As soon as the participants were faced with the first double stimulant they engaged in productive collective contributions towards modelling of the solution. The expansive learning process unfolded as follows:

Participant F10: Audit must be regularly conducted.

Researcher: How often?

Participant F8: Quarterly

Participant E3: In the irrigation constitution it is written internal and external audits. And we suggested the Extension Officers can help with the internal audits then Mr. Chabata a Commercial teacher at Nyanyadzi high school can help out with the external audits... let me tell you something Mr. Researcher if the farmers want the financial reports... they just boycott paying their monthly payments in their blocks until the IMC present the financial reports

Interestingly, in the activity the need for regular quarterly financial audits was identified and offers for internal and external audits were also volunteered in the form of the Extension Officers and the school commercial teacher. It was a relief to realise the active role the Extension officer wanted to play in the financial management activity and this would make a complete activity. On the other hand this could also be a catch out plan to expose financial management weakness and expose the perpetrators which could also be mistaken to a hunt mission considering the existing relations between the current IMC and the Extension Officers. Despite all this, one positive thing is that the finances will be safe and regularly accounted for. Participant E3 also offered the solution that farmers adopt a boycott strategy to ensure timely presentations of financial reports. This is an example of what Engeström (2011) describes as committing to concrete actions aimed at changing the activity.

Participant F6 said:

I think what has been come out Mr. Researcher its clear, the Supervisor is the chairperson of the IMC, finanacial reports must be ready by the 30 of August for example, the treasury report by the 30th must be done and feedback given to the farmers... the Supervisor must overly see all is in place and its good because the Supervisor doesn't hold any money... he just supervise...

The above summary made me realise how much the participants had learnt in such short period of time and how they had managed to internalize the systems beyond a classroom setup. I realised how emancipatory the expansive learning process, is as learning concepts can be easily accessed and internalised without difficulty or boundaries. The participants showed immense concetration and were drawn into the proceedings in the quest to transform troublesome activities.

Figure 6.5 is the Way forward Plan chart formulated in the ELP. Linked to the above, Participant F15 asked a critical question “*is the money we pay or they collect allowed sleep over in the individuals' house or it's supposed to be surrendered elsewhere?*” The above question is very important to this activity, it signals an inner contradiction. It surfaces issues of safety and asks about procedural setups. Participant F6 elaborated the issue at hand when she explained that,

the issue is that farmers are not aware that there is now a new merchant code called Nyanyadzi Irrigation Scheme on which you can pay straight into the irrigation scheme's merchant account. You can pay cash to the treasurer but it's no longer advised so you can send your money by ecocash to the mechant code which is traceable and for accountability hence, no-one has to sleep on or hold irrigation's cash.

The summary of the ELP on Leadership and management contradiction activity is presented as Appendix W. As shown in Appendix W, the Expansive Learning Process was never a linear and fluent process, but it was characterised by high levels of discussions, conflicting ideas, derails, dissonance and it took us three days to reach to a well informed solution model. As the insider formative interventionsit reseaher it was a challenging space to work in. There were many issues and processes that you may assume you knew until you get into susch space, you realise you were wrong. So it was also a learning curve for me and of course being an insider there are practices we used to do but without detailed understanding of why we used to them, like scooping sand in the pump house sump but through the Expansive Learning Process there

was a better enlightenment for me. Through the ELP we were able to develop the following work plan (see Figure 6.5).

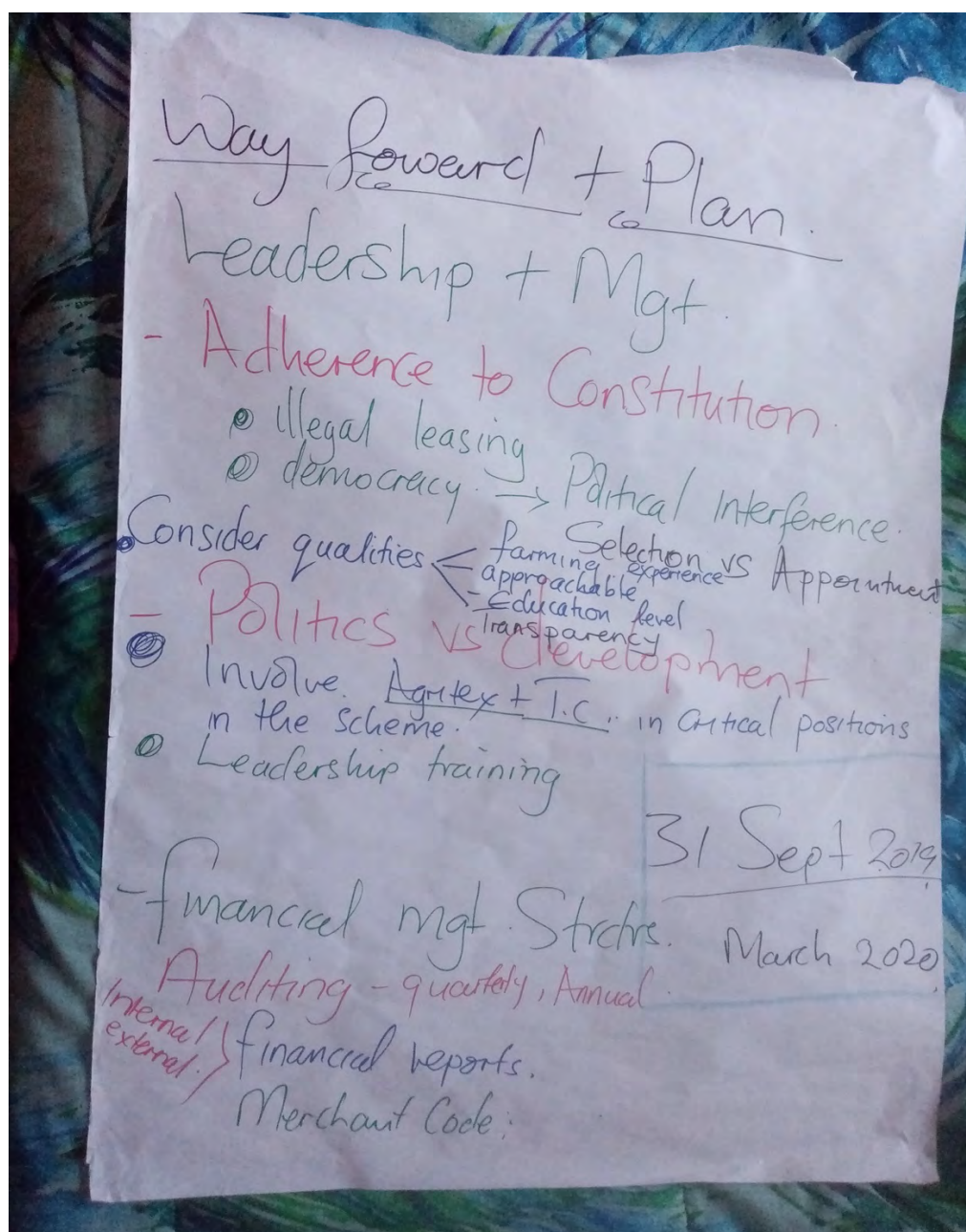


Figure 6.5: Way Forward and Plan on Leadership and management contradiction

Source: Author

As explained in the previous section, the ELP led us to a collective model to the solutions on leadership and management contradiction. In summary through the ELP we realised that we were dealing with inner contradictions and suggestions were made for building up to The Way

Forward Plan presented in Figure 6.5. The detailed solution model adopted in the Way Forward Plan adopted presented in Figure 6.5 is presented in Table 6.1. The inner contradictions and the solution model are summarised in the Table 6.1.

Table 6.1: Leadership and management inner contradictions and the solution model

Contradiction	Inner contradictions	Solution model	Time frames
Poor Leadership	Absence of a framework on expected leadership and management qualities	All the IMC members shall have the following qualities: • Be a plot holder • Knowledgeable and committed to irrigation farming • Reliable, accessible, accommodative and considerate • Church goer • At least have reached O' level in education	March, 2020 Committee after engaging with other absent farmers
	Selection procedure of IMC members at Block level Selection procedure of the IMC chairperson	• The selection of the IMC members at Block level shall be based on meeting the above stated framework on leadership and management qualities. • Secondly, only the plot holder farmers shall elect a member of choice. • The chairperson position shall be reserved for the sitting AGRITEX Irrigation Supervisor and in his absence, the Deputy Supervisor shall temporarily resume the chairperson's position. • In case of transfer, the incoming AGRITEX Irrigation Supervisor shall resume the vacant position. • The chairperson shall be deputised by a farmer elected by the farmers themselves. • Both the chairperson and vice chairperson are expected to be educated, knowledgeable of irrigation farming, possess managerial skills and authoritative.	March, 2020 Committee after consultations with other absent farmers
	Non-adherence to the Constitution	• Suggestion boxes shall be used to monitor abuse of constitutional law • Review and responses to the suggestion boxes' comments shall be on the meeting agenda • Constitution to be reviewed to add on all the new actions agreed in the CLW.	2020 further after consultations and agreement with other absent farmers

	Exclusion of AGRITEX & NVTC in IMC	• The position of the IMC chairperson shall be reserved to the AGRITEX's Irrigation supervisor. • The AGRITEX & NVTC practitioners shall be elected to IMC positions by the farmers and through consultations with the IMC Chairperson.	March, 2020 further after consultations with other absent farmers
Poor Financial Management	Lack of financial management structures Lack of awareness to new developments	The IMC shall be requested to do the following: • Produce monthly Operational and Financial reports. • The reports should be circulated to all the farmers through a WhatsApp group at the end of every month. • Facilitate Quarterly Internal and External Audits. • The internal audits shall be conducted by the AGRITEX Extension Officers and the External audits shall be conducted by Mr. Chabata of Nyanyadzi High school. • Annual Operational and Financial reports and shall be circulated as explained above. • Annual Internal and External Audits shall also be conducted by the above mentioned personal. • Quarterly and Annual Financial Audits shall be circulated to all the farmers by the IMC as explained above. • Farmers are to take advantage of the Nyanyadzi Irrigation Scheme's Ecocash Merchant Code to make their relevant payments and avoid pay in cash to eliminate cash abuse. • All the payments/expenditures to be done through bank transfers • All contracts/repairs in the irrigation scheme to be done through tender system • Petty cash float to be kept at the office only for emergency purchases and accompanying receipts and invoices to be kept for accountability purposes.	2020 further after consultations with other absent farmers

Source: Author

6.2: EXPANSIVE LEARNING PROCESS (ELP) ON FARMER EDUCATION AND TRAINING CONTRADICTION

In the Change Laboratory Workshop, I started with a recap on the previous discussions and revisited the initial chart we collectively put together in attempt to describe and explain how

poor farmer education in the irrigation scheme has come to be. The introduction and the chart (see Figure 6.6) became my first double stimulation mediation tools. These mediation tools ushered us into a critical questioning phase where we reoriented and related to the historical activities. In essence, we were trying to find relevance in the current activity by comparing it to the historical events, practices and achievements from elsewhere. Furthermore, we were also trying to find niches and further connections of this activity with other activities in the irrigation scheme. This describes the first phase of the ELP with the farmers and other stakeholders.

However, it is important to mention that this activity was a bit different from the previous one (leadership and management contradiction activity) dealt with in the previous **Section 6.1**. The activity emerged within other activities hence it draws much from the historicity of the object led by the Researcher in the first day and prioritization process with the farmers and other stakeholders in the second day. The contradiction itself emerged from thorough and careful historicising of the farmers' activity system and the mirror data. Interestingly, lack or poor farmer education was never mentioned in any farmers and other stakeholders' issues of concern (see Figure 5.5 and 5.7), yet proved to be a central contradiction in the farmers' activity system. The community itself was expecting the Researcher as an insider formative interventionist leading in the study as well as a third-generation farmer to help with ideas and solutions. Hence, as an insider formative interventionist researcher working with my community of more than 25 years of engagement, I led the discussion working with the mirror data and my personal experiences. The community was ready to learn from me as I was also learning from them.

The process became collaborative in nature and I took part as an insider although, I was open to my role as a researcher in that plenary session. This is in line with Lektorsky's (1980) description of an interventionist researcher, when he posits that interventionist research is an ongoing reflective mediation in which the interventionist researcher's role is seen as a means of supporting and mediating change in activities and creating new collective activities. He further argues that if the study outcomes are accepted by the community, the knowledge obtained may re-mediate activities and change human reality.

Mirror data drawn from the three generations of the farmer' narrations pointed to a challenge in the lack of farmer education and training. Issues that deal with diseases and pest resistance

in farming are a manifestation of lack of proper farmer education. An example mirror data drawn from an interview with Interviewee FGI 3 presented below shows this,

Researcher: ...but during that time as farmers were you learning?

Interviewee: Yes, we were learning in groups... we were taught in groups on how to farm... it was sort of an attachment learning ...

Interviewee: Yes, there are changes now, it's like nowadays there is no systematic cropping... there is no proper guidance... we only know that in order for us to succeed there is need of proper farmer guidance and effective policies. If you see maize in one plot and groundnuts in the next it's a sign that there is a problem...

Researcher: What can be done?

Interviewee: I'm glad you have taken up this challenge and we look forward to you because you are the young farmers, and you are still at school. These are the challenges we are faced with and we look forward to you...

Just to present few more mirror data extracts, an interview with Participant FGI 3 also acknowledged that the learning processes they were engaged in, from the beginning of the irrigation scheme was sort of an attachment learning. He further denotes his hope in new research work and transfer the challenge to new scholars like me, to understand and mediate. He was very convinced that the individualistic farming that was going on is a true reflection of complex challenges they are faced with. The interview with Interviewee FGI3 reveals further dimensions to the crisis in Nyanyadzi irrigation scheme and beyond, it also shows a remarkably close link with poor farmer education and training going on in the scheme. The interview with Participant FGI 4 went on as follows:

Researcher: From what I hear, it seems as if most of the farmers in Nyanyadzi irrigation scheme came from different places, so in terms of learning were you getting any form of farmer education?

Interviewee: Learning yes... there were some learned Extension Officers from Domboshava who came to teach us...

Researcher: Are there any farmers who were also sent to farming vocational training centres?

Interviewee: No, were just encouraged to send our children to be trained in the training centres.

Researcher: So how did you learn?

Interviewee: Through demonstrations at the Training Centre (now called Nyanyadzi Vocational and Training Centre), that's where the Extension Officers from Domboshava would come...

Researcher: What should be done?

Interviewee: Yes, I think if it was that we have found a person in the irrigation who can lead us... the government should make its Extension Officers move around in the plots... but nowadays the Extension Officers are just looking and leave as it is. I think the Extension Officers were too quick to abandon us and the reason is that the people were given power and some individual farmers abuse and sometimes assault the Extension Officers.

Researcher: So, from your experiences are farmers still learning?

Interviewee: No learning at all it's now individualistic farming...

Interviewee: Yes, it's like some of the youth farmers (third generation farmers) some never went to school, and they don't have any respect.

Researcher: So, what are the challenges working with people of such calibre?

Interviewee: Yes, there are many challenges associated, the young generation are very troublesome when watering. I don't want to lie, there is a need for a real and effective management team to surpass these challenges... remember when the government is sending its Extension Officers it's not because they are being paid but it's because they understand that most of the farmers came here to Nyanyadzi uneducated and unknowledgeable of farming...

What also came out dominant among other various issues when I interviewed Participant FGI 4, was the existing gap between the first to the third generations of farmers in terms of farmer education. It was visible in the interviews with the first generation of farmers that whenever they compared the mode and type of learning they went through they thought they had best of all. Comparing to now, they are hesitant and point to a relaxed stance amongst the Extension Officers in terms of teaching or facilitating collaborative learning in farming. Participant FGI 4, raised a concern with the third generation, with most of them described as uneducated and very disrespectful. This is worrying, I then started to visualise a kind of a farmer with the above-described characteristics who is expected to be fully functional and productive in the irrigation scheme. The relaxed way of dealing with farmer training by Extension Officers (which interviewee FGI 4 referred to as abandonment) was also worrying.

Similarly, what also came out in the interview with the second generation of farmers pointed to similar issues of poor farmer education. The interview revealed the following: Participant FG2 6:

Researcher: But by that time were farmers learning?

Interviewee: Yes, the farmers were taught by the Extension Officers. There was a time when the Extension Officers would move around the irrigation educating the farmers on how to grow, let's say beans... it was very educative. Compared to now, it's now here and there, it doesn't have the real respect and impact it used to have. The workshop maybe attended by only $\frac{3}{4}$ the farmers and the rest don't even know anything... farmers have to make ends meet, but now with the new young farmers (third generation) in the irrigation scheme its difficult. They lack farming knowledge and most of the times they go wrong and at the end the irrigation is dying a slow death especially with this new generation we are moving forward with...

Researcher: In terms of education are there any changes in the kind of farmer education help you got before independence and now after independence 1980 onwards?

Interviewee: ... yes, the main difference is that our parents were well organized and were much attached to Extension Officers in their farming activity unlike now the Extension officer are on themselves and the farmers on themselves and where it is going is a slow death there is no improvement to talk about. And there is also a sign of laziness from the new coming generation. Our parents taught us farming but this generation is not interested in farming. But, during our young age we took farming seriously and again there is no improvement we can talk about here.

Researcher: I heard you emphasise a lot on issue of attachment and generational gaps ... My question will be, from your own generation moving to the third generation and forward do you see possible challenges on attachment to the plot and commitment to farming?

Interviewee: Yes, there are so many challenges we face that are related to farmer-plot attachment... our generation going backwards we had better attachment to the plots, the government should at least teach the other subsequent generations and at least gazette a policy that clearly spells that a plot holder must know or have acquired certain farmer education trainings so that our production can improve...

Again, the interview with Participant FG2 6 was an eye opener. He not only did open the planes of generational gaps and how they affect the smooth running of the irrigation scheme but, also showed how farmer education and training has slowly died in the irrigation scheme. He also opened a lens on how plot attachment played out in farmer commitment to progress and called for a need to teach especially the third generation going forward irrigation farming systems. Lastly, he wished for minimum requirements on achievements in farmer education and training courses for an individual to be considered a rightful plot holder. In essence, he points out the need for farmer training before plot acquisition. All these ideas opened my thinking horizon and focussed my concern on farmer education, and I started to realise how farmer education is intertwined in challenges faced in the irrigation scheme.

With all the mirror data from the ethnographic inquiries, I was now engaged in the CLW to lead and feedback to the farmers and the other stakeholders on a way forward. I further drew mirror data from the initial phases of the CLW. There were two critical challenges raised by the farmers in the first plenary session of the CLW which convinced me that there is farmer education contradiction during the Questioning sessions. It was when the farmers and other stakeholders as critical activity systems broke away in small plenary groups to collectively discuss the challenges they were faced with, within and between working with other key stakeholders' activity systems. In the feedback session, Participant F13 reporting for the farmers said,

01:46:14: No. 7. *"Lack of communication between farmers and the Extension Officers, ZINWA & ZESA- there is no longer transparency, there are times when the farmers are faced with diseases and pests in their fields and report to the Extension Officers. It doesn't really matter what time of the day you report, they don't come to ground truth... we have a challenge there."*

01:51:24: No. 16. *"Disease & pest resistance- over use of pesticides – most of the farmers are buying own pesticides but seems as if they are overusing it and have made the pests resistant. Now if you look at our farming records the pests and diseases have become persistent, year in year out its those same pests and diseases..."*

The above narrations opened space for rethinking the role of the Extension Officers in responding to various complex issues in the irrigation scheme. The second narration on diseases and pest triggered deeper ontology on farmer education. I began to ask myself so what

does this mean in terms of education practices happening in the scheme. I started to visualise a model of better farmer education and the likely outcome.

In the Critical Questioning & Discussion phase: 01:52:44, Participant E3 responded to the farmers' No. 7. "Lack of communication between farmers and the Extension Officers, ZINWA & ZESA, explained that, *Participant E3: Yes, point taken, but maybe I didn't understand you quiet well. Our point as Extension Officers is that, in our extension work if a farmer wants to start a new crop, you are supposed to come first to AGRITEX and discuss with your Extension Officer about your intention to begin a new crop. But current farmers start by experimenting and when faced with challenges that's when they will come to consult, and this is the challenge we face... Then number 2, resistance of disease and pests- this we have to blame everyone; farmers are buying pesticides without labels... what cause the diseases and pests to resistance is overdose of the pesticide let's say you are supposed to use 16ml you end up doubling to 32ml, so the pest build resistance...*

The response was enough to single out that there is a challenge. To begin with, the title of the farmers' challenge points to tensions experienced between the farmers, Extension Officers, ZINWA (water utility authority) and ZESA (electricity utility authority). Secondly, Participant E3's emphasis on "*in our extension work*" shows deep tensions in contextualisation of the extension work from the now and previous. Lastly, the issue addressed by Participant E3 on resistance of diseases and pests shows lack of farmer education. The farmers may have the knowledge of the pesticides they must purchase but application for effective control needs knowledge expertise and this is what seemed to be lacking.

Another important mirror data was Participant F10's observations and critique on the Nyanyadzi pesticide application system. He said,

my question is on persistent diseases and pests. From my experience and knowledge through Kadoma Cotton I once attended, I would agree with what Extension Officer X said on chemical application... let's say Lamuda must be used for not more than 2 years in Nyanyadzi then exchanged to another pesticide that was being used in Bulawayo... that's what makes diseases and pests easy to control. Going to some of the new pests we now have in the irrigation, they are difficult for us farmers to understand them there is need for proper research in the whole irrigation scheme... So, we are lacking

practitioners who come to explain these diseases and pests for us. Number 2. this has end up most farmers purchasing pesticides from South Africa yet, the pesticides and the diseases and pests here in Zimbabwe might be different from those ones in South Africa. Farmers go to purchase their pesticides from South Africa, and they don't even know what diseases or pests it controls and how is it applied, result in guess work. This is the reason why I pleaded with you Extension Officers if we could have block by block learning process and could be through workshops because things are extremely bad. Because would that be ineffective if I change a pesticide, yet my neighbour farmer continues with the old one, it's pointless. Only if we could agree as an irrigation scheme on one pesticide and if we can hire a helicopter to spray all the fields and the whole valley...

In his critique Participant F10 used a concept of applied holistic disease and pest control systems to argue for the need of more collective actions including farmer education. He even pleads for block-by-block intensive learning programs because the situation he calls it extreme. I do agree with him and his thinking resonated well with my own observations as well as my careful analysis of ethnographic data.

The last mirror data I will drew out from the same first plenary session is a contribution by Participant F16. He posited that,

I also want to ask on the issue of communication between the farmers and the extension workers. We have a challenge that they are not communicating with our local Agro-dealers who sell us the chemicals... Because tuta abosulluta has troubled us and its visible... But we have farmer educators in our midst, and they are not uniting us to collectively fight these diseases and pests. Please they should help us since they are out Extension Officers and our eye...

It is generally not the duty and mandate of the Extension Officers to inspect chemicals sold in Agro-dealers, but their job is to sensitize the farmers to trending farming news, new developments in pesticides, diseases and pest controls systems. Through this, farmers are able to stay abreast of any new developments. This is the kind of knowledge I found lacking and it also reflects the same plea by Participant F16, for Extension officers to unite in collective

finding of the diseases and pest outbreaks. And for him the Extension officers are the eye of the irrigation scheme, which I also agree with.

I used the above-mentioned mirror data as a form of double stimulation to trigger high order thinking and reasoning in pursuing modelling of solutions. I was able to figure out some practices and points of dissonance or weakness that were likely to dampen the zeal for farmer education in the system. I critically engaged the farmers and the other stakeholders through the second plenary where we were prioritizing the challenges. But as I said before, farmer education was an emergent theme. When I was given the chance to lead in both the historical and actual-empirical analysis of the contradiction, I managed to break through and consider the farmer education contradiction. In my reflections to the farmers and the other stakeholders in the CLW I said the following:

Researcher: Right, I think most of the issues you raised they are not about management but farmer education. On all you have said its purely lack of farmer education. Where does our major issue lie? It lies in the disposition of the AGRITEX and NVTC roles in the irrigation scheme. I think yesterday we talked about it, if you look at the role of AGRITEX, the main purpose of AGRITEX or what was the main role in the past and you also look at the role of the NVTC or what was the main role in the irrigation scheme. Then if you check from the first-generation period, the roles played by AGRITEX and NVTC you will then start to understand the disposition I am talking about. Then if you ask the farmers from the first generation if they have ever experienced the challenge diseases and pests you are faced with today? Did they never experienced the disastrous locust (1947); did they spend the whole year suffering? But you are suffering year in, year out yet the major issue is on farmer education. The biggest problem is that AGRITEX & NVTC are no longer allowed to play their own role and mandate in the irrigation scheme.

If we give them a chance to play their roles in the irrigation scheme and to give them their role to develop us into better farmers giving us the best farmer education which we require we may also realise that some of the issues we complain about will be issues of the past (marketing education; artificial water shortages). If we get the proper education, farmer education that's where the youth can go for 2-3 months Farming Course. They should be able to learn on the diseases and pests, controller regimes and

so on... so this the role we have taken away from the AGRITEX and NVTC in our irrigation scheme.

AGRITEX is now just a symbolic organisation then, to say the truth about NVTC, I didn't know that they have a horticulture department. I only thought NVTC has building, carpentry and motor mechanics. I only came to know of it because of this research and this may show how a white elephant it has become. So, I think our major issue is on farmer education, but we can safely say poor farmer education.

If you do a careful historical analysis like we did yesterday you will appreciate that poor farmer education is central and interconnected to most manifestations in the irrigation scheme. And one more thing, in the period we have experienced poor farmer education challenge we had another internal problem of many plot holders in the irrigation scheme and most of them being the 3rd generation farmers. Majority of these new plot holders (3rd generation of farmers) have no knowledge and experience of farming. This is where one of our major challenges lies. This is where most of the discord in planting activity arises because most of the third generation of farmers are not knowledgeable. You can now agree with me that because these youths have never experienced proper farmer education, we end up blaming the AGRITEX. But that won't be true because it is also on record that when the AGRITEX calls for meetings there is poor attendance. And those who by chance attend they also learn and leave it in the meeting because they lack commitment to put into practice.

The commitment that I have attended a training or a field day training at Mr. so and so let's form small working groups to further train fellow farmers, is in short. We are just individualistic in mind and doing, putting into practice learned ideas is one of the big challenges faced. The other challenge I found is on following the cropping calendar. If you pay a close look at it, you will realise that one of the biggest enabler forces during the first generation and second generations of farming was a strict observation of the cropping calendar. This was the main reason the irrigation scheme survived so long and progressed that far. We used to know that Nyanyadzi irrigation scheme is short of water and did not surpass September so during the time of plenty all farmers would plant the same crops almost in the same period. After September only one Acre was

allowed per plot, but majority didn't grow anything. Besides the fact that water was in short supply, there was a substantive control of diseases and pests...

So here is the summary of what I learnt, our major issue is on dislocation of the AGRITEX and NVTC from their roles and mandate to the irrigation scheme. If, it's about the NVTC, the truth is we have totally forgotten its existence. Most of the people present in this workshop asked why I chose NVTC for this workshop because it's far from the business centre and we could have equally done this workshop from the AGRITEX offices or Nyanyadzi primary. But I felt the NVTC belongs to us, yet doesn't have our support as farmers. The other thing is their strong connection to our object of crop production and marketing. Lastly, this is where our extension officers were, and are being produced hence, it deserved our mutual engagement. Also remember poor farmer education leads to various leadership and management; marketing; water use and management issues.

The above presented in the Change Laboratory Workshop, was my honest reflection of the contradiction, as was highly informed by my experience as a farmer working with my community for more than 25 years; as a critical researcher mindful of the theoretical framework that allowed me a deeper probe into historical and actual-empirical analysis of the contradiction and which also provided me the freedom as an insider formative interventionist researcher to use my positionality as a vantage and entry point to the community transformative development and expansive learning work. The above reflection opened those pockets of reasoning and envisioning that we underestimated and never cared to explore in the past. The reflections also proved to me how powerful the historicity grounded in the CHAT theoretical framing is in surfacing contradictions. In this case a careful probe and understanding of the historicity and actual-empirical analysis made us aware of other vital mediation tools that are normally never visible yet, extremely critical as pillars to success in many community projects. I realised how education is critical in allowing us to know, act and take up agency of change for the betterment of the society.

With the above reflections we were able to collectively summarise what we thought best described the farmer education contradiction. In the process we managed to develop a particularly important chart (Figure 6.6) and this chart simply described and explained how the

farmer education contradiction came to be and the driving forces thereof. The same chart (Figure 6.6) was used as mirror data and the second double stimulant which served the purpose of envisioning the solutions and betterment of the irrigation scheme. The farmer education contradiction chart is presented in Figure 6.6.

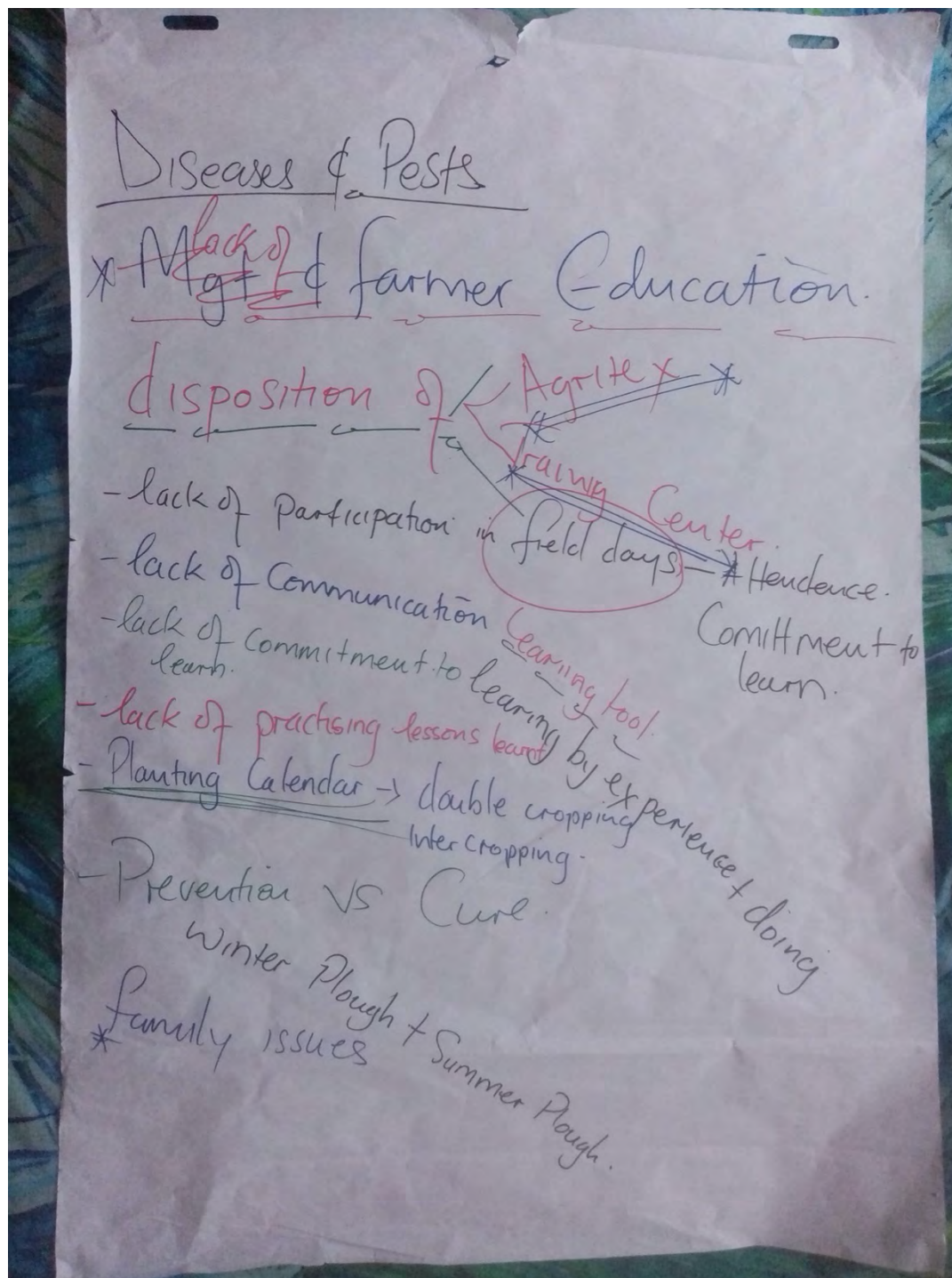


Figure 6.6: Description of Farmer education contradiction

Source: Author

In essence, Figure 6.6 shown above critically describes how the disposition of the AGRITEX and NVTC has led to poor learning opportunities in the irrigation scheme. It highlights lack of participation in the field day as a hindrance and a sign of lack of commitment to learning. Secondly, it also highlights lack of communication, lack of learning commitment, lack of putting lessons into practice (learning by doing) as some of the missed opportunities which are tightly knitted in farmer education. It also referred to issues to do with planting calendar where double cropping and intercropping were considered vital as form of knowledge transmitted in farmer education. As said before Figure 6.6 was used as a double stimulant in the CLW. In the next session, which was part of the envisioning of the future, modelling the solutions that can usher us to the desired future, I build upon the provided double stimulant (Figure 6.6) and I started my reflection introduction as follows:

04:08:45 Farmer education: *Researcher: On this one we said the critical challenge we are faced with is poor farmer education due to the deposition of the AGRITEX and NVTC. We have ignored the roles played by the AGRITEX and NVTC and in the process we have disposition them leading to lack of communication, lack of commitment and lastly, we as farmers we are no longer observing the planting, disease and pest control calendars. So, what can we do on the issue of farmer education?*

Participant F8: There should be farmer training courses.

Researcher: Yes, someone says we should have farmer training courses. One thing that I have seen that troubles most people is donor syndrome. When we call for training, expect an NGO to take them for some expensive training programs, away in some resort places. Yet, we have our own local resources including internal resources such as AGRITEX and NVTC practitioners who have experience in the subject content. We have our own Vocational & Training Centre already which has horticulture department and if we manage to incorporate them into our activity system, we shouldn't be troubled with marketing issues as well.

So, in my opinion the idea said before that we should start with farmer training courses, I also see it as a noble idea. These farmer training courses could be organized training courses. Some could even be one-day workshops, and some could be 2-day workshops and there is a small demo-plot here at the NVTC which you can as well utilize for training purposes and demonstrations. We can also start to envision long courses up to

diploma level through our NVTC. And if you begin from that and maybe in the near future when you are more organized you can as well decide on training in other agriculture courses like apiculture. Many organisations would love to help you in such training areas, and they don't end there but can even support groups or individuals with material and financial support to realise their goals. I will give you a good example of my late brother and project mentor some of you would remember the late Dr. Tichaona Pesanayi, who once did several farmer trainings here in Chimanimani and part of this Ward 6 with Environment Africa. He did awesome job training farmers in sort of skills from permaculture to water harvesting here in Zimbabwe and in South Africa.

So, we can also develop farmer training courses together (farmers) whether horticulture or apiculture and we can also borrow some training materials from similar resource packs. We can also seek training assistance in developing our own training course materials and modules from the Environmental Learning Research Center (ELRC) -Rhodes University where I learn I am sure they can help us in this area because they have been working with farmers and designing some training courses for farmers and communities. Another way to motivate learning will be running certificate courses maybe partnering the NVTC with other relevant associations like ELRC (Rhodes University) ...

So, we can also start to think on approaching them (ELRC-RU) and other important stakeholders (like SAFIRE, Tsuro dzeChimanimni) to collaborate with NVTC to write farmer training modules. I am sure we can also build on the expertise and experience in modules and training manual designing and publishing. We can also dive into water harvesting and drip irrigation systems to especially curb our so-called water shortage issues... we can also start look and learn approach, whereby few farmers can be supported to visit another neighbouring irrigation scheme or farm to learn how they practice and principles to their success... We can as well meet later own as NVTC, AGRITEX and myself to discuss on the training courses that might benefit the farmers.

The above reflection focused on bringing forth a well-articulated and thought of reflection from the previous historical and actual-empirical analysis process. The most important was to suffice the potential in expansive learning as a mediation tool in the irrigation scheme. My second target was to suggest practical ways in which learning process can be facilitated and be

accessed to all the farmers in the irrigation scheme. Lastly, I wanted the farmers to later work on their own models that suffice their needs. So, my reflections were suggestive in nature and still leaving space for more options and considerations. Working out of this activity we together with the farmers and other stakeholders produced a summary plan we hoped may be the right steps towards promoting farmer education in Nyanyadzi irrigations scheme. The chart is presented in Figure 6.7.

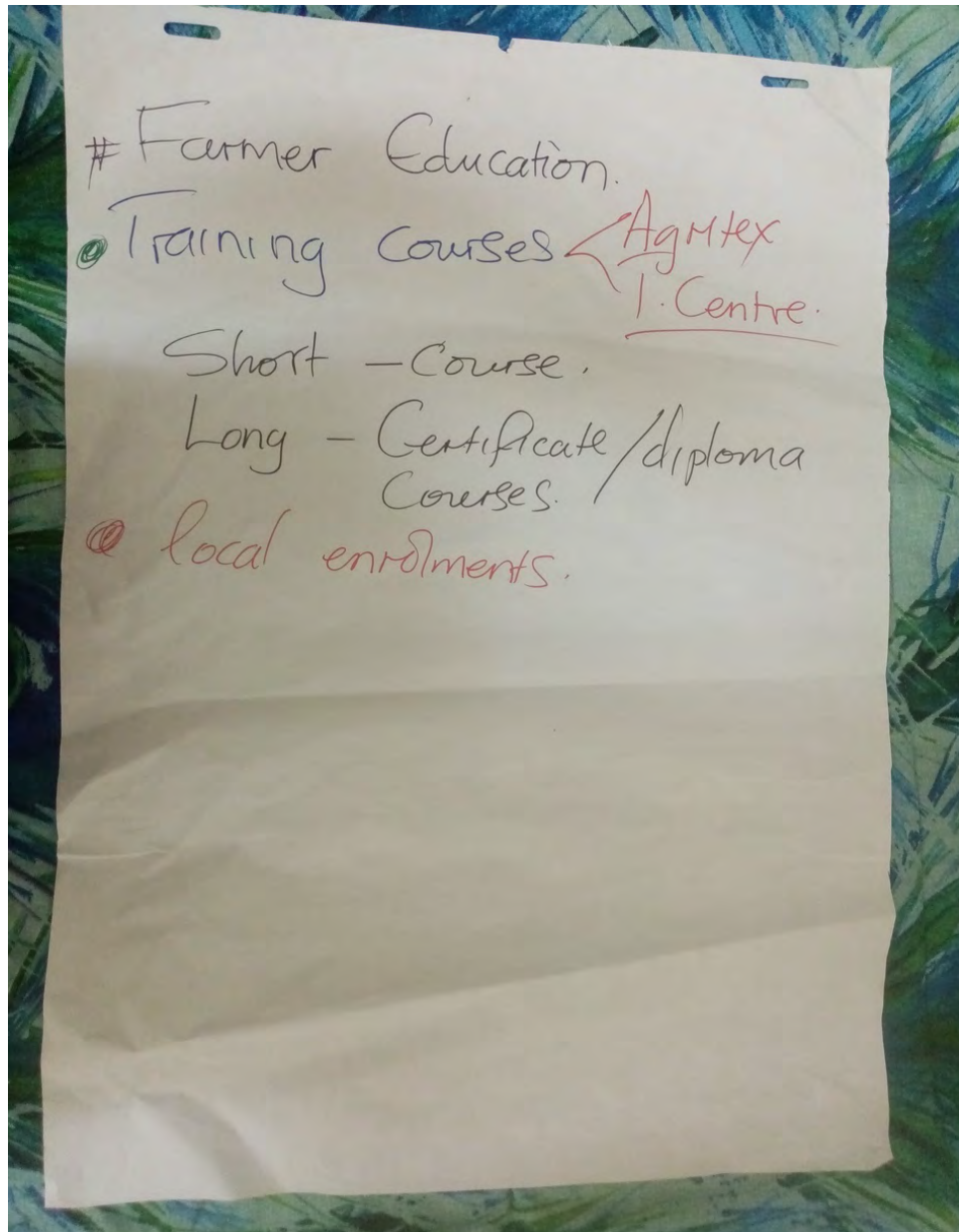


Figure 6.7: Farmer Education Solution model

Source: Author

Figure 6.7 show the resolutions reached in the CLW regarding the farmer education contradiction. The above model of solution was a result of the Expansive learning process the farmers and other stakeholders were engaging in. This show some commitment to transformative change and is evidence of emerging agency. The summary of the Expansive Learning Process (ELP) on farmer education and training is given in Appendix X.

As seen from the table above ELP was a process and it involved deeper engagement with the contradiction and a better understanding of the contradiction in order to reach desired solutions. In the study, the ELP was not an end but a mediation tool to make us reach collective solutions. In the CLW a solution model was agreed upon and summarized in the Table 6.2.

Table 6.2: Farmer education and training inner contradictions and the solution model.

Contradiction	Inner contradictions	Proposed Action	Time frames
Farmer Education and training	Farmers lack crop planting calendar knowledge Farmers lack disease and pest control knowledge. Disposition of the Farmer education and training organs AGRITEX & NVTC in the irrigation activity system No/little local enrolments at the NVTC - Horticulture department Poor farming knowledge by the third generation of farmers	There should be farmer education and training programs: • Farmer education and training courses – short courses -Long courses - Certificate/Diploma course • Utilise local available resources for training purposes i.e., AGRITEX & NVTC practitioners as training facilitators. • Utilise NVTC as a host for the training courses & demonstration purposes. • Partner/Collaborate with other relevant and interested organisation i.e., SAFIRE and Tsuru DzeChimanamani in further training programmes. • Collaborate with expert organisations like Universities i.e., ELRC-RU in training modules and manual development and publications • Borrow related training course materials from other organisations i.e. ELRC-RU • Researcher, NVTC & AGRITEX to further sit meetings to plan farmer education and training programs and materials. • Encourage and support youths to enrol at NVTC horticulture department	Farming year 2020 after engaging with other absent farmers

Source: Author

Table 6.2 shown above describes the inner contradictions as well as detailed proposed actions that are to be systematically put in place and implemented in the irrigation scheme. The idea is not to achieve all at once but is to focus the above in due course and promote better farmer education and training processes that are feasible and effective.

6.3: EXPANSIVE LEARNING PROCESS (ELP) IN RESPONSE TO THE CROP MARKETING CONTRADICTION

Just like in the above case, poor marketing is one of the challenges reported from the beginning of the study but in the Change Laboratory Workshop (CLW) the Expansive Learning Process (ELP) was not linear nor cyclical as depicted in the ELP cycle (Engeström & Sannino, 2011). The poor marketing contradiction is much grounded in the historicity, so was the ELP. Lots of mirror data from the ethnographic data was used as mirror data in the ELP thereby, providing the important double stimulation process necessary to untangle, understand and envision the better marketing strategies for the betterment of the irrigation farming. Like in the case of the previous discussed contradiction (farmer education), the marketing contradictions was not highly prioritized from the beginning but through the double stimulation, historical and actual-empirical analysis it became one of the vital activities in the irrigation scheme. Because of the nature of the contradiction its principles and understanding were a bit far-fetched to many farmers and other stakeholders. Hence, the researcher had to utilize the possibility in the CHAT theory through the insider formative interventionist approach.

The community itself expected the Researcher as an insider formative interventionist and one of the third-generation farmers to lead with practical ideas and solutions. Like before, as an insider formative interventionist researcher working with my community of more than 25 years of engagement (see Section 3.1.1), I led the expansive learning process but mostly working out of and through the mirror data, by double stimulation and my personal experiences.

The mirror data drawn from the three generations of the farmers' interview narrations that showed one of the biggest challenges faced by the farmers is poor market(ing). Issues to deal

with poor marketing was a manifestation of poor farmer education and the political-economic environment. I started by a recap of the previous discussions (mirror data) and revisited to the initial chart we collectively put together in an attempt to describe and explain the marketing concerns in the irrigation scheme. The mirror data drawn from the ethnographic data from fifteen interviews with three generations of the farmers together with the historicity of the object deliberated in the CLW became the first double stimulant in the CLW. The chart developed in the CLW become the second double stimulant (see Figure 6.7). Double stimulants described above, became our main mediation tools that ushered us into a critical questioning phase where we reoriented and related to the historical activities around and governing crop marketing in Nyanyadzi and Zimbabwe as whole. In essence, we were trying to find relevance in the current activity by comparing it to the historical events, practices and achievements from elsewhere. Furthermore, we were also trying to find niches and further connections of this activity with other activities in the irrigation scheme. This describes the first phase of the ELP with the farmers and other stakeholders.

I will then begin by presenting the main mirror data from the ethnographic work and explain how it was used as part of the first double stimulation process in this study. The challenge of marketing was highly mentioned from the onset in the interviews with the fifteen farmers from the three generations in Nyanyadzi irrigation scheme. Narrations drawn from the ethnographic data are as follows: Interviewee FGI 1 when asked about the challenges they faced in the irrigation scheme he said,

challenges were there of course, number one, there was no cash crop that could generate income... it was just maize you could sell and some other crops like beans and tomatoes no one would buy them. But with time around 1960 to 1970s that's when we saw contractors coming with seeds they wanted to be grown. We started growing sugar beans and tomatoes for Cains company around 1960s... things started to normalise the year (1962) we started to grow seeds provided by Liebig's canning company in the irrigation scheme. That's when we started to realise better profits because they would buy the green beans and the pawpaws, they would have provided us with the seed. These two crops had a better market, every week we would make money after delivering the paw paws and green beans we were getting paid...

Researcher: looking at the period after independence (1980) are there any new developments happened in the irrigation scheme up to date?

FGI 1: Yes, there were some new developments the farmers were given farming inputs such as seeds like beans, sugar beans and maize but the marketing we had to our own and we had new crops like cotton, and tomatoes.

Researcher: So was there a better market after independence?

FGI 1: The market was now open after independence, but in the past (prior to independence) it was more closed but after independence it was too open but very difficult and it was because, as we were about to get independence we were under the British sanctions (1965-1970s) (after Ian Smith declared the for a Unilateral Declaration of Independence (UDI) in the Southern Rhodesia from the British government). During the Smith sanctions no exports were allowed and shortly after there was the First and Second Liberation wars but during these difficult times the market of the green beans, we used to grow also disappeared... most of the plants we used to grow (prior to independence) also disappeared. The only new crop that was tried to be introduced by Sun roil company was the paprika but never succeeded the company was no longer paying good.

Interviewee FGI 5 also added the following in terms of marketing challenges,

... yes, marketing is one of the biggest challenges the farmers are faced with. Marketing has tossed us, like I previously said we would sell the beans way before harvesting but now there nothing like that, no market at all.

Researcher: What went wrong?

Interviewee: There is nowhere to sell them, the companies have closed or downsized. That is the biggest challenge to the farmers. We are now supposed to do own market research, and the farmers who grow perishables like tomatoes have to transport them to Mutare 100kms to sell their products... yet when we started farming, we used to sell to Cains company. No one would transport boxes of tomatoes they would come to buy and transport on themselves. This has just started recently because no canning companies are still operating as they all closed.

Critical issues to be learnt from this mirror data and historical analysis shows that the marketing in the past was better. Then the critical question I had was why, what were the driving forces or factors contributed. The second set of mirror data showed how the political and economic environment shaped the marketing activity. There is an issue of coordination, FGI 1 said the

market system was very closed meaning few operated or controlled the marketing systems of the irrigation system. FG1, described the current as too open yet exceedingly difficult to work in. Thirdly, they raised an issue of contract farming which provided a readily available market, hence this is what Interviewee FGI 5 meant when he said we could sell the products way before they are harvested. They were contract farming hence by engagement there was guarantee that all the produce would sell and Interviewee FGI 1 reported the period around 1962 as being the most profitable and individual development because of the green beans and pawpaw contracted to Sun Roil company.

Further historical analysis also showed the issue of routine/crop rotation farming as a better marketing strategy. Interviewee FG2 6 explained,

during the precolonial era most of the farming activities were systematically organised unlike what we are now doing. For instance, by this time of the year there would be maize and cotton in the fields and you will be only allowed to grow small portion of groundnuts because it wasn't considered a cash crop. So there was a well-defined and systematic crop rotation, the next season after the groundnuts and cotton we would know we are planting beans and wheat. There are some crops we were not encouraged to grow like okra and tomatoes, but they still succeeded because there was the market.

Researcher: Who was responsible for marketing your crops?

Interviewee: Marketing was done, we didn't know the prices, but we were just told to grow for example beans.

Researcher: Who?

Interviewee: Our Extension officers, would encourage us to grow beans because they are in demand. There were some other companies who would request us to grow for example beans for them and they would come to buy. For instance, Victoria foods, the National Foods, Blue Ribbon would request Nyanyadzi irrigation farmers to grow beans for them so, there was a ready market already. Unlike, now we are just growing without knowledge of where we are going to sell them.

Lastly, an interview with Interviewee FG3 15 revealed the following,

... marketing of the produce is affected because of the economic hardships currently prevailing in our country. You find that for example beans, all major leading food processing companies like National foods, Blue ribbon, Victoria foods used to camp in

Nyanyadzi buying tonnes and tonnes of beans giving fairly prices in past. But now because of what is happening in the country economically, they are no longer coming and what it means now is that there is open informal market. The informal buyers come all the way from Bulawayo and Harare buying small quantities for resale in the local markets. So, they offer little prices and out of desperation the farmers accept to cover some necessities like paying fees for the school children and replenishing drying up household food stocks resultantly they don't break even.

Another important issue I learned from the above narrations, is the issue of market promoters. The farmers were not aware who does the marketing nor the prices of their output and would be advised by the Extension officers. In this case the Extension officers were their market promoters and did the market research and chain value management. The farmers knew how to farm and nothing beyond that. So I learnt as well through this historical analysis process. Lastly, FG3 15 raised the issue of marketing economics where he claims most of the farmers are failing to break even and again blaming much to the economic meltdown in Zimbabwe. All these lessons helped me to understand the nature of the contradiction I was dealing with, understand the socio-characteristics of the farmers I was dealing with and lastly, to envision the ideal marketing system for the irrigation scheme. In the CLW these narrations were spelt out as the first double stimulation. Later, the historical analysis also helped the farmers to reflect on practical experiences drawn from the familiar context so as to make meaning in a familiar environment.

With the ethnographic mirror data described above I engaged the farmers in an Expansive Learning Process (ELP). The mirror data became the first double stimulant to me the researcher and it was used in the plenary session to guide, frame the marketing contradiction spelt out the CLW. The second double stimulation process was through the critical questioning system. The farmers, as mentioned above, were split into respective plenary groups where they were asked to discuss and list the challenges they were faced with. Afterwards the participants were asked into the main group to present and discuss the challenges faced. This activity was an eye opener and a form of double stimulation process itself. The participants had to draw from their historical lived moments and experience, draw from actual practices, challenge the driving forces that shape and fuel these challenges. The critical questioning itself as a mediation tool wanted to achieve clarity, better understanding and collectively frame the contradiction

experienced based on the manifestations presented in the activity. Hence, the critical questioning became the mediation tool and there were many historical artefacts, lived experiences, stories, examples the farmers drawn on to describe and clearly explain the experienced manifestations. This way it was easy to collectively reflect on the narrations in one accord.

In essence, in the first plenary session with the farmers and other stakeholders it was interesting to realise that poor marketing was singled out as the 2nd challenge in the session as reported by Participant W6. It was contextualised as follows,

01:06:15: No. 2. **Informal Market-** *informal traders are the ones coming to buy our produce. So they buy for exceptionally low prices but only if we can find some interested formal traders whom we can engage in contract farming with we may profit better.*

Linked to poor marketing is also 01:07:28: No. 4. **Lack of crop diversity.**

Participant E3: ... by crop diversity we mean, in Nyanyadzi irrigation scheme you grow one crop (monocropping) for example, you only grow beans and tomatoes as main cash crops but if we closely look you are not making huge profit margins. Let me give you another example Mr. Mukome... he grows garlic and is profiting a lot because he diversified from what is grown here.

Interestingly, on the Q & A session none of the participants asked anything related to the points raised on marketing. However, when it was the farmers' turn to present their challenges, marketing was reported fourth as follows,

01:44:44: No. 4. Participant F13: **Marketing of crops-** *tomatoes, beans and other crops. There is informal trading, we don't have a market to sell our crops timely. Let's say I grow beans where to sell the beans is the challenge. There are no formal buyers and not even marketing support from the government hence, we are clueless...*

Participant E3: ... then there is another issue I want to comment on that was raised earlier on. It's the issue of informal market, I think few years ago we used to see companies like Midlands Buyers, Gloria, Victoria Foods, Blue Ribbon coming to buy beans... there was no informal market, and you were paid cash... I think we had forgot this point, that there is no liquid cash in the market system hence being a rural irrigation scheme transacting electronic money is a big challenge... Selling on your own it's still

a loss because you still want to 1) hire people to harvest the tomatoes for you, 2) buy packing cardboard boxes 3) hire transport to ferry your produce from the fields to the bus stop 4) hire a truck to ferry your produce to Mutare, Sakubva market place... Grant and company still become your Sales Representative charging you as minimum as Z\$2:00 per box to sell the box of tomatoes for you... sometimes Z\$5:00 for every box sold... for around 20 boxes $\times$ \$5 = \$100 for free... I call for the government to call upon the local companies to support local communal irrigation schemes like Nyanyadzi.

The three issues raised above were brought into the questioning phase in the CLW. It is important to highlight that three major manifestations namely, “*informal market, lack of crop diversity and marketing of crops*” were used to describe what seemed like poor crop marketing contradiction to me. In their presentations the presenters drew a lot from the historical analysis, personal experiences and compared to these present situations. This movement of comparing the past to the present convinced us that there was a contradiction. The intervention by Participant E3 provided further explicit description and explanation on the poor crop marketing manifestations. One thing that struck me most from the actual-empirical analysis and examples given, was the transformative agency embedded in the words and essence of action in the used examples. For instance in the incident of Wallace the informal trader (mentioned by Participant E3) what struck me was how the example was used to explain mistreatment and being taken advantage of but, in the double stimulation example I see the issue of market protection and I then later used Wallace’s double stimulation story as mirror data that triggered how the farmers may derive means to protect their own market from infiltrating informal traders.

In order to pursue and probe the marketing contradiction further, I engaged the farmers and other stakeholders with critical questioning as follows,

Researcher: okay in the situation that the government did not support through marketing the farmers’ produce, as farmers what are you doing to support your own market? What I am trying to mean is that do you realise how Wallace and Grant protect their market in Mutare. Instead of letting you, do business they do all in their power to protect and even become your Sales Representatives because you have come with your produce to their workplace and that’s where their livelihoods depend on. So as a farmer what are you also doing to protect your market and become just the farmer and not both the farmer and the trader. This is because in the field that’s where the farmers

know best am, I lying Mr. MK. You grow your crops and send to Cains company and get paid and you return to the field... whatever they do next, it's none of your business. So as a farmer what are you doing? That's my question to you all.

Participant F16: ... as farmers we started a Marketing Committee. The Marketing Committee represents us in meetings. The Marketing Committee is only said to be seen representing us in meetings, but what I am not sure is whether have managed to source out formal traders/buyers. There were some Mozambiquean traders reported to have visited Nyanyadzi recently, but they failed to negotiate with the buyers to buy their lots from Nyanyadzi... The Marketing Committee was formed recently.

Researcher: As farmers what stopped you from exporting your produce to Mozambique?

Participant F16: To export to Mozambique? The communication would be the greatest limiting factor unless if we had a committee that would go and negotiate, I think what is only needed is proper communications.

Researcher: So do you see where our problem lies?

Participant F16: It's on all of us farmers we are not taking any initiatives. But we must mostly look towards a functioning committee because if you are said to be a committee it means you are representing the whole community. So they are not putting any effort or doing any initiative, they are just a committee by name.

As shown in the narrations above, Wallace and Grant's story stimulated further reasoning and visioning of the future activity. In addition, the double stimulation opened the participants' horizons of understanding and engagement in critical questioning phases that was critical in understanding the contradiction from the now and the past. This helped the farmers and other stakeholders to positively critique forces that influence and advance marketing challenges. This resulted in the farmers and other stakeholders becoming critical of their own present practices which formed into the actual-empirical analysis of the contradiction. New ways of understanding were realised and better ways of doing were reviewed. As shown below,

Participant E3: Yes, I agree with Participant F16, let me explain to you this committee from my understanding was not chosen by the farmers. It was appointed by a Politician along political motives and belonging so as long as it's an appointed committee it doesn't work well. Farmers are supposed to elect or vote for the rightful farmers they want because if you were to look, the Cooperative buildings are dilapidating, yet the

marketing committee is available. So the question posted by the Researcher that, what are you doing as farmers is extremely critical. If the Marketing Committee in place is not functional then you are supposed to remove it and elect a functional one with the farmers of your choosing.

Participant F4: from my own opinion, it's not the problem of the committee but I have realised that it is the problem of the farmers. It is the problem of intermediators, if buyers come to Nyanyadzi by the end of the day they would be farmers who wrongly advise giving them low price guidelines. So I want to believe that the Mozambiqueans mentioned, if they come back they will come with good offers but when they want to buy from other individual farmers they would be advised to pay a bit little... so farmers in Nyanyadzi are full of jealousy and are cruel... if we closely look at it, if the informal traders were not gazetted low prices by our own cruel farmers we would be profiting because informal traders are equal traders and what we value is the money not the profession.

Issues raised above by Participant E3 on acceptance and functionality opened my understanding very well. I started to realise that despite the presence of a marketing committee what is more important is whether it is accepted and the farmers ready to support it. And the above conversation showed that the initiative of putting a marketing committee in place can only be possible if the committee is chosen and put in place by the farmers themselves. So the contradiction in the initial activity was on the selection procedure as well as the motive, not on the idea of having a representative committee. If this succeeded, then the issue of uninformed representatives reported by P4 could also be dealt with. From this discussion I realised that the uninformed representatives are a manifestation of uncoordinated marketing that is happening in the scheme. If there was coordination towards price gazetting and the marketing process all this couldn't happen. The further discussion also revealed important lessons as follows,

Participant F13: The problem I have noticed is that, of course crop marketing could be a problem, but the challenge starts with the farmer. A farmer grows his crops let's say tomatoes and after harvesting he ferry his produce to Mutare for marketing and the IMC and the Marketing Committee are not involved for whatsoever reason in the process. Now if he/she arrives at Mutare marketplace looks for market of the tomatoes from the buses and resident buyers. The buyers respond "we are interested in buying the tomatoes but not the Rio Grande type" yet, that's the ones you have.

Researcher: Right, you are coming back to the Extension Officer's point....

Participant F13: Yes, because I was born here doing the same and we knew once a crop is grown goes to market at once than, what is currently being done, that each farmer grows his own or unique plants.

Researcher: The other thing is you don't involve the IMC in planning your crop calendar.

Participant F13: The problem is that in the past we were told what plant to grow...

The issues raised in the above discussion show a fragmented activity and it has become difficult to market because there is no unit of purpose and collective marketing is difficult. The second issue is market research farmers are just growing without a proper market research and again it come back to the previous discussed issue on the need of Marketing Committee. The third issue is failure to have a proper coordinated cropping calendar. Therefore, Wallace and Grant's double stimulation also helped to illuminate some of the practices that are going unnoticed yet are very influential in group marketing. Such practices were also mentioned above and earlier on, and they include uncoordinated crop calendar and experimental varieties without proper market research. I therefore, used the reflections above stimulate critical envisioning of future better practices with the farmers and other stakeholders in the CLW. In my reflections in addressing and trying to unpack as well as understand the crop marketing contradiction I introduced my third double stimulation tool in form a scenario of marketing at OK supermarket and it unfolded as follows:

Researcher: In short, we are coming back to the point of the Extension officers that you are now doing your own things... and the issues is on competition to be the first to harvest and avoid market competition. Yet, group marketing is easy. I was discussing with one farmer here and I said do you know that if you come together as farmers and approach OK Supermarket there is infinite market, yet you still complain that there is no market. If you approach OK Supermarket, they will tell you that they accept farm supply tenders from registered farmers. So, what can deny you to just produce 3 tonnes of tomatoes and approach OK Supermarket with your registration documents and you are allowed to supply...

Participant F13: The standards of our products could be a challenge. The reason being that we can't produce the same quality and same levels... what is happening is that some farmers invest more ... what was nice about Cains is that it took from everyone whether you have 2 boxes, or 4 boxes.

What was so interesting about this questioning phase was that the farmers and other stakeholders become more critical and open to criticism. Some of the comments as shown above were self-blaming in nature and this is a sign of self-reflexivity and reframing of the contradiction. Interestingly, when I worked with the second double stimulation tool (Wallace and Grand's story) to pick up on the third double stimulation tool of OK supermarket, the farmers started to assess their own product for quality, presentation and consistence. It was the first time in the CLW that issues pertaining to the quality of the product were discussed and it was even linked back to the enabling factors which are farming inputs like fertilisers. In essence, as OK supermarket is one of the best retail outlets with a high standard with a vast customer base, the farmers didn't doubt the availability of the market, but started to frame quality standards that may be acceptable. So for them it's not about market anymore but inconsistency in product quality. It was also interesting how the farmers did not bother about issue of registration but worried about the quality of the product. The main purpose of the third double stimulation was to widen the farmers' knowledge and horizon on marketing. It was to challenge them to think beyond normal marketplace but be innovative in their seeking of solutions. So the third double stimulation opened many ways of seeing and doing that were never thought of in the irrigation scheme. A summary of the marketing contradiction was collectively mapped on a chart shown in Figure 6.8. This chart became useful in reframing the activity and in seeking solutions. The chart was contextualised successfully as the fourth double stimulation tool in the CLW.

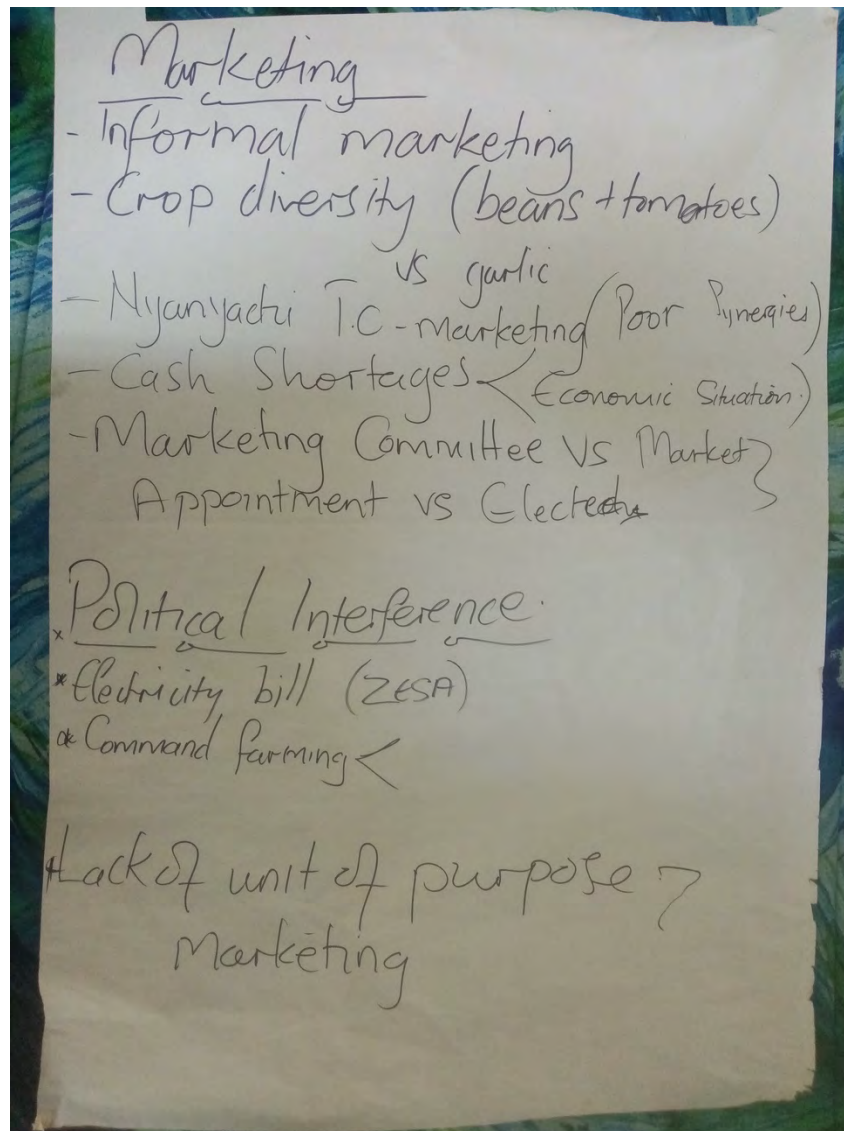


Figure 6.8: Marketing contradiction

Source: Author

As said before, Figure 6.8 was applied as the fourth double stimulation tool in the CLW. The Figure 6.8 above reveals critical manifestations such as informal marketing, poor crop diversity, selection procedure of the Marketing Committee- appointment vs selection, lack of a unit of purpose among others. These manifestations were carried with us into Day two of the activity which focused on examining the marketing contradiction activity to better our understanding and widen our horizons on the contradiction and its likely impacts. In practice the examination process oscillated between the historical analysis and the actual-empirical analysis of the contradiction. To me it was a learning curve, I had to lead and learn, reflect on the process and advise the farmers of the options available where I could and listen carefully

to option held being put forward by farmers. In essence, the researcher introduced the activity of the day and used the Figure 6.8 as a recap of the previous critical questioning process and to summarise the manifestations of the crop marketing contradiction. The researcher led the proceeding as follows,

*00:40:09: No. 2. **Informal Market**- lets frame it as poor crop marketing, so as we looked at it through the historical analysis yesterday. Can we relate where our real contradiction is? All these other issues we are raising like informal marketing for example, are all manifestations of poor crop marketing.*

Participant F16: I would say poor advertisement of the produce and the irrigation scheme.

Participant F4: On marketing the real problem is on that we used to have Cains, National Foods, Victoria Foods who used to buy our produce and these companies are no longer coming so we are only left with informal traders... and its mostly because of the economic situation most companies have closed.

Researcher: So, there is no longer contract farming plus difficult economic and political environment.

Participant F14: On marketing again, we no longer have external buyers and we no longer exporting our produce.

Participant F6: ... we once referred to the farmers, they are not honest...

Participant E3: Yes true... there was one buyer who wanted to promote contract farming of beans... but he said Nyanyadzi no because if you give Nyanyadzi farmers inputs you are on loss instead of owning the agreements they sale the produce to other buyers. So Nyanyadzi are untrustworthy, not only Nyanyadzi but, most of the irrigation farms.

Participant F14: Researcher lets refer to the historicity, how was the market in the period of the first generation of farmers...

Researcher: In the first period there was poor marketing they only had surplus maize for sell.

Participant F14: let's move to the next period, how was the market, was it supported by the Cains, National Foods?

Researcher: Yes, this period market was very good.

Participant F14: Market so the period was good, and the dealers/traders could also contract farmers through provisions of inputs, right?

Researcher: Plus, there was Nyanyadzi Cooperative which gave farmers credits and loans in form of inputs. The market was through contract farming on pawpaw and green beans.

Participant F14: So, what made contract farming to collapse and give in to informal market?

Researcher: There are two issues Poor political environment -there was the UDI declarations which brought in the Smith's sanctions and then came the liberation wars (Chimurenga 1 and 2).

Participant F14: ... but informal market is not the beginning in itself, let's say Mr. Majoni approaches me with beans seed and we agree to sell him at \$5 per kg at that time and Mr. Mukwambo come during the harvest time and offers the same beans \$8 per kg. Mr. Majoni who gave me the beans seed and offers that \$5 agreed long then, as a farmer what am I going to get as a farmer, that's where I end up looking for a better market offer despite previous contract. The budget won't allow because the prevailing circumstances at the time of agreement and by the time of harvest would have totally changed hence as a farmer, I would prefer a win and win situation to owning the first contract at a loss.

Researcher: What exactly do you mean?

Participant F10: If we look carefully, for the market to be viable the economy has to be stable. So, even these other companies we name them, National Foods and others they would love to come here and buy the produce but there is no liquid cash to do so. So much of our poor market is caused by the unstable economy.

Participant NV 11: Still on marketing I have also realized that most of the farmers just copy when they are growing their crops. We can't do market research ... Last time it was pathetic when farmers would barter trade tomatoes for a bundle of firewood... So, a real farmer must know that during the preparation stage he has to do a market research then grow the best crop with ready market. But most of us farmers, we just follow and realize on the last minute that there is no market for that crop.

Participant F10: What I have heard about the market in the second-generation of farming is that time for beans Nyanyadzi would be asked to produce so much tonnage not like now. I don't know where the Extension Officers would do their meetings and will come up with the proposals for Nyanyadzi and would advise us to plant so many hectares of beans and same applies with cotton. That is what was happening in the

second generation of farming phase but now a farmer just grows what he wants and of his understanding (from collective object to fragmented objects). But long back we had people who represented us and would advise us even during the peak season of farming they would come and advise if there are any farmers who want to grow a certain crop, we want so many tonnes. Farmers would grow the plant knowing that there is a ready market, so, the market was researched not because it's an individual who wants it but because it was their duty to conduct market research for us...

The above critical examination of the contradiction revealed the following critical areas needed to be focused on namely, marketing strategies, informal marketing, market research, market management including value chain management, value addition, contract farming, fragmented activity system, unfunctional Marketing Committee, among others. In a wrapping up the examination of the contradiction activity the researcher was given an opportunity to critically reflect on the proceedings during the examination of the marketing contradiction as well as personal experiences. The researcher started as follows,

*Researcher: ...what I have noted in Nyanyadzi irrigation scheme is that there is an issue of lack of representation and lack of value addition. So, the first issue is **Lack of representatives**: the real challenge is on poor marketing strategies, ...we don't have a Marketing strategist... this is person responsible for market research and this is the person we don't have, and another duty is to manage our value chain including value addition initiatives. Value chain management shows that the farmer is the primary producer and other respective eutrophic levels follow. But now we are now found in the field producing the crops and we are now partaking in the selling of the produce... So, the market strategist is our main challenge. Instead of focusing on local market economy we should be exploiting export market or international market. You said "in the past they would come and say 200 tonnes of beans is needed" it is the same person we are lacking ... someone was managing your value chain....*

The other challenge is on trust... after the contractor gives you seed, fertilizers and wait for you for 3 months and when he come to buy you change your mind. Yet, he entrusted you with his investment and wait for that long 3 months and that trust erodes because of a \$0.50. You would have agreed if he/she gives all the inputs, he/she will buy at \$2.00 but, because someone else who didn't even give you anything offers you \$2.50 and you breach the contract. If you sit down and calculate the value of seed,

value of fertilizer you would realise how much wrong you are. This is one challenge I realised and it can be all linked to the lack of the Market strategist we talked about. And failure to get the Market strategist we end up on another manifestation of poor crop choice. We end up confused and we don't know what to grow hence individual farming succeeds which may later lead to fragmented object because we don't have the rightful personnel who go ahead of us doing market research and advising us accordingly. The Market strategist has to work hand in hand with the Extension officers and be advisory to both the Extension Officers and the farmers... so you will find that most of the farmers will grow the crop on demand and with a ready market. So, the market will be there already no need for individual market search and this Market strategist shall negotiate prices for the produce since, he/she will be managing your chain value as well so it will be easy to determine right prices.

Then another way to deal with unstable economy would be to use US\$, so all the agreements will be converted to US\$ because it's one of the stable currencies. So, in essence, that's the task we have to look for that person so that most of our marketing troubles could be resolved.

My reflections influenced the farmers' critical reflections and the building up of the chart Figure 6.8. It is important to mention that, as we were critically questioning, examining and critically reflecting on the contradiction we were collectively building up a chart that summarises, describes and to some extent explains the contradiction at hand (see Figure 6.8). However, instead of moving straight into the solution model, the farmers moved a step back to re-examine the facets of the contradiction again. In essence, we moved between historical analysis and actual-empirical analysis of the contradiction in the next activity. The point to make here is that ELP is never a linear nor a cyclical process rather it forms and unfolds in many ways. Sometimes as the formative interventionist researcher I wondered whether we are heading the right way, whether the process is back and forth like this and sometimes I felt like we are stagnant, we are in a repeat. Yet, it was a process of resurfacing, rediscovering and understanding the difficult scenarios which from an abstract perspective may look easy and straightforward, but in reality, were complex. It was also a process of challenging own frames, critical reflexion and constant struggle to figure out the truth and reality. In essence, the back and forth was necessary and important in understanding the contradiction at hand.

Soon after my reflections on the crop marketing contradiction and modelling of new solutions the farmers critiqued their own practices and went further into the historicity in an attempt to understand and figure out the best model solution to resolve their crop marketing challenge. The discussion was as follows.

Participant F10: So, this is the person we must look for... but to take you back were the prices also different with contract farming.

Researcher: Yes, they were different for instance some could be buying at \$1.50 others at \$1.75 and another could be at \$1.65 plus packing bags.

Participant F6: Difference of \$0.10.

Participant F9: So one thing I picked it seems as if the farmers are not much interested in contract farming.

Researcher: No, they don't understand it.

Participant F9: They don't know? Why I am saying this it's because more than 5 years ago there was a Whiteman who wanted to engage Nyanyadzi farmers on paprika farming. The farmers only became aware after realising how Birchenough irrigation scheme was prospering from paprika production.

Researcher: Yes, a careful analysis will show that it's also about poor farmer education. And it's because of the fragmentation that current exists between the farmers, Extension workers and the NVTC... resultantly, there is no unit of purpose, and at the end of the day we cry of the market and we don't even put value addition. Value addition simply means adding some importance to the product. As farmers we never thought one day, we could start our own small industry canning beans putting our label of the Nyanyadzi irrigation scheme and sale. If they are tomatoes, we can process and tin them with a beautiful label written Nyanyadzi... but because we rarely think of it, you may realise that we have some NGOs like Tsuro dzeChimanimani they are based here, and they do have offices here in Nyanyadzi, but I doubt if we are benefiting from their value addition processing.

Participant F16: They are no longer doing; we are not so sure why they stopped.

Participant E3: You have talked about issue of value chain management and value addition at Tsuro DzeChimanimani, they are now much concentrating on apiculture (honey) and cream of tartar... There is another project supported by the SAFIRE in Chapanduka area in Buhera they build an office for the locals to pack, label their honey and sale to supermarkets.

The farmers were intrigued with the idea of contract farming and wanted to further examine the possibility from understanding its historicity. Secondly the farmers showed much interest on value chain management and value addition proposal. Suggestions and examples were given to further stimulate their decision-making processes and access to more marketing initiatives. The examples by Participant E3 on value addition by *Tsuro DzeChimanimani* honey and cream of tartar as well as the *Chapanduka* project in *Buhera* which is being supported by the SAFIRE became the sixth double stimulation process. Interestingly, the envisioning of value addition in Nyanyadzi irrigation scheme was also Alvord's prime intention as argued by Bolding (2003:145) that,

as usual, Alvord had bigger plans in store. The basic idea, as proposed in 1943, entailed the integrated development of a waterpower plant and cart factory. The plant consisted of a 56 horsepower turbine to generate power for all sorts of industrial enterprises, such as a sawmill, a grinding mill, oil pressing equipment, alcohol production, fibre extraction from sun hemp, and the cart factory. The latter aimed at the production of scotch carts for African use all over the country..., Alvord envisaged the framing of African cart makers at the Nyanyadzi factory.

Although not in the same logical framing but the idea of having a factory in Nyanyadzi covering all sorts of value addition work was envisioned.

As mentioned earlier the above discussions and researcher's critical reflections aided in the build-up of the chart in Figure 6.9 shown below. The chart was represented to the farmers in the next solution modelling session as the sixth double stimulation and mediation tool. The main aim was to re-orient the farmers and other stakeholders to critical issues discussed earlier on and prioritise for the purpose of coming up with a collective solution model.

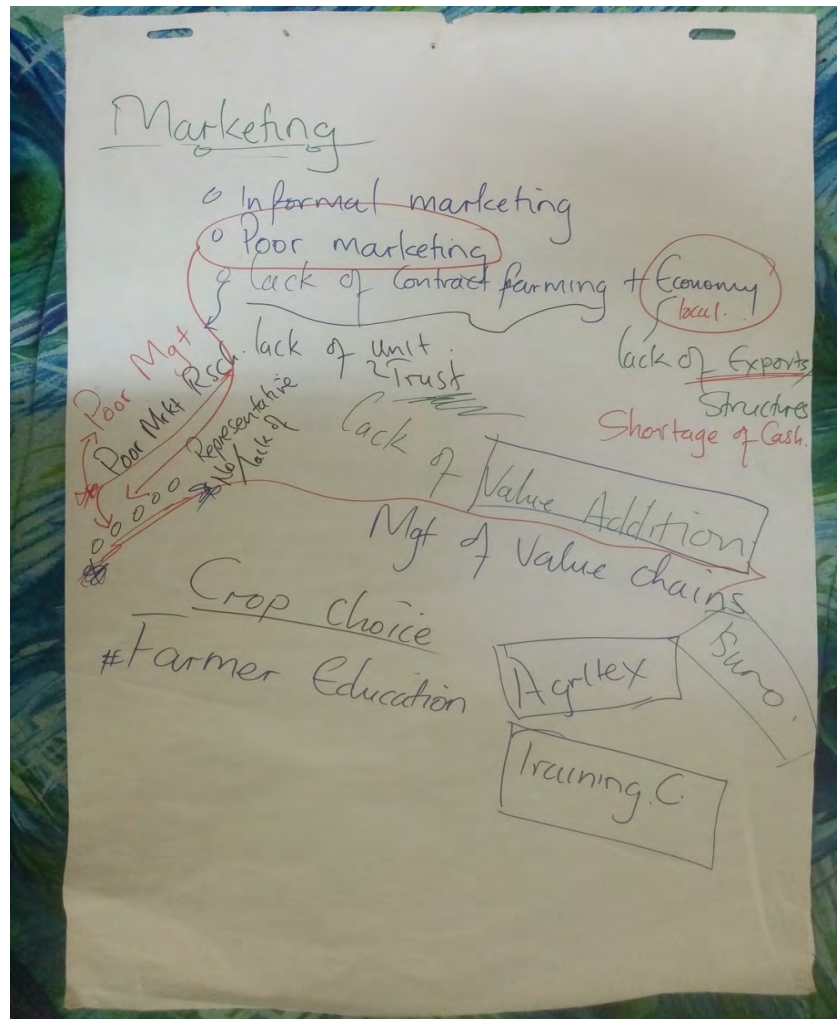


Figure 6.9: Crop marketing contradiction

Source: Author

In Day 3 of the CLW, the researcher introduced the farmers and other stakeholders to the last session of the poor crop marketing contradiction. The last session was aimed at devising strategies and solutions to the current crop marketing contradictions. The researcher engaged in a recap to the previous sessions by referring to the Crop Marketing chart shown above in Figure 6.9. As mentioned earlier on Figure 6.9 above was introduced as the sixth double stimulation and mediation tool. Like in the previous farmer education contradiction the farmers expected the researcher as an insider formative interventionist and one of the third generation of farmers to help them with the solutions and to lead the solution envisioning process. This I did through self-reflection and suggestions of probable solutions and strategies to deal with the poor crop marketing contradiction. I began my self-reflections as follows.

04:15:03 **Poor Marketing:** *The other issue is poor marketing. I think issues like marketing can also be constituted as some of the topics covered in the farmer training modules. So, if we start to think of farmer trainings this way we can suffice on this issue. A farmer who has been trained on marketing principles and an untrained farmer are totally two different farmers when it comes to professional farming. They are totally different and most of our worries on crop marketing can disappear with proper farmer education. So, I think farmer education is the best solution to our marketing crisis. The moment we will be able to successfully integrate with the AGRITEX and NVTC we will be able to easily tackle all these other problems... One more thing we should know as farmers is that we have the right to benefit from the services of the AGRITEX and as an irrigation scheme we must also benefit from the training center (NVTC). It's our right they were established because of our existence.*

So, we need to utilize the local human resources available to us instead despising NVTC we should work together and closely with them. We need to utilize their expertise and experiences that's why we were thinking of reserving them positions in the IMC or even to just be a committee member then give them a position in the Marketing committee. In the meetings we can benefit one or two issues from them. I also heard the NVTC also complaining of non-local enrolments and I think it's a good idea to encourage and support our children to enroll agriculture courses at NVTC. At least the courses can prepare us to be different farmers ... Because in the courses critical areas are covered on problematic areas like disease and pest control, marketing and issues around marketing research. Once we manage that then we can as well start to visualize farming in Nyanyadzi irrigation scheme as commercial farming not the current subsistence farming that is going on.

Because of time we wanted to do much modelling in this session, but I will leave you part of the solution modelling on this issue of marketing. Will leave you the task to find that missing person in the marketing puzzle we talked about the previous day (Marketing Committee). If we already have that person then we might need to do some wake up. So, I would expect you the farmers to sit down with the AGRITEX and NVTC to help you set a working Marketing Committee that is functional and that can deliver the desired results. So, I will make follow ups to find out if you have implemented the solutions, we discussed in this CLW...

A model of the poor crop marketing contradiction and the proposed solutions and period into action are presented in Table 6.3 below:

Table 6.3. Crop marketing inner contradictions and the solution model

Contradiction	Inner contradictions	Solution model	Time frames
Poor crop marketing	• Unstable political and economic environment- lack of liquid cash Informal trading, Lack of contract farming • Lack of a market representative- unfunctional Market Committee- selection procedure (appointment vs voting) • Lack of marketing knowledge	• Use the US\$ as a standard • The farmers were encouraged to engage in other marketing innovations and value addition to their products Other marketing innovations- engage in collective farm produce tenders in supermarkets, boarding schools etc. Employ a Marketing Strategist/officer who works closely with the AGRITEX, NVTC, IMC, Marketing Committee and farmers advise on the following areas: -value chain analysis and management -market research -market contracts and produce prices -exploits international and export markets -Market protection -quality control -contract farming Value addition innovations- -consider starting a small-scale tinning industry -consider processing, packing and labelling farm produces i.e. tomatoes, sweet beans, green beans -partner with other NGOs for financial assistance, training and farm produce processing and packing technologies i.e. SAFIRE, Tsuro DzeChimanimani • The farmers agreed to dissolve the current Market Committee and elect a new one democratically. The Market Committee must represent the farmers in all pursuits. -work hand in hand with the Markets strategist/officer -do all marketing related duties -However, as an alternative the farmers were highly advised to	Farming year 2020 after engaging with other absent farmers

		consider employing a Market strategist/officer to do professional market. This is a move to strengthen and compliment the weakness involved in working in a teamwork and voluntary spaces. • Farmer education- marketing topics in the broader proposed farmer education courses	

Source: Author

As indicated, the ELP process was never linear or cyclical in nature, as the insider formative interventionist researcher I had to facilitate and mediate meaningful learning. Overall, the process was educative, and I also learnt as I went through the process. Much of the proposed actions are still yet to be realised and much shall be discussed in the following section. The ELP summary report for poor marketing contradiction is attached to this study as Appendix Y. In the following section I shall discuss the Transformative Agency Pathways in the CLW.

6.4 TRANSFORMATIVE AGENCY PATHWAYS (TAP) IN THE CHANGE LABORATORY WORKSHOP (CLW)

Transformative agentive talk can be seen in the excerpt above, in dialogue turn #1, where NEDSA2 is ‘explicating new possibilities or potentials in the activity’ (Haapasaari *et al.*, 2012) by proposing that “farmers come together and work together” and opening market access for more farmers even.

In this study the Transformative agentive talk was used to analyse farmers and other stakeholders’ transformative agency in the CLW. In essence, the process involved the use of Transformative Agency Expressions (shown in Table 6.4). Those expressions of Transformative Agency (TA) were used to identify agentive talk and these include resisting change, criticising, envisioning new possibilities, committing to actions among others.

Table 6.4: Types of Transformative Agency Expressions

• <i>Resisting</i> change, new suggestions or initiatives directed at the management, co-workers or interventionist
• <i>Criticising</i> the current activity and most often highlighting the need for change in the activity
• <i>Explicating</i> new possibilities or potentials in the activity; relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges
• <i>Envisioning</i> new patterns or models of the activity, which can range from preliminary suggestions to the presentation of comprehensive models for the future
• <i>Committing</i> to concrete actions aimed at changing the activity, which is typically manifested in the use of commissive speech acts
• <i>Taking consequential actions</i> to change the activity where participants of the interventions may perform consequential change actions within, between and after laboratory sessions
• <i>Confronting and navigating power relations participants recognise, navigate power relations, and voice out the power they have which can be significant in mediating new ways of doing things in the activity. Taking consequential actions (outlined above) or being able to commit to actions is often dependent on the transformative agentive capacity to navigate or negotiate power relations (Kachilonda, 2015)</i>

Source: Engeström, 2011; Haapasaari *et al.*, 2016; Kachilonda, 2015, Chisoni (2018:99)

There was a evidence in the CLW data showing all forms of TA expressions in the three ELPs that focused on the three contradictions It is interesting to note that in the ELP plenary on the leadership and management contradiction much of the transformative agency discourse was on envisioning new patterns, explicating and committing to action. However, there are few instances where the participants showed resistance to change. The very incident was when the Extension officer resisted the motion of reserving and constituting the Irrigation Chairperson's position to the AGRITEX Irrigation Supervisor. Despite all the mirror data drawn from the historicity of the object including the double stimulation texts in the form of the 5 Day-workshop meeting minutes in 1995 entitled "Why Water Cut" he was resistant to the proposal. With further deliberations we reached an agreement. However, I realised that resistance is a useful form of transformative agency. Not only does it expose social and institutional structures that defy collective action and efforts towards a shared object, but it also helps in confronting

such forces and stimulates the collective conscience to achieve the shared object. Particularly, in this activity the Extension officers were more than willing to work with the farmers and other stakeholders and went on to commit themselves to further tasks such as quarterly and annual internal audits of the irrigation scheme. The Transformative Agency Expressions emerging from the double stimulation processes in the Leadership and management activity are presented in Table 6.5a below.

Table 6.5a: Transformative Agency Expressions in Leadership Management Activity

Types of Transformative Agency Expressions in Leadership management Activity	Evidence
1. <i>Resisting</i> change, new suggestions or initiatives directed at the management, co-workers or interventionist	Emerging from second Double stimuli (DST2) (Figure 6.3) and Double stimulant 3 (DST3) (Nyanyadzi irrigation scheme's Organogram in Figure 6.4): Participant E3: suggested that, <i>"the National labour law doesn't allow Extension Officers (government employees) to handle community."</i>
2. <i>Criticising</i> the current activity and most often highlighting the need for change in the activity	Emerging from second Double stimuli (DST2) (Figure 6.3): Participant F22 stated that: <i>"mostly the people voted into IMC its either they are vocal... they don't have the rightful qualities... So maybe the constitution should explicitly relate the qualities a chairman must have... the constitution doesn't mention the qualities expected of the chairman/chairperson, it just mentions that there shall be a chairman/chairperson, treasure and so on,"</i>
3. <i>Explicating</i> new possibilities or potentials in the activity; relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges	Emerging from second Double stimuli (DST2) (Figure 6.3): Participant F18 pointed that: <i>"I personally feel that where we were going wrong is on that, the four blocks were selecting their norminees and from those norminees its where the chairman was elected by the committee members. We as mafarmers must norminate the chairman of the IMC."</i> Double stimulant 3: <i>a 5-day workshop minutes entitled "Why water cut?" It was a 5 day-workshop held in 1995, in Manesa Chipinge, for all the Supervisors and Extension Officers from all the irrigation schemes in Manicaland. Of interest to this study and the Change laboratory workshop was organogram diagram and in the organogram of Nyanyadzi irrigation scheme of 1995, it was interesting to realise that District Officer (DAEO) was the head followed by the Irrigation Officer (AEO), Irrigation manager (AES) then the IMC, Extension workers, clerks and drivers.</i>

4. <i>Envisioning</i> new patterns or models of the activity, which can range from preliminary suggestions to the presentation of comprehensive models for the future	Emerging from Double stimuli (DST2) (Figure 6.3): <i>Participant F10: First and foremost there are some qualities we should expect as farmers on what kind of committee members we want and elect. And even at block level nominees we should have a frame of qualities we expect and farmers should be able to justify if their block nominee suitable and meet all the expectations. 1. He./she must be a plot holder, a capable farmer and concerned about irrigation farming. 2. A person who is reachable, accommodative, and considerate to our old aged farmers. Not a person who is unrespectful and inconsiderate to the elders. 3. A church goer not a drunkard... because much of the challenges we have are engineered in the beerhalls.</i> <i>I want to propose that there are some positions at committee level which should be reserved for practitioners serving in important government departments (AGRITEX & NVTC). We would also want to elect educated personnel on the Chairman/chairperson positions, the person must be knowledgeable, authoritative and that way I see our irrigation scheme moving forward</i> <i>Participant F18: I suggest that what if we invite the Extension Officers to be part of the IMC. They can even supervise and advise us on the candidates to select into the IMC as well starting at Block level.</i> <i>Participant F10 suggested that, “On the way forward plan, I want to personally encourage that as Participant F16 stated the only person we can respect in this irrigation scheme, is the person who spent 4 years studying management... let's reserve the position for the Extension Officers so that our irrigation scheme may progress again.</i> <i>Participant F16: Yes, I agree so that our irrigation can prosper again.</i> <i>Participant F18: I want to second... we were now discouraged... but part of the way forward is to reconcile with the AGRITEX and NVTC, they are our important government departments.</i>
5. <i>Committing</i> to concrete actions aimed at changing the activity, which is typically manifested in the use of commissive speech acts	Emerging from Double stimuli (DST2) (Figure 6.3): <i>Participant F22: So maybe the constitution should explicitly relate the qualities a chairman must have... the issue of framework on qualities is helpful but has to be backed up by the constitution... I suggest the use of suggestion boxes can be helpful and the suggestions be read in the meetings as an additional agenda...</i>

	<i>Participant F15: “I want us to deal with the issue raised by Participant E3 that they are not allowed to be involved in the IMC or to take the lead role. So, what if we elect a committee and take that committee through leadership training...”</i> <i>Participant NVTC “I totally agree with the point raised by Participant F15 on putting the selected management committee leadership and management skills’ training...”</i> <i>Participant E3 “we should set standards... at least a farmer who has reached Ordinary level... who can also attend meetings and write feedback notes...”</i>
6. <i>Taking consequential actions to change the activity where participants of the interventions may perform consequential change actions within, between and after laboratory sessions</i>	Emerging from Double stimuli (DST2) (Figure 6.3): <i>Participant F16: Supervisor must be the Chairman of the IMC. Because he is in overall charge of the whole irrigation scheme. So, he has the qualities to be the Chairman of the IMC and vice by one of the farmers. So that he can be overseeing our financial management with the help of the farmers... so what we want is to agree that on leadership and management, the Chairman position is not contested but reserved and obvious the chairman is the seating Supervisor of AGRITEX. This way I see the system of the irrigation moving forward.</i>
7. <i>Confronting and navigating power relations participants recognise, navigate power relations, and voice out the power they have which can be significant in mediating new ways of doing things in the activity. Taking consequential actions (outlined above) or being able to commit to actions is often dependent on the transformative agentive capacity to navigate or negotiate power relations (Kachilonda, 2015)</i>	Emerging from Double stimuli (DST2) (Figure 6.3): <i>Participant F8: Right Mr. E please allow me to question you, you said you are not allowed, how different are you from the government school setups because in schools there is a Chairman, Secretary and their vices then other committee members including the headmaster and the deputy in the committee members. So how different are you from these other setups?</i> <i>Participant E3: Its different in that at AGRITEX we are not allowed to handle communal funds, it is a punishable offense you can be arrested or expelled.</i> <i>Researcher: So, if his role is to manage the irrigation scheme with the help of the IMC so what’s wrong with the AGRITEX Supervisor heading the IMC chairperson since his role and qualification allows?</i> <i>Participant F15: “Yes, that’s why I asked that time the difference with the school setup... but you refused...now you agreed, but if they (Extension Officers) think they may be overwhelmed because of what they see please bear with us zuva rimwe hariodzi nyemba (Shona metaphor-translated as one day cannot make cowpeas go bad. Meaning change cannot be an overnight thing. Most of the times the Supervisor can chair and only when he is on leave you may chair as for that only month.”</i>

Source: Author

As indicated in Table 6.5b there is also evidence of envisioning new patterns and models in the activity as well as commitment to concrete actions in the financial management contradiction activity in the CLW with the farmers and other stakeholders. The more concrete envisionings were around the monthly, quarterly and annual financial reports as well as quarterly and annual internal and external financial audits. There was a strong call to put the above mentioned actions into practice and the Extension officers were willing to be part of the envisioned model and execute internal quarterly and annual financial audit reports. This activity was expected to bring stability at the core activity of financial management and n to kick start soon although of course it has been hampered by the current Covid 19 pandemic. This was one of the stronger examples of transformative agency in the activity. Another example was the proposed action to enforce the functionality of the former mentioned financial management actions put in place. The proposed action was to boycott any monthly subscriptions and payments to the IMC treasure if the financial reports were not prepared on time and made available in the public domain by the monthend. Lastly, another concrete action mentioned was to begin a mobile Irrigation Whatsapp group where important communications including the monthly, quarterly and annual financial and audits reports were to be published. This was meant to increase access, transparency and timely planning. The examples of the TAPs in the financial management contradiction activity are summarised in Table 6.5b.

Table 6.5b. Transformative Agency Expressions in the Financial management contradiction activity

Transformative Agency Expressions in Financial management activity	Evidence
1. <i>Resisting</i> change, new suggestions or initiatives directed at the management, co-workers or interventionist	
2. <i>Criticising</i> the current activity and most often highlighting the need for change in the activity	Emerging from Double stimulant 3: Nyanyadzi irrigation scheme's Organogram (Figure 6.4) and Double stimulant 4: Way Forward and Plan on Leadership and management contradiction (Figure 6.5). Participant F15 asked a critical question "<i>is the money we pay or they collect allowed sleep over in the individuals' house or it's supposed to be surrendered elsewhere?</i>"

3. <i>Explicating</i> new possibilities or potentials in the activity; relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges	
4. <i>Envisioning</i> new patterns or models of the activity; which can range from preliminary suggestions to the presentation of comprehensive models for the future	Emerging from Double stimulant 4: Way Forward and Plan on Leadership and management contradiction (Figure 6.5): <i>Participant F10 said “Audit must be regularly conducted.”</i> <i>Participant F8: Quarterly</i> <i>Participant E3: In the irrigation constitution it is written internal and external audits. And we suggested the Extension Officers can help with the internal audits then Mr. X a Commercial teacher at Nyanyadzi high school can help with the external audits.</i> <i>I think what has been come out Mr. Researcher its clear, the Supervisor is the chairperson of the IMC, financial reports must be ready by the 30 of August for example, the treasure by the 30th must be done and feedback to the farmers... the Supervisor must overly see all is in place and its good because the Supervisor doesn’t hold any money... he just supervises...”</i>
5. <i>Committing</i> to concrete actions aimed at changing the activity, which is typically manifested in the use of commissive speech acts	Emerging from Double stimulant 4: Way Forward and Plan on Leadership and management contradiction (Figure 6.5): <i>Participant E3 “... let me tell you something Mr. Researcher if the farmers want the financial reports... they just boycott paying their monthly payments in their blocks until the IMC present the financial reports.”</i> <i>Participant F6: “I think what has been come out Mr. Researcher its clear, the Supervisor is the chairperson of the IMC, financial reports must be ready by the 30 of August for example, the treasure by the 30th must be done and feedback to the farmers... the Supervisor must overly see all is in place and its good because the Supervisor doesn’t hold any money... he just supervises...”</i>
6. <i>Taking consequential actions</i> to change the activity where participants of the interventions may perform consequential change actions within, between and after laboratory sessions	

7. <i>Confronting and navigating power relations participants recognise, navigate power relations, and voice out the power they have which can be significant in mediating new ways of doing things in the activity. Taking consequential actions (outlined above) or being able to commit to actions is often dependent on the transformative agentive capacity to navigate or negotiate power relations (Kachilonda, 2015)</i>	

Source: Author

In the second CLW activity, the inner contradictions in the farmer education and training were explored and solution models were figured out as summarised in Table 6.2. However, the study further explored the Transformative Agency Pathways (TAPs) in the farmer education and training contradiction. As evidenced in Table 6.6 there were more instances of criticism from the farmers, more so than explicating new possibilities or potentials envisioning or committing to any meaningful actions and solutions towards the current situation. This showed that by criticism the farmers and other stakeholders present, knew things are diverting from the norm and they wanted some change. By criticising the past experiences and practices I want to believe that the farmers were also showing agency in their motive. However, the lack of envisioning and commitment by most of the farmers maybe a sign of the dilemma that existed between knowing, understanding and doing. In my view the farmers knew something was wrong but didn't know the root cause and hence, were not sure of how to approach the situation or resolve the situation. Hence, the role for the insider formative interventionist researcher was appropriate since, with the background knowledge and acquired experience I was able to lead in the process. But this could also be dangerous if there is no smooth transfer of the knowledge and transition from researchers' suggestions to imposition. I was critical of the fact that as a researcher I was not supposed to impose any solutions to the farmers, but it was right to lead and suggest. Which I believe I managed to do, and the farmers were appreciative.

Most importantly in the CLW most farmers showed great understanding and critiqued some practices including extension workers' response time span, overuse of pesticides, lack of alternating pesticides. The majority of these critical observations emanated from their farming

and some from training experiences they have went through. This was important because at least some of the farmers appreciated the suggestions because either they aligned with or sounded familiar to their own experience or previous training activities. As the insider formative interventionist researcher I also critiqued the disposition of the AGRITEX and the NVTC as farmer educators and trainers, which combined with donor syndrome when it comes to farmer and training. In essence, these critiques empowered the AGRITEX and NVTC with transformative agency powers. The critique of own practice again was viewed as a sense of transformative agency in this study.

As seen above, transformative agency expressions were realised in explicating and envisioning new patterns and models of better farmer education and training. Some possibilities were realised as the need for research work in the irrigation scheme, need to alternate the current pesticides that have been used for generations and lastly, the need to establish and implement farmer education and training courses. Other explicating and envisioning expressions are shown in Table 6.6. However, it is interesting to note that little or no evidence of explicit commitment(s) to action were recorded. The two commitments recorded were coming from the researcher and were inclusive and suggestive in nature. Hence, none of the participants took full responsibility to implement, monitor and report on those solution models. The commitments were on collaborative farmer education and training courses through the NVTC as well as potential partnerships with other organisations such as the Environmental Learning Research Centre (ELRC) at the Rhodes University (RU), SAFIRE and Tsuru DzeChimanimani on developing farmer education and training modules. However, I am skeptical that such commitments if not properly adopted and taken up by the farmers and other relevant stakeholders could just be discursive. Secondly, if the researcher heavily partakes in the development and uptake of the initiatives without co-operative agency from others, they can end up as a super imposed initiative and can overwhelm the researcher and can lack traction. Hence, a smooth transition should be nurtured to enhance these commitments into real transformations and enhance some agency within the farmers activity system. A summary of the TAP is presented in Table 6.6.

Table 6.6: Transformative Agency Expressions in the Farmer Education and Training activity

Transformative Agency Expressions in Farmer Education and training activity	Evidence
1. <i>Resisting</i> change, new suggestions or initiatives directed at the management, co-workers or interventionist	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): <i>Participant E3: Our point as Extension Officers is that, in our extension work if a farmer wants to start a new crop, you are supposed to come first to AGRITEX and discuss with your Extension Officer about your intention to begin a new crop.</i>
2. <i>Criticising</i> the current activity and most often highlighting the need for change in the activity	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): <i>Participant F13: ... there is no longer transparency, there are times when the farmers are faced with diseases and pests in their fields and report to the Extension Officers.</i> <i>Participant F13: ...most of the farmers are buying own pesticides but seems as if they are overusing it and have made the pests resistant.</i> <i>Participant E3: ... resistance of disease and pests- this we have to blame everyone; farmers are buying pesticides without labels... what cause the diseases and pests to resistance is overdose...</i> <i>Participant F10: From my experience and knowledge through Kadoma Cotton I once attended, I would agree with what Extension Officer X said on chemical application... we are lacking practitioners who come to explain these diseases and pests for us ...</i> <i>Participant F10: Number 2. this has end up most farmers purchasing pesticides from South Africa yet, the pesticides and the diseases and pests here in Zimbabwe might be different from those ones in South Africa.</i> <i>Researcher: If you do a careful historical analysis like we did yesterday you will appreciate that poor farmer education is central and interconnected to most manifestations in the irrigation scheme.</i> <i>Researcher: The commitment that, I have attended a training or a field day training at Mr. so and so let's form small working groups to further train fellow farmers, is in short. We are just individualistic in mind and doing, putting into practice learned ideas is one of the big challenges faced.</i> <i>Researcher: So here is the summary of what I learnt, our major issue is on dislocation of the AGRITEX and NVTC from their roles and mandate to the irrigation scheme. If it's about the NVTC, the truth is we have totally forgot of its existence.</i> <i>Researcher: We have ignored the roles played by the AGRITEX and NVTC and in the process we have disposition them leading to lack of communication, lack of commitment</i>

	and lastly, we as farmers we are no longer observing the planting, disease and pest control calendars <i>Researcher: One think that I have seen that trouble most people is donor syndrome. When we call for training people expect an NGO to take them for some expensive training programs, away in some resort places. Yet, we have our own local resources including internal resources such as AGRITEX and NVTC practitioners who have experience in the subject content.</i>
3. <i>Explicating</i> new possibilities or potentials in the activity; relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): <i>Participant F10: Going to some of the new pests we now have in the irrigation, they are difficult for us farmers to understand them there is need for proper research in the whole irrigation scheme...</i> <i>Participant F10: Because would that be ineffective if I change a pesticide, yet my neighbour farmer continues with the old on, it's pointless. Only if we could agree as an irrigation scheme on one pesticide and if we can hire a helicopter to spray all the fields and the whole valley...</i> <i>Researcher: If we give them a chance to play their roles in the irrigation scheme and to give them their role to develop us into better farmers giving us the best farmer education which we require we may also realise that some of the issues we complain about will be issues of the past (marketing education; artificial water shortages). If we get the proper education, farmer education that's where the youth can go for 2-3 months Farming Course. They should be able to learn on the diseases and pests, controller regimes and so on... so this the role we have taken away from the AGRITEX and NVTC in our irrigation scheme.</i> <i>Researcher: Lots of organisations would love to help you in such training areas and they don't end there but can even support groups or individuals with material and financial support to realise their goals</i>
4. <i>Envisioning</i> new patterns or models of the activity, which can range from preliminary suggestions to the presentation of comprehensive models for the future	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): <i>Participant F10: This is the reason why I pleaded with you Extension Officers if we could have block by block learning process and could be through workshops because things are extremely bad.</i> <i>Researcher: ... if you look at the role of AGRITEX, the main purpose of AGRITEX or what was the main role in the past and you also look at the role of the NVTC or what was the main role in the irrigation scheme. Then if you check from the first-generation period, the roles played by AGRITEX and</i>

	NVTC you will then start to understand the disposition I am talking about. Participant F8: <i>There should be farmer training courses.</i> Researcher: <i>... in my opinion the idea said before that we should start with farmer training courses, I also see it as a noble idea.</i>
5. <i>Committing to concrete actions aimed at changing the activity, which is typically manifested in the use of commissive speech acts</i>	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): Researcher: <i>These farmer training courses could be organized training courses. Some could even be one-day workshops and some could be 2-days workshops and there is a small demo-plot here at the NVTC which you can as well utilise for training purposes and demonstrations ... We can also start to envision long courses up to diploma level through our NVTC.</i> Researcher: <i>So, we can also start to think on approaching them (ELRC-RU) and other important stakeholders (like SAFIRE, Tsuro dzeChimanimni) to collaborate with NVTC to write farmer training modules. I am sure we can also build on the expertise and experience in modules and training manual designing and publishing. We can also dive into water harvesting and drip irrigation systems to especially curb our so-called water shortage issues... we can also start look and learn approach, whereby few farmers can be supported to visit another neighbouring irrigation scheme or farm to learn how they practice and principles to their success...</i>
6. <i>Taking consequential actions to change the activity where participants of the interventions may perform consequential change actions within, between and after laboratory sessions</i>	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): Researcher <i>We can as well meet later on as NVTC, AGRITEX and myself to discuss on the training courses that might benefit the farmers</i>
7. <i>Confronting and navigating power relations participants recognise, navigate power relations, and voice out the power they have which can be significant in mediating new ways of doing things in the activity. Taking consequential actions (outlined above) or being able to commit to actions is often dependent on the transformative agentive capacity to navigate or negotiate power relations (Kachilonda, 2015)</i>	Emerging from <u>Double Stimuli 1</u> (Figure 6.2) and <u>Farmer Education Solution model</u> (Figure 6.7): Participant F16: <i>We have a challenge that they are not communicating with our local Agro-dealers who sell us the chemicals... But we have farmer educators in our midst, and they are not uniting us to collectively fight these diseases and pests.</i> Researcher: <i>The biggest problem is that AGRITEX & NVTC are no longer allowed to play their own role and mandate in the irrigation scheme.</i> Researcher: <i>AGRITEX is now just symbolic organisation then, to say the truth about NVTC, I didn't know that they have a horticulture department.</i>

	<i>I only came to know of it because of this research and this may show how a white elephant it has become.</i>

Source: Author

In the third CLW activity, the inner contradictions in the crop marketing contradiction were explored and solution models were figured out as summarised in Table 6.7 below. The study further explored the Transformative Agency Pathways (TAPs) in the crop marketing contradiction activity. As evidenced in Table 6.7 there were more of critiques compared to any solutions. As discussed earlier on this was a sign of dilemma and double bind, the farmers felt something is wrong but failed to figure out where and how to respond to the double bind. We were, however, able to untangle the contradiction. In the CLW much time was spent moving between questioning and examining the contradiction which involved pendulum between historical and actual-empirical analysis of the contradictions. Most importantly, a greater understanding was reached, and the process was emancipatory in itself and transformative agency was developed among the participants in the study. Much of critique focused practices on individualistic planting, poor or no market research by farmers, dysfunctional marketing committee, subordination by other farmers and a poor contract farming reputation. However, there were few explicating ideas that came out of this activity and most of them came as suggestions from the insider formative interventionist researcher. Among them were possibilities around contract farming, formulating a functional marketing committee, approaching supermarkets as potential markets and lastly, but not least employing market strategist/officer to handle issues like market research, value chain management and analysis, export deals, and market protection.

While, the majority of the envisioning was also done by the researcher, this also confirms the point discussed earlier on that the community looked to the researcher as an expert, a third-generation farmer and experienced person who can help them with advices. Much of the envisioning was around the possibility of employing a market strategist/officer and what he/she has to offer, adoption of the US\$ as the standard for pricing products to eliminate the effects of the unstable market-economy and the essence of providing farmer education and training as core to professional farming. There was only one commitment to action pronounced by the farmers which was to look into hiring the rightful market strategist/officer. Another commitment to action suggestion was made by the researcher for the AGRITEX, NVTC and the farmers to sit and help each other to set up a functional marketing committee. But again as

mentioned earlier, if these suggestions are not well placed, adopted and put into practice the activity will be meaningless. The summary of the transformative agency expressions in the crop marketing contradiction activity is presented in Table 6.7.

Table 6.7: Transformative agency Expressions in crop marketing contradiction activity

Types of Transformative Agency Expressions in crop marketing contradiction activity	Evidence
• <i>Resisting</i> change, new suggestions or initiatives directed at the management, co-workers or interventionist	
• <i>Criticising</i> the current activity and most often highlighting the need for change in the activity	Emerging from Double Stimuli 1 (Figure 6.2) Marketing contradiction chart (Figure 6.8) and Crop marketing contradiction chart (Figure 6.9): <i>Participant E3: ... by crop diversity we mean, in Nyanyadzi irrigation scheme you grow one crop (monocropping) for example, you only grow beans and tomatoes as main cash crops but if we closely look you are not making huge profit margins.</i> <i>Participant E3: Selling on your own it's still a loss because you still want to 1. hire people to harvest the tomatoes for you, 2. buy packing cardboard boxes 3. hire transport to ferry your produce from the fields to the bus stop 4. hire a truck to ferry your produce to Mutare, Sakubva marketplace...</i> <i>Researcher: So as a farmer what are you also doing to protect your market and become just the farmer and not both the farmer and the trader.</i> <i>Participant F16: The Marketing Committee is only said to be seen representing us in meetings, but what I am not sure is whether have managed to source out formal traders/buyers.</i> <i>Researcher: As farmers what stopped you from exporting your produce to Mozambique?</i> <i>Participant F16: But we must mostly look towards a functioning committee because if you are said to be a committee it means you are representing the whole community. So they are not putting any effort or doing any initiative, they are just a committee by name.</i> <i>Participant E3: Yes, I agree with Participant F16, let me explain to you this committee from my understanding was not chosen by the farmers. It was appointed by a Politician along political</i>

	<i>motives and belonging so as long as it's an appointed committee it doesn't work well.</i> <i>Researcher: Farmers are supposed to elect or vote for the rightful farmers they want because if you were to look, the Cooperative buildings are dilapidating, yet the marketing committee is available. So the question posted by the Researcher that, what are you doing as farmers is extremely critical.</i> <i>Participant F4: from my own opinion, it's not the problem of the committee but I have realised that it is the problem of the farmers. It is the problem of intermediators, if buyers come to Nyanyadzi by the end of the day they would be farmers who wrongly advise giving them low price guidelines. if we closely look at it, if the informal traders were not gazetted low prices by our own cruel farmers we would be profiting because informal traders are equal traders and what we value is the money not the profession.</i> <i>Participant F13: Yes, because I was born here doing the same and we knew once a crop is grown goes to market at once than, what is currently being done, that each farmer grows his own or unique plants.</i> <i>Researcher: The other thing is you don't involve the IMC in planning your crop calendar.</i> <i>Participant F13: The problem is that in the past we were told what plant to grow...</i> <i>Researcher: the issues is on competition to be the first to harvest and avoid market competition. Yet, group marketing is easy</i> <i>Participant F13: The standards of our products could be a challenge. The reason being that we can't produce the same quality and same levels... what is happening is that some farmers invest more ... what was nice about Cains is that it took from everyone whether you have 2 boxes, or 4 boxes.</i> <i>Participant F16: I would say poor advertisement of the produce and the irrigation scheme.</i> <i>Participant F6: ... we once referred to the farmers, they are not honest...</i> <i>Participant E3: Yes true... there was one buyer who wanted to promote contract farming of beans... but he said Nyanyadzi no because if you give Nyanyadzi farmers inputs you are on loss instead of owning the agreements they sale the produce to other buyers. So Nyanyadzi are untrustworthy, not only Nyanyadzi but, most of the irrigation farms.</i> <i>Participant F14: So, what made contract farming to collapse and give in to informal market?</i>

	<i>Participant F14: ...The budget won't allow because the prevailing circumstances at the time of agreement and by the time of harvest would have totally changed hence as a farmer, I would prefer a win and win situation than owning the first contract at a loss.</i> <i>Participant NV11: ...a real farmer must know that during the preparation stage he has to do a market research then grow the best crop with ready market. But most of us farmers, we just follow and realise on the last minute that there is no market for that crop.</i> <i>Participant F10: That is what was happening in the second generation of farming phase but now a farmer just grows what he wants and of his understanding.</i> <i>Researcher: And it's because of the fragmentation that current exists between the farmers, Extension workers and the NVTC... resultantly, there is no unit of purpose, and at the end of the day we cry of the market and we don't even put value addition.</i>
• <i>Explicating new possibilities or potentials in the activity; relating to past positive experiences as evidence of unacknowledged potentials or characterising the problematic object as a source of new possibilities and exciting challenges</i>	Emerging from Double Stimuli 1 (Figure 6.2) Marketing contradiction chart (Figure 6.8) and Crop marketing contradiction chart (Figure 6.9): <i>Participant F13: ... but only if we can find some interested formal traders whom we can engage in contract farming with we may profit better.</i> <i>Participant E3: I call for the government to call upon the local companies to support local communal irrigation schemes like Nyanyadzi.</i> <i>Participant F16: But we must mostly look towards a functioning committee because if you are said to be a committee it means you are representing the whole community.</i> <i>Researcher: I was discussing with one farmer here and I said do you know that if you come together as farmers and approach OK Supermarket there is infinite market, yet you still complain that there is no market.</i> <i>Participant NV11: So, a real farmer must know that during the preparation stage he has to do a market research then grow the best crop with ready market.</i> <i>Researcher: ...we don't have a Marketing strategist... this is person responsible for market research and this is the person we don't have, and another duty is to manage our value chain including value addition initiatives. Value chain management shows that the farmer is the primary producer and other respective eutrophic levels follow... Instead of focusing on local market economy we should be exploiting export market or international market... You would have agreed if he/she gives all the inputs, he/she will buy at \$2.00 but, because someone else who didn't even give you anything offers you \$2.50 and you</i>

	<i>breach the contract. If you sit down and calculate the value of seed, value of fertilizer you would realise how much wrong you are.</i> <i>Researcher: As farmers we never thought one day, we could start our own small industry canning beans putting our label of the Nyanyadzi irrigation scheme and sale. If they are tomatoes, we can process and tin them with a beautiful label written Nyanyadzi... but because we rarely think of it, you may realise that we have some NGOs like Tsuru dze Chimanimani they are based here, and they do have offices here in Nyanyadzi but I doubt if we are benefiting from their value addition processing.</i>
• <i>Envisioning new patterns or models of the activity, which can range from preliminary suggestions to the presentation of comprehensive models for the future</i>	Emerging from Double Stimuli 1 (Figure 6.2) Marketing contradiction chart (Figure 6.8) and Crop marketing contradiction chart (Figure 6.9): <i>Participant E3: Farmers are supposed to elect or vote for the rightful farmers they want... If the Marketing Committee in place is not functional then you are supposed to remove it and elect a functional one with the farmers of your choosing.</i> <i>Researcher: The Market strategist/officer has to work hand in hand with the Extension officers and be advisory to both the Extension Officers and the farmers... so you will find that most of the farmers will grow the crop on demand and with a ready market. So, the market will be there already no need for individual market search and this Market strategist shall negotiate prices for the produce since, he/she will be managing your chain value as well so it will be easy to determine right prices.</i> <i>Researcher: Then another way to deal with unstable economy would be to use US\$, so all the agreements will be converted to US\$ because it's one of the stable currencies.</i> <i>Researcher: I think issues like marketing can also be constituted as some of the topics covered in the farmer training modules. So, if we start to think of farmer trainings this way, we can suffice on this issue... So, I think farmer education is the best solution to our marketing crisis. The moment we will be able to successfully integrate with the AGRITEX and NVTC we will be able to easily tackle all these other problems... So, we need to utilize the local human resources available to us instead despising NVTC we should work together and closely with them. We need to utilize their expertise and experiences that's why we were thinking of reserving them positions in the IMC or even to just be a committee member then give them a position in the Marketing committee. In the meetings we can benefit one or two issues from them. I think it's a good idea to encourage and support our children to enroll agriculture courses at NVTC. At least the courses can prepare us to be different farmers ... Because in the courses critical areas are covered on problematic areas like disease and pest control, marketing and issues around marketing research. Once we manage that then we can as well start to visualize farming in</i>

	<i>Nyanyadzi irrigation scheme as commercial farming not the current subsistence farming that is going on.</i>
• <i>Committing to concrete actions aimed at changing the activity, which is typically manifested in the use of commissive speech acts</i>	Emerging from Double Stimuli 1 (Figure 6.2) Marketing contradiction chart (Figure 6.8) and Crop marketing contradiction chart (Figure 6.9): <i>Participant F10: So, this is the person (Market Strategist/officer) we must look for...</i> <i>Researcher: So, I would expect you the farmers to sit down with the AGRITEX and NVTC to help you set a working Marketing Committee that is functional and that can deliver the desired results. So, I will make follow ups to find out if you have implemented the solutions, we discussed in this CLW...</i>
• <i>Taking consequential actions to change the activity where participants of the interventions may perform consequential change actions within, between and after laboratory sessions</i>	
• <i>Confronting and navigating power relations participants recognise, navigate power relations, and voice out the power they have which can be significant in mediating new ways of doing things in the activity. Taking consequential actions (outlined above) or being able to commit to actions is often dependent on the transformative agentive capacity to navigate or negotiate power relations (Kachilonda, 2015)</i>	Emerging from Double Stimuli 1 (Figure 6.2) Marketing contradiction chart (Figure 6.8) and Crop marketing contradiction chart (Figure 6.9): <i>Participant F4: its mostly because of the economic situation most companies have closed.</i>

Source: Author

6.5: ADVANCING THE ZONAL OF PROXIMAL DEVELOPMENT IN NYANYADZI IRRIGATION SCHEME.

Collective learning, as envisaged in expansive learning, was a strong outcome of the ELP leading to TAP (Engeström & James, 2010). To understand how collective learning unfolded

and was core in supporting and scaffolding learning in the irrigation scheme, the ZPD as a symbolic space was applied to negotiate and understand the vertical as well as the horizontal transformations. In this study the ZPD provided tools to interpret the data for common trends across two dimensions such as a continuum from government oriented irrigation farming to improved communal management and marketing systems (vertical axis) in the learning of crop production and marketing under irrigation farming (horizontal axis) as shown in Figure 6.10.

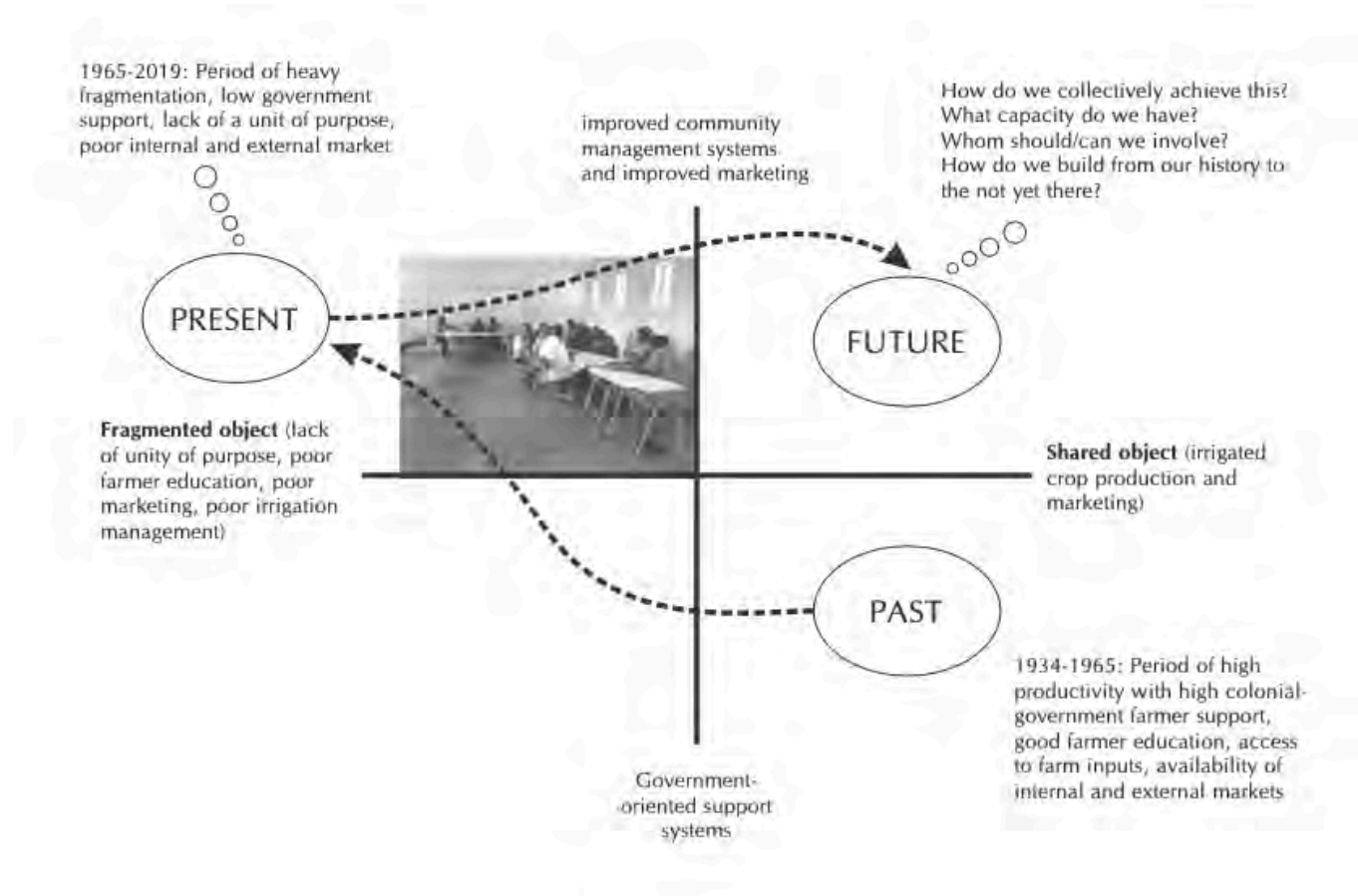


Figure 6.10: The Zone of Proximal Development for collective crop production and marketing in Nyanyadzi irrigation scheme

Source: Author

Figure 6.10 above shows a four-field ZPD symbolic space that can aid negotiation and understanding of the journey (1931-2019) the Nyanyadzi irrigation farmers went through. Of interest to the study was the rich historicity the Nyanyadzi irrigation case holds and how that historicity enabled mediation of transformative agency through the double stimulation. The historicity can be arranged in three broad time series namely, 1934-1965 which marks the birth and establishment of the irrigation scheme. This period is located in the right quandram and

could be described as the bottom of the vertical axis. This period has been characterised by heavy government oriented support systems that ranged from provision of farmer education and training, a systematic irrigation management system and provisions of inputs as well as marketing opportunities. Hence, this period was described as a period of high productivity, full of farmer support and better market systems. I would liken much of the ZPD process during this period to collective learning that *“involve teacher-student or tutor-tutee interactions... the learning that allows new forms of actions,... happens in small setups such as the dyads (parent-child) to larger groupings such as classrooms where scaffolded teaching and learning situations happens* (Kozulin, Gindis, Ageyev, & Miller, 2003; Shayer, 2003). However, this government control was also colonial control.

What is also coming out from the data is the realisation that the farmers' activity system expanded both horizontally and vertically over time. Horizontally, the farmers' object increased by inclusion of various crops which were unavailable or less valued in the past. Expanding on the latter, was the value of crops like maize which is one of the primary or staple crop for Zimbabwe which started to be grown from the onset of the irrigation scheme and subsequently increased. Maize, in the second generation of farming, grew from a staple and subsistence crop which sustained the household food security to the most valued and sought-after crop. Together with other agrarian institutions the irrigation schemes contributed their fair share to winning Zimbabwe the reputation and status of bread basket of the region from the early 1960s onwards. This status was maintained throughout the second generation of farming until or up to the third generation of farmers. To support the former, the diversity in crop species also increased to include sugar beans, paw paws, wheat, tomatoes, cotton and even foreign crops like the khakhi beans, soya beans, paprika and *Dzunzu* which started to feature in the scheme. However, as the object of the activity system expanded and evolved over time so did the learning. The farmers were exposed to new ways of cropping, started to develop understanding of the value addition, exporting, and better marketing practices as well. There is no doubt the farmers passed through the ZPD process progressing towards the betterment of the scheme during the same period. There is also no doubt that major political and economic spheres of the period engaged the farmers through some individual and collective learning through several contradictions that arose from within and or from the interacting activity systems (see Chapter 2).

The second phase (1966-1980) is diagrammatically represented by the black arrow in the left bottom quadrant. As represented by the line in the bottom left quadrant, this was the period

of decline in all aspects. The period is known to be characterised by a shift in the management style and process resulting in the practical handover of the irrigation to the community. Government support decreased in all aspects from farmer education and training, the market decreased because of the Smith inspired sanctions by the British government followed by the two liberation wars (*Chimurenga 1 and 2*) (see Chapter 2). Notable, the farmer education system slowly shifted to a consultative basis on the assumption that the farmers ZPD levels were improved. During this period the learning process can be likened to collaborative learning phase where farmers can learn from other farmers who are “*at the same developmental level rather than with more advanced others (teachers, parents)*” (Roth & Lee, 2007; 2005). The type of learning can also be further likened to “*advanced forms of teacher training through co-teaching, a form of teaching in which two or more individuals teach together simultaneously, enacting full responsibility for all parts of the curriculum* (Roth & Tobin, 2002; Roth *et al.*, 2005: 41). These, forms of learning are said “*to open up many learning opportunities to all the other individuals from the community, those participating in the roles...*” (Roth & Tobin, 2002: 23).

The last phase (1980-2019) is characterised of many ills from political and economic instabilities to the intergration of the third generation of farmers who have to be of low farming knowledge and or commitment. This period is diagramatically on the upper left and represented by the orange bubble entitled “Present”. As shown by the black arrow connecting the past and the present as you move on the horizontal ZPD line there is a decrease in practically everything ranging from the government support, farmer education and training, the market system. hence, the now period is characterised by the deepest crisis in the irrigation farming history. This era is the period of a heavily fragmented object, the irrigation scheme has lost its identity, there is no unity of purpose among the farmers. Resultantly there has been high outbreaks of persistent and devastating pests and diseases, high debts in water and electricity and poor markets. This period is calling for emancipatory education initiatives to support and engage farmers to move out of the current dilemma and double bind situations. This is the period in which my study is playing a critical role engaging the farmers in a collective Expansive Learning Process (ELP) with the aim enabling learning and Transformative Agency Pathways (TAP) emmergence and expanding the farmers’ Zone of Proximal Development (ZPD).

In essence, my study has adopted the insider formative interventionist approach to research thereby engaging the farmers in an expansive and transformative learning, increasing their

transformative agency and expanding their and my ZPD. In Section 6.1 data was presented and thick descriptions were also given on how the participants in this study were engaged in the ELP and now they were able to work on three critical contradictions via this process. A provided summary of the ELP process is also presented as Appendix W, X, & Y. Secondly, Section 6.2 thick descriptions on the transformative agency pathways that were emerging. Evidence in the form of a summary of the transformative agency expressions were provided in Tables 6.5; 6.6; & 6.7.

In the ELP it was evident on several occasions that the collective learning towards a commonly defined motive of activity shifted the different subjects from the level where they are, probably stuck (the zone of actual development) to an expanded level of development and potential learning known as the zone of proximal development (ZPD) (Vygotsky, 1978) (see Section 6.3 and Chapter 2). My work with the community has now progressed to the envisioning of the future. I want to describe the future as a potentially enacted utopia and the current ZPD (Sannino, 2020). Through the ELP we were able to understand the major contradictions we were working on and we managed to reframe them to three broad contradictions. Through the TAP process relying on the use of transformative agency expressions as the unit of analysis we were able to locate the three fields and fitted them in our ZPD symbolic space (shown in Figure 6.11). In Figure 6.11 the picture inserted slightly overlapping the vertical field shows the envisioning process by and with the farmers. This shows the expansive learning process and transformative learning the farmers and other stakeholders have gone through. Out of the transformative agency pathways the farmers were able to envision dimensions of the future they wanted for their irrigation scheme. Through locating transformative agency expressions concretely three fields were established, and these are leadership and management, farmer education and training and lastly, improved crop marketing.

In the CLW these three fields were thoroughly questioned, examined, and explicated for new possibilities as well as envisioned for new solution models (see Figure 6.11 below). Furthermore, inner contradictions were established, and solution models were developed and presented for each field as shown in Table 6.1; 6.2; & 6.3, respectively. Most of the solution models still need to be carefully enacted and mediated with the farmers for a smooth and elected transfer which will see the transformative agency expressions enacted further into actual actions. Again, due to the Covid 19 pandemic and shortness of time and funding in the study,

I could not visit regularly and facilitate engagement meetings and workshops to kick start the project into the second phase, but the interest in these TAPs remains in place for the future enactment.

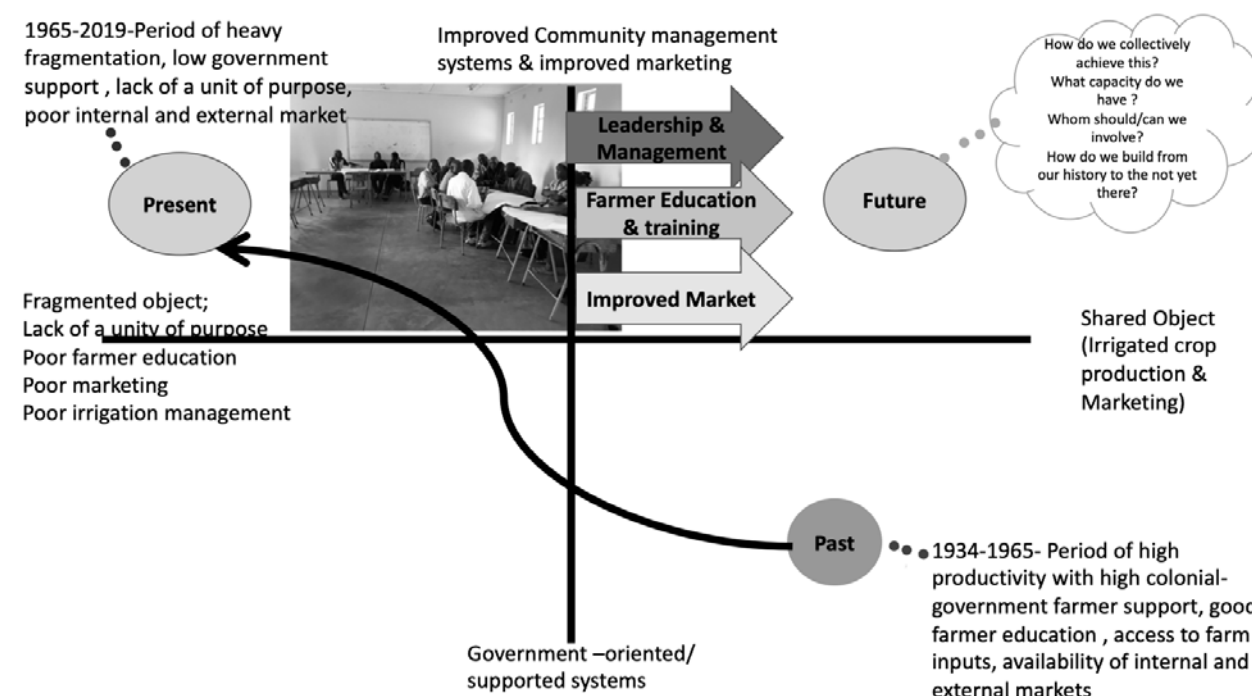


Figure 6.11: The three fields in the Zone of Proximal Development for future collective crop production and marketing in Nyanyadzi irrigation scheme

Source: Author

It is important to realise that in terms of the ELP cycle we only managed to go as far as the 3th cycle (Modelling new solution models) but we failed to initiate the 4th phase (Examining and testing the new models) of which I anticipate the farmers would implement some, but some of the facets in the new models still need nurturing and further facilitation from an insider formative interventionist researcher perspective, which aim to further as part of a Post-Doctoral study or community process, as soon as Covid-19 conditions allow.

It will be safe to say that this study so far has yielded responses to the first and partly the second questions of the study namely,

1. What are the multidimensional complexities that have (in the past), and are (in the present) enabling or constraining learning of household food production in interacting farmers' activity systems?

2. How can the multidimensional complexities (outlined in 1) be mobilised as a source of expansive learning via mediation in a formative interventionist expansive learning process to enhance food security (into the future)?

However, there is still more work to be done on the second question if any fruitful results are to be realised from the context (in expanded forms of transformative agency. The most important lessons drawn from this study has been on how generative the deep and careful cultural historicity of the context in the CHAT theory can be, in understanding multidimensional complexities that shape and influence ELP potentials. Secondly, I have learned about empowerment through expanded learning frames and transformative agency that the participants go through in the ELP and TAP processes despite and in response to multi-dimensional complexities. As shown in this chapter, Nyanyadzi farmers learnt through the process and most importantly were able to unearth critical issues they need to collectively tackle. The role of the insider formative interventionist researcher has been an anchor in the scaffolding of learning in the context a role which I had to occupy given my own historicity in the context, and then also reflexively consider in the ELP process as captured above.

6.6 CHAPTER CONCLUSION

To conclude, this chapter has discussed the expansive learning processes (ELP) that happened in response to each contradiction during the CLW. Furthermore, the chapter has presented the transformative agency pathways (TAP) that developed in the ELP by the farmers and key stakeholders in the CLW process including myself as a formative interventionist researcher with empathy and interest in the Nyanyadzi irrigation scheme's well-being. Lastly, the chapter has presented and described how the CLW process helped in advancing the ZPD of the farmers together with the other key stakeholders including myself as a 3rd generation participant and movability going forward. A summary of the contradictions and solution models were also presented for ease of reference (see Tables 6.5a; 6.5b; 6.6 & 6.7). In essence, the chapter has captured the present and has identified what is not yet there. Inner contradictions were established, and solution models were developed and presented for each field as shown in Table 6.1; 6.2; & 6.3, respectively. The chapter has suggested solution models which need to be carefully enacted and mediated with the farmers for a smooth and elected transfer which will see the transformative agency expressions enacted further into actual actions. The chapter argued the current Covid 19 pandemic and shortness of time and funding in the study as some

factors that limited the full facilitation and future enactment of the TAPs. Hence, the chapter points on to future activities towards the full realisation of the study motive and the of the participants from Nyanyadzi irrigation scheme. In this chapter I have argued that there is need to engage the transformative agency needed to fully realise change in Nyanyadzi irrigation scheme. What I have done in this chapter is to pinpoint on the necessary foci but now there is a need to further the study to realise a fuller expansive learning process and the agency potentials opened in the TAPs as reported on in this chapter. The chapter provided the necessary focal points to conclude the study in Chapter seven that follows.

CHAPTER SEVEN: SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.0 INTRODUCTION

This is the last and concluding chapter of the study. In essence, the chapter presents the key findings of the study, draws conclusions and lastly, recommends a way forward including recommendations for future studies.

7.1 SUMMARY OF THE KEY FINDINGS

The main goal of this study was to examine and mediate expansive learning in the context of the multidimensional complexities affecting household food security activity systems in an irrigation scheme in Zimbabwe. In order to achieve the above-mentioned goal, the study was guided by two main research and four specific research objectives (see Section 1.4). Hence, the study findings shall be summarised in line with the main research goal and the objectives.

7.1.1 The multidimensional complexities in Nyanyadzi farmers' activity system

Main Research question: 1. What are the multidimensional complexities that have (in the past), and are (in the present) enabling or constraining learning of household food production in interacting farmers' activity systems?

Research objective 1. Historicize the multidimensional complexities and learning of crop production (food security and marketing) in Nyanyadzi smallholder irrigation scheme prior to 1980 (year of independence) and 1980 and beyond (past perspective).

In summary the study found three influential multidimensional complexities that existed in Nyanyadzi irrigation scheme namely, farmer education and training; leadership and management; lastly, crop marketing. These three multidimensional complexities have been shaped and deepened over time and by practice. They were both learning enablers and at times they constrained learning of crop production under irrigation farming. These three multidimensional complexities shall be discussed.

7.1.1.1 Farmer education and training complexities in Nyanyadzi irrigation scheme.

Since the inception of the irrigation scheme in 1931 until it came into full functionality in 1934, one important thing that Rev. Alvord introduced and encultured was the spirit of learning, learning to farm sustainably. The first thing he identified in Nyanyadzi was the water and potential in the alluvial beds, but the second tool was farming education. In his autobiography he said he wanted to give the African farmers the “gospel of farming,” meaning he wanted them to learn farming hence, from the inception to date the irrigation scheme has been a mediation tool for learning.

The study found out that in the past, farmer education and training was used as a successful management tool in the irrigation scheme; as a mediation tool for household food insecurity reduction and to modernise Nyanyadzi community. There were many mediated learning activities going on in the irrigation schemes such as the Master farmer training, field days, and agricultural shows. These learning initiatives were based on the demonstration learning method. This method of teaching and learning was also known as “*learning by doing*,” later on the “*seeing is believing*” approaches and lastly, the “*winners and looser*” approach. The demonstration teaching method was implemented in three ways:

- a) the use of a demonstration plot where the demonstrator(s) would work, illustrating to the local farmers the proper methods of crop culture, and, when time permits the demonstrator can also visit and advise the farmers on better farming methods.
- b) partnership which can also be known as collaborative teaching and learning approach whereby, the demonstrator partners with a willing farmer on a piece of land where they can work for 1 or 2 years and the idea being that the farmer will learn by doing, by seeing and the demonstrator would shift to another willing farmer.
- c) Agricultural Advisor- this where a demonstrator is allocated a working area and would just merely go about as agricultural advisor, advising the various farmers on better methods and showing them how to do the different operations properly.

So, these methods of teaching and learning were successfully manipulated in the first years of the irrigation scheme to improve crop production, yield per unit and improve the local community’s wealth. The major tenants of this farmer education and training in the early years of establishment were based on the ripple effect that, if you train one farmer then he will influence others and the other farmers would learn from him. But this wasn’t the case, for

example in the case of the master farmer training, those trained to influence the ripple effect were later reported relaxed and instead of supporting other farmers to *“keep up with the Joneses they pulled down the Joneses.”*

Later on, in the 1960s, the same learning that had brought so much development was resisted and some farmers were said to have left the irrigation scheme because the education system was said to be strict and tough. Hence, it also became a source of dissonance and conflict in the irrigation scheme. Around the late 1970s, during the rise of nationalism the same farmer education and training was now viewed as a colonial manipulation tool and was heavily resisted and there was high resistance and sabotage work among the farmers as well.

Post-independence, the same farmer education and training that was flourishing in the first generation of farming changed, it was not the same again. The farmers deemed it unnecessary and a point of manipulation and independence for them meant freedom, freedom from the bounding farming education systems. Hence, the farmers were free and could do what they want, decide what they want to do with their plot, among others. At the same time, the NVTC that trained extension officers and provided farmer education to the farmers especially young farmers, lost its presence in the irrigation scheme disappeared. Additionally, the AGRITEX, that also provided farmer education and training, shifted from the most popular and productive demonstration (a. use of demonstration plots and resident demonstrators and b. partnership demonstrators) teaching and learning approaches to c. agricultural advisory services. The latter means the extension officers offer advice upon request and this is the situation that characterises the present.

The result has been a dysfunctional irrigation scheme that has failed to observe basic proper methods of farming like crop rotation, manuring, following cropping and diseases and pest control calendars. Resultantly, poor crop production and marketing has been witnessed, but this has not been limited to farmer education complexity alone but other multidimensional complexities as well I shall discuss them as well. In the beginning of the study, I observed and argued that *“there has been little said about the collective learning in the irrigation schemes and given the dearth of detail on such learning, it seems that this learning is either going unnoticed or is ignored.”* Up to date, this argument stands, what I have noticed is that the farmers and extension workers underestimated the power of the irrigation scheme as a

mediation tool for learning to do crop production and marketing efficiently. The multidimensional complexities that manifested then and now are much of the “*unnoticed or ignored*” praxis embedded in the irrigation scheme as a harbour of collective learning process that can also be of an expansive learning and transformative agency nature. Hence, I further argued that “*the irrigation schemes are both a stimulant for learning and provide a space (object) for collective learning,*” as was also shown by Baloi (2016) and “*the collective learning that is rich in these irrigations can be pro-actively mediated via expansive learning formative interventions*” (Engeström & Sannino, 2010; Baloi, 2016) and this what this study sought, and demonstrated in practice (see Chapter 6).

7.1.1.2 Leadership and management complexities in Nyanyadzi farmers’ activity system.

Leadership and management have been one of the multidimensional complexities influencing the irrigation scheme which has been noticed since its inception up to date. There are three tenants in this complexity that the irrigation has been struggling with namely, a) leadership, b) mediation tools (water and land) management and lastly c) financial management. I shall discuss summatively these tenants separately starting with a) **Leadership and management.**

From the word go, Nyanyadzi irrigation evolved many types of leadership and management systems up to date. This evolution was motivated and shaped by various reasons but mostly, the need to establish a control of the scheme which I termed **leadership + management** and this includes leadership roles and the general day to day management of the irrigation scheme, what is grown, where is it sold, how much must be grown among others. Secondly, it was historically, under the colonial regime, would be motivated by the need to control the Natives’ land and water resources keeping a check on wealth accumulation and at the same time modernising the community and this I called **management**. This can basically describe the form of leadership and management of the scheme from the inception up to date. The leadership and management complexities that manifested then and now in the irrigation scheme are motivated and shaped by the motives described and these have also been reshaped by other political-economic developments over time.

There is no doubt that Nyanyadzi irrigation scheme went through strong leadership and management styles over the time. From the inception up to the 1940s Rev. Alvord provided strong leadership and a strict management style that was framed in the Missionary-colonial

manner. From the beginning there was much mistrust between the local community “*Africans*” and the whites “*Colonialists*”. Alvord had to go out of his way by walking on his hands to demonstrate that there is more than one view on the world, dressing up like a woman, his hair painted purple, sitting on the ground with other women to show humility and tip silver coins and a big cloth to appease water spirits thereby, accepting the African’s culture (Bolding, 2003). The actions were meant also to convince the local community to provide labour in the digging of the furrow but because of the hard labour some community members fled, while some of the residents fled because they suspected it was a plot by the white man to test the fertility of the land before they take it away (Bolding, 2003).

This was evidence of the kind of mistrust and difficulties amongst the people he was dealing with from the onset. Bolding (1996: 69) described the local community as the “*people of different and multiple backgrounds... but importantly, people who align themselves in numerous factions organized along dynamic political, social and professional lines.*” This made Nyanyadzi irrigation scheme diverse, and I argued that, “*if carefully mediated this diversity can be an enabler to collective expansive learning and transformative agency in the irrigation schemes.*” But this wasn’t the case in Nyanyadzi irrigation scheme at that time, it became a source of hostility hence, the unpopular connotations such as “*difficult and troublesome*” among the government officials. The difficultness can be tracked back to as early the mid-1940s and escalated up to the 1960s where even sabotage to the extent of torching the Demonstrators’ house and in 1970s torching the LDO’ house was reported (see Section 4.2). The leadership and management idea of this period was to enforce discipline among the farmers through strict supervision and eviction threats. Contrary, this turned Nyanyadzi irrigation scheme into political hotbed, because of the insecurity these policies brought, and this destabilised the ongoing learning processes in the irrigation scheme.

During this colonial era, the leadership and management was guided and supported by political policies. As mentioned earlier, there was a heist to control the land ownership and water use on the African irrigation farmers through levies and rates. This was again an attempt to maintain discipline among the farmers, pop up economic recovery by the government and impose a constant check on African’s wealth. These attempts were always faced with high resistance and sabotage from the irrigation farmers, and this never improved or encouraged the learning of crop production in the scheme. Most of the policies were to establish a control over the two

mediation tools water and land as said before mention the policies again before (see also Chapter 4).

The first policy was the Native Affairs Act (1927) that allocated the unproductive land to the Africans and formed reserve settlements in these sandy lands. When Rev. Alvord established Nyanyadzi irrigation scheme, he also drafted and implemented the Irrigation Policy (1939). The policy stipulated and regulated the operations in the irrigation schemes and clearly spelt the farmers' role and expectations, as discussed in Chapter 4. It gave much managerial power to the Irrigation Director (Alvord) and his staff (including the demonstrators). In 1945 the government was ready to withdraw with Rev. Alvord stepping down for Chikore. A new managerial and leadership course was put in place through the instalment of Mr. Saunders (an LDO) in 1947 and Alvord remained the director of the irrigation scheme. The LDO worked with the same demonstrator team and the task was to provide close monitoring and discipline among the irrigation farmers. However, the 1939 policy was problematic to the farmers as there was no freedom and they felt more like employees in the irrigation scheme than irrigation farmers. Everything was decided by the management team what to grow, when to plant and to harvest and where to sell. Then the irrigation policy (1948) that provided a set of by-laws that guided the operations in the irrigation scheme was developed.

In 1951, there was the introduction of the Native Land Husbandry Act (NLHA) which was never popular amongst the African irrigators. Due to increased resistance and water rates sabotage by the Nyanyadzi irrigation farmers in 1958 the Nyanyadzi kraalhead committee was formed as a consultative body mediating between the management and the plot holders. In 1963, the Department of Conservation and Extension (CONEX) took over the management of African irrigation schemes and introduced management committees in each scheme. The intention was to re-establish an interest among the irrigation farmers efficient operation and maintenance of the scheme, as well as to bring about an appreciation of the economic need for the higher paying cash crops and the general need for a more efficient approach to irrigation farming. Then followed the Control of Irrigation Schemes Regulations of 1967 which provided control technologies with a grip on management of the scheme and its functions (see Section 4.2 & Table 4.2). The same policy was heavily contested and reduced interested in the learning potential in Nyanyadzi irrigation scheme. It was interpreted to be a ploy to evict farmers since Nyanyadzi irrigation scheme was not yet included under the 1970 Control of Irrigable Areas Regulations.

Post-independence, the management was forcibly turned into communal leadership and management systems. There was never an official handover of Nyanyadzi irrigation scheme to the community but through political instigation they managed to use the local Member of Parliament and ZANU PF provincial structures to exempt land and water levies and rates as well as to institute self-rule. Resultantly, they managed to distance themselves from the AGRITEX which was initially managing the irrigation scheme. This strained the relationship between the AGRITEX, resident Irrigation Managers, Extension officers and the farmers leading to the death of farmer education in the irrigation scheme.

Post-independence policies included the Derude Policy (1981) which dissolved the Department of Agricultural Development (Devag). The Derude was responsible for the construction and management of smallholder irrigation schemes, placing the AGRITEX for agricultural extension, and the DWD for water delivery to the irrigation schemes. However, this separation done under the Derude was problematic because, departmental co-ordination and co-operation was poor and inadequate. This caused more complexities than before. Until July 1987 when the irrigation component of Derude was transferred to AGRITEX, effectively merging the extension and management functions into a single department. This promoted learning praxis in the irrigation scheme although there were also several constraints in the scheme already. Another visible policy was the National Farm Irrigation Fund (1985), which was meant to benefit smallholder irrigation farmers in Zimbabwe. This policy aimed at providing smallholder irrigation farmers with loan facilities to maintain and expand their irrigation schemes infrastructure using the land as collateral. However, the policy was not welcome because of the unclear ownership rights in the irrigation schemes and the ongoing promises by the political figures to build dams and irrigation schemes in each district for free as well as the free humanitarian work through the donor support to smallholder irrigation development work at no charge.

The government went on to adopt the neo-liberal policies in the 1990s which resulted in the reduction or withdrawal of its funding obligations for both the operations and maintenance of the existing irrigation schemes. This step was disastrous to extension work hence a blow to learning activity in the scheme since the extension workers were recalled and the few left had to engage in the Agricultural advisory approach to teaching and learning as discussed earlier on. Additionally, the political unrest and unpopular land invasions by the war veterans in the late 1990s dried up the international and bi-lateral funding agency support who were earlier

interested in irrigation development work. This left irrigation farmers with the high burden of financing the operational and maintenance costs of the smallholder irrigation schemes and this became a new catch phase of the present era.

Another policy adopted was the Decentralisation Policy (1991-1993) that intended to implement a participatory system of local governance, that was based on the devolution of authority to various levels, at village (VIDCO), ward (WARDCO) and district level (District Council). The idea was to involve the local communities in all governance processes. A further step through the Rural District Council Amalgamation Act of 1991 (implemented in 1993) saw a more serious attempt to impeach the involvement of line departments in the administration, operation and management of local projects, including smallholder irrigation projects. The attempt was heavily resisted by the line ministries, fearing the dominance of party politics over administrative and technical competence. These two initiatives did little to improve or change the learning of crop production in Nyanyadzi irrigation scheme. Instead, they strengthened local governance but were highly criticised as stated above. Then came the National Water Policy and Strategy (1995-1998) which had the aim to re-distribute water access, commercialise government departments involved in the management of water and involve the water users in the development and management of water on a river basin/catchment scale. This further led to the Water Act (1998) which had the mandate to implement the water reforms and privatisation of the DWD and it was later changed to the Zimbabwe National Water Authority (ZINWA). Through the water catchment councils all the stakeholders were actively involved in the allocation of water permits and development of new (irrigation) infrastructure. The National Water Policy and Strategy (1995) resulted in two outcomes namely, the rise in national blend price charged for agreement water and the withdrawal of electricity subsidies on pump operated smallholder irrigation schemes. These policies hammered the operation of the smallholder irrigation farmers and this is a living manifestation in Nyanyadzi irrigation scheme where debts are looming.

The discourse of leadership and management in Nyanyadzi irrigation farming post-independence era is centred on two issues, improved productivity and improved cost recovery by the government. However, there has been absence of the rights and responsibilities of the irrigation users (farmers) in all the policy discourse. As a result, the current IMC have no legal grounding making it difficult to fully execute strong leadership and managerial decisions on underperforming or defaulting irrigation farmers.

b) Mediation tools' (water and land) management complexities

Management of the two mediation tools (water and land) has been the focal point in this irrigation's complex structure. Most of the complexities realised in this study involved management concerns related to these two mediation tools and interestingly, the two mediation tools have also provided important learning activities in the study. Farmers learnt to utilise the land and water wisely in the manner that can improve crop production as well as conserve the water and the land.

Water, as a mediation tool for learning has also been noted to have influenced much learning to be, in this case learning to be a good farmer and learning to be a better manager. Hence, in the first phase of the irrigation scheme Alvord together with his staff and farmers were learning how to manage the water network system. Water contributed and shaped the learning collective processes that were going on. Water caused managerial complexities in this study and Bolding *et al.* (1996) described the early irrigation scheme as, "*difficult to manage and marred by scarcities*" and he was referring to water. So, water scarcity (see Table 1.2) was a menace to the irrigation stakeholders themselves but regularly put them under serious collective expansive learning and transformative agency pathways. In other words, water has kept the farmers in a continuous expansive learning process of learning to deal with the scarcity, learn to use the water wisely and establish better farming practices. The past and present management of water and land are similar. There has not been much change, as the same policies and structures in the past were to maintain control and access of water and the land and it's still pretty much the same.

However, in terms of efficiency the present management systems have suffered decline, there are water leaks in all the pipe and canal water network systems, old and overdue infrastructure and this has increased water loss by increasing the water cost as well. This study further widens our horizon of understanding towards water and land as a mediation tool and arising and changing the ongoing contradictions around water and land. In this study, we started to envision better methods of irrigation schemes that are more water efficient like the pivot irrigations, and the drip irrigation system.

c) Financial management complexities in the irrigation scheme

Financial management is one of the complex structures in the irrigation scheme. In the past it seemed financial management was a bit more structured. Since the LDO together with his staff

collected and managed the funds there was never reports of financial abuse. However, the major case in the past has been in the collection of the levies and water rates. The farmers have a strong history of defaulting and resisting. Inside understanding reveals a tension that existed between the colonial system of management and the farmers' activity system, where on several occasions the water rates were increased as the yield increased, and it seemed like it was an intentional increase based on the idea of preventing wealth accumulation in African irrigators. In the post-independence period, there has been a deliberate relaxation and understanding that this is what fought for against the colonial government for i.e. access to free water. Coupled with that, are pre-independence nationalism movements that identified the water rates and levies and a colonial manipulation hence, after independence irrigation farmers live the promise. The liberation and the early new government made promises of free dams, free irrigation schemes in every district but this has not been realised because the government withdrew its support. As a result of this, communal irrigation schemes like Nyanyadzi have had to support their own operational and maintenance costs resulting in high debts to the ZETDC, ZINWA, Odzi catchment.

However, in the post-independence era Nyanyadzi irrigation scheme's financial management record is worrying. There have been reports of financial abuse, lack of physical financial management structures like monthly reports, quarterly and annual financial reports. There has also been absence of trackable financial record keeping, the figures exist in few people's heads. The bookkeeping in the irrigation scheme is below standard as there has never been proper internal and external auditing facilities. The farmers rely on hearsay related to the ZINWA and ZETDC debts or water cut actions. Because of the lack of utility bill payments, the farmers reacted by dissolving the current IMC and installing a new one. Attempts to recover the funds was in vain and since some of the IMC were in positioned through political party affiliation. Eventually, the perpetrators got away with no form of punishment and the cycle becomes repetitive. What results is high debt and strained relations with the other critical key stakeholders who are sometimes forced to abide because of party politics. What happens after the party is voted out is something yet to be seen but this could impact heavily on Nyanyadzi irrigation scheme.

7.1.1.3 Crop marketing complexities in Nyanyadzi farmers' activity system.

As discussed earlier, crop marketing is one of the critical complexities experienced in Nyanyadzi irrigation scheme. The activity has changed and been reshaped over time by the developments of the day. In essence, crop marketing has been one of the learning mediations tools in the scheme. Farmers and the management have been in constant collective learning process from the conception of the irrigation scheme to date. In the early phase of the irrigation scheme around the 1930s to the 1940s it was noted that there was not much crop marketing to talk about. The market was rather poor and notable there were also few crops grown (maize, beans, tomatoes) in the irrigation scheme. Maize was the only cash crop of this phase hence, they lamented on the lack of market of the other two remaining crops beans and tomatoes. By then maize production was also highly controlled and monitored by the government and being of African origin meant it was difficult to get a market for the maize except for household use and barter trade among the communities. The irrigation policy of 1939 placed all the managerial power on the Irrigation Manager who then as dictated in the policy (see Table 4.2), would facilitate control over the planting of crops according to a compulsory crop rotation. By, 1940, the compulsory crop rotation included maize during the wet season and wheat (50%) and a legume crop (50%) during the dry winter season. In addition, during the first generation of farming a three successive stage cropping pattern can be established. As given by Roder (1965: 128-30) cited in Bolding (2003: 136) the three-stage pattern is as follows,

from 1934-39, the dominant pattern consisted of maize in summer and wheat in winter. During 1940-42, maize in summer and beans (50%) and wheat (50%) in winter prevailed. And from 1943 to 1956 the dominant crop pattern consisted of maize in summer, and wheat (50%), sunhemp (45%) and beans (5%) in winter. After 1952 the share of sunhemp in the winter rotation tapered off to zero in 1958, since insect damage terminated high veld use of sunhemp as green manure crop.

The above cropping structures provided ample collective learning opportunity since crop diversity also meant new mediated learning activities. In the second generation of farming, crop marketing was extremely good. The farmers were engaged in contract farming and produced for export as an initiative of the colonial government. However, around the 1950s there was over production of maize crop thereby lowering its market value. This also affected other crops such as the sunhemp which was previously rewarding but became unprofitable and petered out in the mid-1950s, similarly with Onions which were tried in 1954, but the

production quickly saturated urban markets and the same fate awaited the production of peas. *“Thus, diversification of the cropping pattern proved difficult, and mainly a matter of finding a suitable market outlet nearby to economise on transportation costs”* (Roder, 1965: 131). This also compromised the potential to the collective learning associated with production of these crops in the irrigation scheme.

Contract farming started to flourish in 1957, when the Liebig's canning company opened a subsidiary processing plant in Cashel Valley in Chimanimani district. Various types of vegetables, such as onions, carrots, cauliflower, sweet corn, peas, tomatoes and beets suddenly found a guaranteed market, though only green beans proved financially rewarding in the end. The contracts were negotiated by the irrigation scheme's management and the company involved guaranteed prices and proved quite rewarding for the plot holder. Contract farming improved the crop marketing activity enormously as well as the collective learning opportunities. However, the handling fees were thought of as exorbitant forcing the LDO *“at times to pressure plot holders to deliver their crops, in order for the scheme to fulfil its contract quota”* (Bolding, 2003: 161). In, 1959 the Nyanyadzi producers' co-operative society commonly known as Co-operative was established, paving the way for a wholesale takeover of all marketing responsibilities for the scheme. The co-operative operated under the guidance of the Government co-operative Officer and its main responsibilities included signing crop contracts with interested companies for example, beans, seed beans and cotton; as well as distributing the seed issued under these contracts. It also collected and registered farm produce as well as issued pay checks to individual farmers via a bank account at the local Post Office. Their functions later included bulk purchase of maize and cotton seed; provision of loans for fertilisers, seed and agricultural equipment; and provision of the equipment, insecticides and labour for cotton spraying under the guidance of local Extension staff. This made the crop market activity more appealing and profitable to the farmers.

However, the crop market was later disrupted by the political environment in the late 1960s when Rhodesia (now Zimbabwe) was under the British sanctions after the Prime Minister Ian Smith declared a Unilateral Declaration of Independence (UDI) on the 11th of November 1965. Immediately afterwards, was a series of African resistance and uprisings which led to Chimurenga 1 and 2. All this saw a dip in the crop market and the plot holders failed to realise substantial profits until the independence in 1980. After independence to date it has been worse, the irrigation scheme has lost most of the contract farming and readily available markets due

to the prevailing political and economic situations. Money shortages and the highest inflation the country has ever seen in the 2000s amongst others, has led to most companies shifting down and /or downsizing (including Liebig's canning company, National Foods, Victoria Foods), meaning limited market. Added to this complexity has been inefficient or dysfunctional Marketing Committees in the irrigation scheme which have been appointed on political grounds. The result is a fragmented crop marketing activity that is characterised by individualistic crop production, absence of a decent cropping calendar or cropping contracts, creating disjoint and competitive marketing system instead of collective bargains. Hence, farmers fail to break even between costs and selling prices. This is coupled with the unstable economic situation where contract farming is difficult because of the ever-devaluing currency and failure of strong monetary policies.

In relation, to the above highlighted multidimensional complexities I argued that *“a careful cultural-historicity of the object of activity and mediation of the situated learning can help to collectively come up with solutions to these multidimensional complexities”* and this what this study sought to do, and as reported in Chapter 5 and 6, managed to catalyse.

7.1.2 Mediating the multidimensional complexities (outlined in 1) as a source of expansive learning via mediation in a formative interventionist expansive learning process to enhance food security.

This question informed and guided the second part of the study which was aimed at mediating expansive learning process in the farmers' and other key stakeholders' activity systems. In order to achieve the above, the study was guided and informed by the following research questions:

Question 2. How can the multidimensional complexities (outlined in Q.1) be mobilised as a source of expansive learning via mediation in a formative interventionist expansive learning process to enhance food security (into the future)?

In order to satisfy the above research, question the following specific research objectives were established and used to guide the study. These are discussed further below:

7.1.2.1 The existing learning and activity systems interacting with the smallholder farmers' activity systems.

Objective 2. Identify and describe the existing learning and activity systems that interact with the smallholder farmers' activity system in crop production in the irrigation scheme (present perspective).

As reported in Chapter 2 with the help of the CHAT methodological and analytical lenses the key stakeholders in this study were identified and defined by their positionality and role played towards the fully shared or partially shared object with the farmers in the irrigation scheme (see Section 2.2.3; Section 2.3 and Section 3.2.3). Identifying and defining activity systems was extremely critical to the understanding of the historicity of the object and illuminated a better understanding of the multidimensional complexities and the transformative learning processes that accompanied each of the activity systems. The main activity system of course was the farmers' activity system which has a history of origin to as early as 1931 (see Section 1.1 and Section 4.1.1) and it began with 29 plot holders by 1935, eight of them were tax defaulters and added to them were another 90 people mentioned above who were believed to have come from the areas around the Sabi-Limpopo valley. To date, the subjects can be categorically described in three distinctive generations of farmers. With the first generation of farmers (born before 1900-1921) (see Section 3.2.1.1) being the pioneers in the irrigation scheme. They were followed by the second generation of farmers, those born between (1921-1969) and lastly, the third generation of farmers born between 1970 to date (see Section 3.2.1.2).

The object of the farmers' activity is crop production and marketing under irrigation, in order to meet for household food security. They work with mediation tools and instruments like water, farming inputs the land and are guided by rules such as the irrigation scheme constitution, the 99-year lease and Water Act; and they engage in some sort of division of labour within their activity (see the Farmers' activity system diagram in Figure 4.1). The farmers interact with the community members in defined tasks and services forming part and parcel of the division of labour in the irrigation scheme. The community includes the following government departments, the Agricultural Technical and Extension Services (AGRITEX) (see Section 4.1.3.1) and the Nyanyadzi Vocational and Training Centre (NVTC) (see Section 4.1.3.2) contributes by providing farmer education and training to Nyanyadzi irrigation farmers. Other important government parastatals include the Zimbabwe National Water

Authority (ZINWA) (see Section 4.1.3.3) which provides the water abstraction rights for irrigation and the Zimbabwe Electricity, Transmission and Distribution Company (ZETDC) (see Section 4.1.3.4) which supplies the farmers with electricity to pump their water from the Odzi river and lastly, the Odzi Catchment Agency (4.1.3.5) which provides specific water abstraction rights from the catchment including Nyanyadzi river, Odzi river. In addition, the farmers also interact with the Irrigation Management Committee (IMC) that provides leadership and decision making for the irrigation scheme (see Section 4.1.2). Lastly, the farmers interact with Non-Governmental Organizations NGOs that may be working with the farmers through various means and support such as Tsuro DzeChimanimani (see Section 4.1.6.1) and the Southern Alliance for Indigenous Resources (SAFIRE) (see Section 4.1.6.2).

7.1.2.2 The contradictions embedded in the multidimensional complexities in the smallholder farmers and other stakeholders' activity systems involved in the crop production in the irrigation scheme for food security.

Objective 3. Surface contradictions embedded in multidimensional complexities in smallholder farmers and key stakeholders' activity systems involved with crop production in the irrigation scheme for food security.

The study found five contradictions between the farmers activity system and other interacting activity systems. These shall be summarised below:

7.1.2.2.1 A primary level contradiction within the Rules: the farmers' inheritance rules over the three generations of farming

The study found a primary level contradiction within the farmers' inheritance rule over the three generations of farming, and it manifests as a double bind as evident by the complex land tenure systems (multiple plot holder, plot leasing), and superficial water shortages (see Section 5.2.1). The complex land tenure produced has manifested as a double bind in form of multiple plots holding where one plot (4 Acres) has been subdivided to rightful plot holders through the inheritance rule (see Section 5.2.1.1.). This has created more plot holders in the irrigation system complicating watering roster management, farm input allocation systems, and disrupting the cropping and diseases and pest control calendars. In addition, the complex land tenure systems mentioned above has also manifested as a double bind in the form of illegal plot

leasing (see Section 5.2.1.1.2). This has further caused tensions and dissonance within the farmers' activity thereby, compromising smooth achievement of the farmers' object in Nyanyadzi irrigation scheme. Secondly, the farmers' inheritance rule contradiction manifested as a double bind in the form of a superficial water crisis in the irrigation scheme (see Section 5.2.1.2). The increased plot holders by the inheritance rule have put more pressure on the available water creating a superficial water crisis. The increased plot holding has also increased poor water management in the irrigation scheme resulting in what seems like water shortage yet, it's a mere poor water management crisis.

7.1.2.2.2 A central secondary level contradiction between the subjects and the mediation tool (water)

The study found a central secondary level contradiction between the subjects' practice and the mediation tool (water) which has manifested as a conflict between farmers' water use and management vs the irrigation's water need resulting in persisting superficial water crisis in the irrigation scheme (see Section 5.2.2). The contradiction has manifested as a conflict as evidenced by tensions and dissonance among and between farmers towards water suggesting there could be water shortage yet it's just a superficial crisis as mentioned above (see Section 7.1.2.2.1). The real contradiction has been on farmers' water use including the flooding irrigation system, the leaking canal and pipe water network, intentional infrastructure damage and poor infrastructure maintenance resulting to over 30% of the irrigation water lost in the process.

7.1.2.2.3 A more advanced tertiary level contradiction residing in the partially shared object of the Irrigation Management Committee (IMC) and Irrigation farmers' activity systems.

The study found a more advanced tertiary level contradiction residing in the partially shared object (which is to promote crop production and marketing under irrigation) of the IMC and Irrigation farmers' activity systems which manifested as a critical conflict paralyzing the motive of the activity systems (see Section 5.2.3; see Figure 5.6). The critical conflict has manifested in four tenants namely as high political interference (see Section 5.2.3.1), poor management (see Section 5.2.3.2), poor marketing (see Section 5.2.3.3) and lack of financial management structures (see Section 5.2.3.4). Resultantly, the IMC activity system is in

constant conflict with farmers' preferences of the type and the leadership they want resulting a management crisis. Secondly, the IMC fails to deliver a management system that is accountable, financially sound, democratically elected and sound crop marketing systems. Hence, they seem unaware of what the farmers want and the course of reforms they should engage to resolve the management crisis that looms in the irrigation scheme. The ordinary farmers seem to have surrendered to individualism and survival spree to meet household food security thereby eroding the common good fellowship, the unity of purpose and the stewardship spirit that existed thereby compromising achievement of the partially shared object.

7.1.2.2.4 A quaternary contradiction deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs (AGRITEX & NVTC).

The study found a quaternary level contradiction that is deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs namely, the AGRITEX and NVTC which has manifest as a dilemma and double bind compromising the formation of a concrete shared object (see Section 5.2.4). The contradiction has resulted in fragmentation of the intersecting activity systems resulting in the displacement of the technical advisory roles of the AGRITEX and NVTC leading to poor farmer education and crop failure in the irrigation scheme system (see Figure 5.11). In addition, the contradiction has strained the relationship and workmanship between the Irrigation Farmers, AGRITEX and the NVTC.

The current relationship and workmanship are characterized by neglect, blame or suspicion and this has left all the three interacting activity systems either in a dilemma or/and double bind. The contradiction has manifested as a dilemma and/or double in the form of poor of farmer education in the irrigation scheme (see Section 5.2.4.1). In addition, the quaternary level contradiction has manifested as a double bind in the form of crop failure in the Nyanyadzi irrigation scheme (5.2.4.2). The existing fragmentation has compromised farmers abilities in accessing current, appropriate, effective farming knowledge to timeously respond to testing times of pest and diseases outbreaks resulting in a crop failure double bind. The farmers in Nyanyadzi irrigation scheme are trapped by the persistent crop failure double bind caused by

pest and diseases outbreaks threatening household livelihood and food security.

7.1.2.2.5 A close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object compromising the formation of a shared object.

The study found a close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifest as a dilemma and double bind compromising the formation of a shared object resulting in the third generation of farmers being dislocated from the main irrigation scheme (see Section 5.2.5). This contradiction is close to the above-mentioned contradiction, but slightly different in that, it reflects the economic characteristics of the subjects and that the object and rulemaking organ of the NVTC together with the AGRITEX's object are failing to intersect. Therefore, the contradiction is between the subjects' economic characteristics which limit them from acquiring the necessary farmer education training from the NVTC. On the other hand, the NVTC's object and set up is designed to provide farmer education and training targeting the local community as the primary beneficiaries. Yet, NVTC's rulemaking organ, the one that gazettes tuition fees and levies is a national and centralized system that does not recognise or consider the local community's economic characteristic hence, the community, mostly the youths are in a dilemma they can't afford.

On the other hand, the NVTC is in a dilemma too since they are under enrolment. The AGRITEX are also in a dilemma as they have inadequate extension work support from the government forcing them into Agricultural advisory teaching and learning methods which deprive the novices decent learning opportunities. It is mostly, to the community mostly the third generation who are novices and who have little or no farming education, and they are driven into double bind situations especially when faced by the persistent diseases and pest outbreaks which result in crop failure. They lack knowledge of farming, and most of the time they end up plot leasing or abandoning the plot as a scapegoat, again causing more problems for the farmers.

7.1.2.3 Mediating the contradictions as a source for expanding farmers and other stakeholders' learning to collectively tackle the multidimensional complexities arising in the irrigation scheme using a mediated expansive learning process.

Objective 4. Use the contradictions as a source for expanding farmers and other stakeholders' learning to collectively tackle the multidimensional complexities arising in the irrigation scheme using a mediated expansive learning process.

Earlier I argue that *“a careful cultural-historicity of the object of activity and mediation of the situated learning can help to collectively come up with solution models to deal with the multidimensional complexities faced by the smallholder farmers in Nyanyadzi irrigation scheme.”* An expansive learning process via double stimulation in the change laboratory workshop helped to mediate the contradictions into a source of expansive learning, developing transformative agency and expanding the farmers and other key stakeholders' zone of proximal development. Three critical contradictions were mediated via the expansive learning process namely leadership and management; farmer education and training; lastly, crop marketing. These mediated contradictions shall be summarised below,

7.1.2.3.1 Mediating the leadership and management contradiction.

During the expansive learning process in the CLW, collectively the farmers and other key stakeholders prioritised and reformulated the leadership and management contradiction (see Section 6.1.1 and Table 6.1). In the CLW it was agreed that there is a combination of poor leadership and poor financial management. In the poor leadership contradiction, the farmers and key stakeholders identified the inner contradictions which they identified as a) absence of a framework that spells out the expected leadership qualities. So, in the expansive learning process in the CLW it was pointed out that that the current leadership lacks charisma and qualities hence going forward there must be a framework that clearly stipulate the leadership and management qualities expected. The description was that the leadership should be a plot holder; knowledgeable and should be committed to irrigation farming; with personal attributes that indicate leaders should be reliable, accessible, accommodative and considerate; with at least an O' level qualification.

It was also noted that the selection criterion of IMC members at Block level has improved, in fact the criterion must meet the above-mentioned qualities. Then selection of the IMC members must be democratic and by selection (voting system). The position of the IMC

Chairperson/Chairman is non-contested and must be reserved for the AGR|ITEX Irrigation Managers and in his absence, the Deputy/Irrigation Supervisor shall temporarily resume the chairperson's position. In the case that the Irrigation Manager has been transferred, the incoming AGRITEX Irrigation Supervisor shall resume the vacant position and the chairperson shall be deputised by a farmer elected by the farmers themselves. Lastly, both the chairperson and vice chairperson are expected to be educated, knowledgeable of irrigation farming, and possess managerial skills and be authoritative.

Under the same leadership contradiction, it was also noted that there was non-adherence to the irrigation scheme's constitution and the following were agreed: the use of suggestion boxes to monitor abuse of constitutional law/power; a review and responses to the suggestion boxes' comments slot shall be on the meeting agendas lastly, the constitution has to be reviewed to add all the new actions agreed in the CLW.

On poor financial management the farmers and the key stakeholders agreed that there was a lack of financial management structures in the irrigation scheme. Hence, the IMC was expected to produce monthly Operational and Financial reports. The reports should be circulated to all the farmers through a WhatsApp group at the end of every month. The IMC was also expected to facilitate a quarterly-internal and external audit and the internal audits shall be conducted by the AGRTITEX Extension Officers while, the external audits shall be conducted by Mr. Chabata of Nyanyadzi High school. Furthermore, annual Operational and Financial reports were expected to be prepared and circulated as explained above. Annual internal and external audits were also expected be conducted by the above-mentioned personnel and be circulated to all the farmers by the IMC as explained above. Lastly, to avoid misuse of cash Nyanyadzi Irrigation Scheme's Ecocash Merchant was now available for farmers to make their respective payments in the comfort of their homes to avoid paying in cash at all costs. In addition, all the payments/expenditures are to be done through bank transfers and all contracts/repairs in the irrigation scheme to be done through tender system. Lastly, a petty cash float system must be kept at the office for emergency purchases. Accompanying receipts and invoices are to be submitted and filed to for accountability purposes.

7.1.2.3.2 Mediating the farmer education and training contradiction.

Farmer education and training was an emergent contradiction which the farmers and other stakeholders were unaware of, but which left them in a dilemma and double situation due to other related multidimensional complexities (see Section 6.2; Figure 6.6 and Table 6.2). However, through a careful expansive learning process using mirror data and double stimulation in a CLW the farmers and stakeholders formulated this contradiction as lack of farmer education and training. The inner contradictions were identified and described as poor crop planting cropping calendar: lack of disease and pest control calendar knowledge; disposition of the farmer educators (AGRITEX & NVTC); no/little local enrolments at NVTC horticulture department and lastly, poor farming knowledge by the third generation. It was agreed that there is need for farmer education training in the form of short and long courses, at certificate and diploma levels. It was also agreed to identify and utilise local available resources like AGRITEX, NVTC and partnership/collaborate with other organisations and NGOs for further training programmes such as SAFIRE and Tsuru DzeChimanmani. In addition, there is need to collaborate with expert organisations like Universities such as ELRC-RU in writing training modules and manual development and publications or borrow some farming related training course materials from other organisations and lastly, to engage the researcher, NVTC & AGRITEX for further farmer education and training programs' meeting(s).

7.1.2.3.3 Mediating the crop marketing contradiction.

Crop marketing was an emergent contradiction which the farmers and other stakeholders were unaware of and which left them in a dilemma and double situation (see Section 6.3; and Table 6.3). Through a careful expansive learning process using mirror data and double stimulation in a CLW the farmers and stakeholders formulated the contradiction as poor crop marketing. The inner contradictions were identified and described as being the unstable political and economic environment. The farmers came to terms with reality and accepted that the current political and economic environment in Zimbabwe is volatile, and unstable. The country has an unstable currency, devaluating every day and there is no liquid or hard cash, hence, contract farming is difficult to practice. They agreed to adopt the use of US\$ as a standard for transacting, engaging in other marketing innovations and value addition. Other marketing innovations include collective farm produce tenders for supermarkets, boarding schools, clinics, among others. Another strategy recommended was to employ a Marketing Strategist/officer who works

closely with the AGRITEX, NVTC, IMC, Marketing Committee and farmers to advise on the following areas:

- a) value chain analysis and management*
- b) market research*
- c) market contracts and produce prices*
- d) international and export markets*
- e) market protection*
- f) quality control, and*
- g) contract farming.*

On the value addition innovations, they were also encouraged to consider the following:

- a. starting a small-scale packaging and tinning industry*
- b. processing, packing and labelling farm produces i.e. tomatoes, sweet beans, green beans.*
- c. partner with other NGOs for financial assistance, training and farm produce processing and packing technologies i.e. SAFIRE, Tsuro DzeChimanimani*

7.2 Conclusions

In conclusion, the farmers activity system is the central activity system which interacts with the Irrigation Management Committee which is a sub-branch formed by farmers from the irrigation scheme. Their main function has been providing leadership, and decision making on issues concerning the whole irrigation scheme. Fundamentally, this is the architecture of the irrigation scheme and they represent the farmers in most of the meetings and their decisions override everyone in the irrigation scheme. The chairman is sort of the “Manager” of the irrigation scheme, and he/she works with a committee with delegated duties as per the constitution hence, they are an important activity system interacting directly with the farmers’ activity system. Secondly, the irrigation farmers’ activity system interacts with five important government departments and parastatals each forming an essential activity system to the farmers hence, sharing a partially shared object. These five activity systems also complete the farmers community, and they are key stakeholders in the irrigation scheme. These includes the AGRITEX, NVTC together they provide farmer education and training and added on are the ZINWA and Odzi Catchment Agency which provided the farmers with water abstraction rights, licensing and the billing system. Then there is the ZETDC which is another parastatal supplying

the farmers with electricity to pump water from Odzi river into the irrigation scheme and the night storage. Lastly, the farmers' activity system interacts with the NGOs such as the SAFIRE, and Tsuru DzeChimanamani Trust. Together they form individual activity systems that provide technical and financial as well as resource support towards agency development and irrigation infrastructure development and maintenance.

However, by interacting within the farmers' activity system and/or with other key activity systems the farmers have faced multidimensional complexities to fully realise their object which is improved crop production and marketing under irrigation farming in order to achieve household food security. These multidimensional complexities include farmer education; leadership and management [(a) leadership +management b) farmer education c) mediation tools' management -water & land] and crop marketing. These multidimensional complexities have a historical account and they have evolved in complexity over time, and I argued that, "*a careful cultural-historicity of the object of activity and mediation of the situated learning can help to collectively come up with solutions to these multidimensional complexities.*"

Moreover, with the help of the CHAT methodological and analytical lenses a careful expansive learning process took place via double stimulation in the change laboratory workshop. Four critical contradictions were identified and through the mediation process three contradictions were prioritised and dealt with namely, leadership and management; farmer education and training; lastly, crop marketing. The double stimulation tools helped to mediate the contradictions into a source of expansive learning, developing transformative agency and expand the farmers and other key stakeholders' zone of proximal development.

Out of the mediated expansive learning process the farmers and the key stakeholders reflected on various of learning processes that have been happening in the past and the present. Such learning was sometimes mediated through demonstrations as "*learning by doing,*" "*seeing is believing*" and the "*winners and losers*" concept. Also, through this CLW process I realised how the farmers' and other stakeholders' cognitive horizons were expanded by the double stimulation process, how the expansive process developed their individual and collective transformative agency pathways and lastly, how the process expanded their zone of proximal development. I argued that "*there has been little said about the collective learning in the irrigation schemes and given the dearth of detail on such learning, it seems that this learning is either going unnoticed or is ignored.*" Lastly, with the understanding gained in this study as

well as the CHAT theory I further argued that “*the irrigation schemes are both a stimulant for learning and provide a space (object) for collective learning,*” as was also shown by Baloi (2016) and “*the collective learning that is rich in these irrigations can be pro-actively mediated via expansive learning formative interventions*” (Engeström and Sannino, 2010; Baloi, 2016) and this what this study found.

7.3 Recommendations

As an insider formative interventionist researcher most of the recommendations have been discussed already. I shall summarise the recommendations here as well, as these pertain to the outcomes of the expansive learning process in the irrigation scheme.

7.3.1 Leadership and management

Selection of IMC members

- Member qualities framework be adopted and implemented: the IMC should possess the following qualities: -must be a plot holder; knowledgeable and committed to irrigation farming; personal attributes-reliable, accessible, accommodative and considerate; at least achieved O’ level qualification.
- Democratic selection systems be adopted and implemented (majority selection not partisan politics)
- Every elected member must have the rightful qualifications to occupy the post.

IMC Chairperson/Chairman position: must be non-contested and has to be reserved for the AGRITEX Irrigation Managers and in his absence, the Deputy/Irrigation Supervisor shall temporarily resume the chairperson’s position. In the case that the Irrigation Manager has been transferred, the incoming AGRITEX Irrigation Supervisor shall resume the vacant position. However, the Chairperson should work closely with the depute, the IMC members and farmers at large and transparency, accountability and responsibility must be prioritised.

Vice/chairperson or Depute Chairperson/Chairman position: shall be deputised by a farmer elected by the farmers themselves.

7.3.2 Financial Management:

- **Financial Reports:** The IMC should produce monthly Operational and Financial reports. The reports must be circulated to all the farmers through a WhatsApp group at the end of every month.
- **Audits:** The IMC should facilitate preparations of quarterly internal and external audits. The internal audits shall be conducted by the AGRTITEX Extension Officers while, the external audits shall be conducted by Mr. Chabata of Nyanyadzi High school. The audit reports must be circulated to all farmers via a WhatsApp group on quarterly basis. Outgoing committees must be audited. The annual audit periods must be in tandem to the annual year of the IMC.
- **Bookkeeping-** Reports must be kept for accountability purposes.
- **Payments:** Nyanyadzi Irrigation Scheme's Ecocash Merchant must be used for all the payments and avoid paying in cash at all costs, unless if the irrigation adopts a more stable currency like US(\$).
- **Procurement practices:** all the payments/expenditures or purchases must be done through the Bank or Ecocash transfers and all the receipts and invoices must be filed and kept safe and available for auditing and accountability purposes.
- **Tender system:** all contracts/repairs in the irrigation scheme must be done through tender system and has to be vetted and awarded with knowledge of the IMC.
- **Petty cash system:** a petty cash float system must be adopted and kept at the AGRITEX office for emergency purchases and accompanying receipts and invoices must be kept safe and ready for accountability purposes.

7.3.3 Farmer education and training

- **Short and long courses:** There must be introduction of short and long agricultural courses offered to the farmers, at certificate and diploma level both facilitated by the AGRITEX, NVTC and further partnership/collaborations with organisations and NGOs (i.e. SAFIRE and Tsuru DzeChimanimani) for further training purposes.
- **Collaborations:** There is a need for collaboration work with experts and organisations like Universities such as ELRC-RU in writing training modules and manual development and publications for farmer training in Nyanyadzi irrigation scheme. Alternatively, there is need to borrow some farming related training course materials from other organisations to further train Nyanyadzi smallholder irrigation

farmers. This may call for electing a Farmer Education and Training Steering Committee comprised of the Researchers, NVTC & AGRITEX and other interested partnering organisations.

7.3.4 Crop Marketing

- Because of the current economic instability in Zimbabwe adoption and the use of US\$ as a standard for transacting is the way to go.
- **Marketing Innovations**
- **Tenders:** Engage in collective farm produce tenders in supermarkets, boarding schools, clinics, among others.
- **Market Strategist:** Employ a Marketing Strategist/officer who works closely with the AGRITEX, NVTC, IMC, Marketing Committee and farmers advise on the following areas:
 - a) value chain analysis and management
 - b) market research
 - c) market contracts and produce prices
 - d) international and export markets
 - e) market protection
 - f) quality control
 - g) contract farming
- **Value Addition Innovations**
 - a. starting a small-scale packaging and tinning industry
 - b. processing, packing and labelling farm produces i.e. tomatoes, sweet beans, green beans.
 - c. partner with other NGOs for financial assistance, training and farm produce processing and packing technologies i.e., SAFIRE, Tsuro DzeChimanimani

7.4 Recommendation for Future studies

Having said the above, I cherish Nyanyadzi irrigation scheme as a conducive space of learning and through this study I learnt about, and much appreciated the CHAT as well as the expansive learning process. Therefore, I recommend the methodological rigor in CHAT especially the issue of cultural historicity, as I found it extremely helpful in surfacing contradictions in such cases of long history like Nyanyadzi irrigation scheme. I would also recommend the insider

formative interventionist approach which I used in this study. It was helpful in so many ways. It was easy to cross reference events and triangulate documents with my lived experiences. Because of having lived some of the experiences the participants were somehow motivated to provide me with truthful details and honest contributions. Secondly, because the participants are familiar with one, (the researcher) they somehow do not expect much in the form of tokens, they are sincere and keen to maximise the kind of help the process can bring forth. This worked positively in my case. I never had to pay participants for their inclusion or participation, but I was able to appreciate their engagement through refreshments and food at the gatherings.

Lastly, I recommend a continuation of this study. Because of the limited time and much background checking, it took time to set the study in motion. However, there is still a lot of work to be done especially in nurturing and co-engaging in most of the solution models developed in this study. It is important to mention that two of the contradictions the farmers and other stakeholders prioritised and were willing to take forward (farmer education and training and crop marketing) were emergent of the ELP hence, there is need further engage the strategies and as an insider formative interventionist researcher I could work on these with the farmers. For example, in the development of farmer education and training manuals. The design of a farmer certificate course and farmer training it is where I strongly suggest furthering of the study is needed. Also, in line to the CHAT theory and the ELP employed we (as the group) failed to complete the expansive cycle (Figure 2.7) we only went as far as phase 3 and 4 respectively, and there is need to implement the new solution models, reflect on the process and consolidate the new practices. Given the nature of this study and the ELP around all the three contradictions there is also high possibility of developing this study methodology into CHAT Fourth Generation work.

There is also a need to conduct studies around crop value chains in Nyanyadzi irrigation scheme with the intention to strengthen the crop marketing strategies identified in this study as well as a potential to establish better strategies. In addition, the community is still far from appreciating the use of farming technologies and there could be a need for a study around the use of mobile technologies in irrigation farming with the intention to strengthen information dissemination and improve crop marketing. Lastly, given issues around climate change, the water uses contradictions highlighted in this study could also be informed by a study on, and assessment of feasibility of some of the improved water efficient irrigation farming technologies like drip irrigation and overhead or sprinkler irrigation systems. The focus here should be on developing

models that are compatible with communal irrigation schemes where there are multiple plot holders and improving on the existing infrastructure into a more water efficient and productive system as was pointed to in this study.

The study findings, resolutions and recommendations are synthesised in Table 7.1 for easy and better understanding of the interconnectivity of the complexity of the results and insights.

Table 7.1: A summary of the study findings, insights and resolutions

Contradictions	Causes	Manifestation	Multidimensional complexities	Resolutions
A primary contradiction within the Rules: the farmers' inheritance rules over the three generations of farming	• <u>Inheritance rules</u> -Deceased Estates <u>Succession Act</u> <u>Section 3(A)-</u>	• <u>Double bind</u> • <u>Complex Land tenure system</u> (multiple plot holding and plot leasing) • <u>Superficial water shortages</u> (complicated water management practices, poor irrigation infrastructure maintenance -high water leakages (pipes/canals)	<u>Leadership and management</u> a) absence of a leadership selection framework b) non-adherence to the irrigation scheme's constitution c) poor financial management	<u>Selection of IMC members</u> • <u>IMC Membership framework:</u> Should possess the following qualities: i) must be a plot holder ii) knowledgeable and committed to irrigation farming <u>Personal attributes-</u> a) reliable b) accessible c) accommodative d) considerate and e) achieved O' level qualification. • Democracy in IMC membership selection <u>IMC Chairperson/Chairman selection procedure</u> must Non-contested- reserved for the AGRITEX Irrigation Managers and in his absence, the Deputy/Irrigation Supervisor shall temporarily resume the chairperson's position. In

			Financial Management	the case that the Irrigation Manager has been transferred, the incoming AGRITEX Irrigation Supervisor shall resume the vacant position <u>Vice chairperson or Depute Chairperson/Chairman selection procedure:</u> The position is reserved for a farmer democratically elected by the farmers themselves. <u>Financial Management:</u> Financial Reports: IMC should produce monthly Operational and Financial reports. The reports must be circulated to all the farmers through a WhatsApp group at the end of every month. Audits: • The IMC should facilitate preparations of quarterly internal and external audits. • Internal audits should be conducted by the AGRITEX Extension Officers while, the external audits shall be conducted by Commerce teacher(s)

				(Mr. Chabata) at Nyanyadzi High school. The audit reports must be circulated to all farmers via a WhatsApp group on quarterly basis. • Outgoing committees must be audited. • The annual audit periods must be in tandem to the annual year of the IMC. Bookkeeping Reports must be kept for accountability purposes. Payments Nyanyadzi Irrigation Scheme's Ecocash Merchant must be used for all the payments and avoid paying in cash at all costs, unless if the irrigation adopts a more stable currency like US(\$). Procurement practices: All payments/expenditures or purchases must be done through the Bank or Ecocash transfers and all the receipts and invoices must be filed and kept safe and available for auditing and accountability purposes.

				• Tender system: all contracts/repairs in the irrigation scheme must be done through tender system and has to be vetted and awarded with knowledge of the IMC. • Petty cash system: a petty cash float system must be adopted and kept at the AGRITEX office for emergency purchases and accompanying receipts and invoices must be kept safe and ready for accountability purposes.
A central secondary level contradiction between the subjects and the mediation tool (water)	• unwise water use; poor water management • sabotage- infrastructure damage, stealing or removal of canal gates and locks; • syndicates on illegal watering (night)	• <u>Conflict-</u> dissonance between farmers' water use vs water need causing superficial water crisis • poor irrigation infrastructure- earth canals; leaking main pipelines, canals and broken gate locks.	<u>Farmer education and training</u> f) lack of farmer education and training g) Poor crop planting cropping calendar: h) Lack of disease and pest control calendar knowledge. i) Disposition of the farmer educators (AGRITEX & NVTC) j) No/little local enrolments at NVTC horticulture department k) Poor farming knowledge by the third generation.	<u>Short and long Agricultural courses:</u> • There must be introduction of short and long agricultural courses offered to the farmers, at certificate and diploma level both facilitated by the AGRITEX, NVTC and further partnership/collaborations with organisations and NGOs (i.e. SAFIRE and Tsuru DzeChimanimani) for further training purposes. <u>Collaborations:</u>

				• collaborate with experts and organisations like Universities such as ELRC-RU in writing training modules and manual development and publications for farmer training in Nyanyadzi irrigation scheme. • Alternatively, borrow farming related training course materials from other organisations to further train Nyanyadzi smallholder irrigation farmers. • Elect Farmer Education and Training Steering Committee comprised of the Researchers, NVTC & AGRITEX and other interested partnering organisations.
A more advanced tertiary level contradiction residing in the partially shared object of the Irrigation Management Committee (IMC) and Irrigation farmers' activity systems.	high political interference; poor irrigation scheme management; poor marketing and lack of financial management structures. high ZINWA (water); Odzi Catchment (water rights) & ZESA-	• <u>Critical conflict</u> • fragment farmers' object of activity. • paralyze the partially shared motive of the interacting farmers' and IMC's e activity systems	<u>Crop marketing</u> a) Volatile and unstable political and economic environment in Zimbabwe (unstable & devaluating currency, shortage of liquid or hard cash) b) No contract farming c) Lack a Marketing Strategist/officer d) Lack value addition innovations on their produce	• Adoption and use of US\$ as a standard for transacting. <u>Marketing Innovations</u> • Tenders: Engage in collective farm produce tenders in supermarkets, boarding schools, clinics, among others. • Market Strategist: Employ a Marketing Strategist/officer who works closely with the AGRITEX, NVTC, IMC, Marketing Committee and

	ZETDC (electricity utility) debts. • - abuse and misuse of irrigation scheme's finances			farmers advising on the following areas: a) value chain analysis and management b) market research c) market contracts and produce prices d) international and export markets e) market protection f) quality control g) contract farming <u>Value Addition Innovations</u> • There is a need to establish a small-scale packaging and tinning industry • There is need to process, pack and label or branding farm produces i.e. tomatoes, sweet beans, green beans. • Partner with other NGOs for financial assistance, training and farm produce processing and packing technologies i.e., SAFIRE, Tsuru DzeChimanimani
A quaternary contradiction deep seated between the partially shared complex object(s) of the farmers and the neighbouring	<u>Poor farmer education-</u> -lack of farmer education processes (farmer courses, workshops, seminars). - shift in Extension Officers' outreach	<u>• Dilemma and double bind</u> • compromise the formation of a concrete shared object.- poor farmer education and crop failure in		

technical advisory organs (AGRITEX & NVTC).	methods from demonstrators to consultants <u>Crop failure-</u> -poor farmer education (farmers, AGRITEX, NVTC) t -uncoordinated farming systems (cropping; diseases & pest control calendars); poor water use and management,	the irrigation scheme system.		

A close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifested a dilemma and double bind compromising the formation of a shared object resulting in the Third Generation of farmers being dislocated from the main irrigation scheme.	<u>Failure to integrate the Third generation into the main irrigation activity</u> Ethnographic and empirical data analysis show failure to successfully integrate Third Generation of farmers into the main irrigation scheme's activity system.	<u>•Dilemma and double bind</u> •Compromise the formation of a shared object resulting in the failure to fully integrate the Third Generation of farmers •Dilemma -lack of decent farmer education and training because youths cannot afford the tuition fees and levies of NVTC. •NVTC is under enrolment. •Double bind – failure to fully integrate the third generation of farmers into the irrigation scheme's activity system.		

7.5 Discussion of Findings

This study aimed at answering two broad questions namely, the multidimensional complexities that have (in the past) and are (in the present) enabling or constraining learning of household food production in interacting farmers' activity systems. In responding to question one of this study, I observed that there are three critical multidimensional complexities in Nyanyadzi irrigation scheme that enabled and constrained learning of household food production in the interacting farmers' activity systems.

Firstly, farmer education and training complexities, in the past, farmer education and training were used as a mediation tool for household food insecurity reduction and to modernise Nyanyadzi community. There were many mediated learning activities going on in the irrigation schemes such as the Master farmer training, field days, and agricultural shows. The methods of teaching and learning were executed in form of "*learning by doing*," "*seeing is believing*" and lastly, the "*winners and loser*" using the demonstration plots and Agricultural Advisors as the mediation tools.

However, today there is lack of coherence and initiatives to pursue farmer education and training and this has been explained at length in Chapter 5, 6 and 7. Of interest to this study, I observed and argued that "*there has been little said about the collective learning in the irrigation schemes and given the dearth of detail on such learning, it seems that this learning is either going unnoticed or is ignored.*" I noticed that the farmers and extension workers underestimated the power of the irrigation scheme as a mediation tool for learning to do crop production and marketing efficiently. As said earlier on, the multidimensional complexities that manifested then and now are much of the "*unnoticed or ignored*" praxis embedded in the irrigation scheme as a harbour of collective learning process that can also be of an expansive learning and transformative agency nature. Hence, I then argued that "*the irrigation schemes are both a stimulant for learning and provide a space (object) for collective learning,*" as was also shown by Baloi (2016) and "*the collective learning that is rich in these irrigations can be pro-actively mediated via expansive learning formative interventions*" (Engeström & Sannino, 2010; Baloi, 2016) and this what this study sought, and demonstrated in practice (see Chapter 6 and Chapter 7).

Secondly, Nyanyadzi irrigation scheme is marred by leadership and management complexities which were vividly noticed since its inception up to date. I observed that the irrigation scheme has been struggling with, a) leadership, b) mediation tools (water and land) management and lastly c) financial management and this has led caused dysfunction in the scheme in many ways and this has explained at length in Chapters 5, 6 and 7.

Lastly, the irrigation scheme has been faced with crop marketing complexities. These have been widely caused by the dysfunction system in the irrigation scheme itself and ever changing and volatile political-economic environment. The continuous devaluation of the Zimbabwean dollar, ever changing currency and money shortages in the system further deepened the crop marketing crisis. Realising these multidimensional complexities in Nyanyadzi irrigation scheme I argued for “*a careful cultural-historicity of the object of activity and mediation of the situated learning to help to collectively come up with solutions to these multidimensional complexities*” and this what this study sought to do, and as reported in Chapter 5 and 6, managed to catalyse.

The study further explored how the multidimensional complexities (outlined in Q.1) can be mobilised as a source of expansive learning via mediation in a formative interventionist expansive learning process to enhance food security (into the future). The three critical multidimensional complexities explained above manifested in form of five contradictions that have been heavily dealt with in Chapters 5, 6 and further summarised in Table 7.1. I found out that there is a primary contradiction within the inheritance rules (Deceased Estates Succession Act Section 3(A)) over the three generations of farming resulting in farmers’ double bind and this manifest in the complex land tenure systems (multiple plot holding and plot leasing) as well as the superficial water shortage that then complicates water management practices, and further cause poor irrigation infrastructure maintenance as evident by high water leakages (pipes/canals) in the irrigation canal network system. This is one important area to focus because not only does the inheritance rule affect the smooth running of the scheme it further fragment the irrigation system into several small units that has potential to prevent realisation of a coherent object or unit of purpose. This may call for a careful analysis into the irrigation scheme’s constitution and collectively amend the rules accordingly to the farmers’ needs.

I also found a central secondary level contradiction between the subjects and the mediation tool (water) manifesting as a conflict or dissonance between farmers’ water use vs water need

causing further superficial water crisis. The conflict has been exacerbated by poor water management practices, sabotage practices and poor irrigation infrastructure maintenance as evident by infrastructure damage, stealing or removal of canal gates and locks (leaking pipelines, canals and broken gate locks), and illegal watering (at night). The major question here is on water efficiency, current water use versus the water-plant need. In essence, the current water-plant need is relatively lower than the water available in the irrigation scheme. This then raises a question on whether there is water shortage or a misuse/management of water. Further questioning goes beyond water use to the irrigation design (which rely on gravitational earth canals and flood watering system). In as much the current design is far less efficient compared to other irrigation designs like drip and pivot systems, the real challenge comes when one takes into cognisance the irrigation scheme's land ownership structure. Learning that it is a community owned irrigation system on a 99-year lease further dampens the potential for investment, and now the only option available is to think of the best ways to improve or slightly alter the current system to become water efficient.

I further found a more advanced tertiary level contradiction residing in the partially shared object of the Irrigation Management Committee (IMC) and Irrigation farmers' activity systems. This has manifested as a critical conflict fragmenting farmers' object of activity and paralyzing the partially shared motive of the interacting farmers' and IMC's activity systems. This has been evident by the high political interference; poor irrigation scheme management; poor marketing and lack of financial management structures causing high ZINWA (water); Odzi Catchment (water rights) & ZESA-ZETDC (electricity utility) debts in the irrigation scheme. This is one of the critical findings of the study that explains well why Nyanyadzi irrigation scheme has become what she is today. The scheme has been marred by huge utility debts and mismanagement of funds, which is a topic in several meetings and general farmer debates. This is one of the areas that needs careful attention if the irrigation scheme is to redeem its status to early years' glory. As explained in Chapter 6 and 7 there are several strategies collectively suggested and further recommended.

I also discovered a quaternary contradiction deep seated between the partially shared complex object(s) of the farmers and the neighbouring technical advisory organs (AGRITEX & NVTC) which has manifested as dilemma and double bind compromising the formation of a concrete shared object as evident in the poor farmer education and crop failure in the irrigation scheme system. Interestingly, as the irrigation object evolved over time so as the Extension Officers'

teaching and learning methods. Their outreach methods shifted from being demonstrators to consultants as discussed in detail in Chapter 6 and 7. This has resulted in uncoordinated farming systems (disturbing cropping; diseases & pest control calendars); poor water use and management and crop failure, which have been the biggest lesson of the process. Again, this is one of the critical areas that needs careful and mostly coordinated efforts to restore farmer education that is tailor made to the specific needs and wants of the farmers in a fashion that promotes and encourage the farmers to take an active role in their own teaching and learning processes.

Lastly, I found a close quaternary level contradiction seated between the subjects (Farmers' economic circumstances) and the object, the NVTC rules and AGRITEX's object which has manifested a dilemma and double bind compromising the formation of a shared object resulting in the Third Generation of farmers being dislocated from the main irrigation scheme. This quaternary level contradiction is close to the previous discussed and relates to the issue of lack of farmer education discussed earlier own. This calls for a careful mediation between the farmers and the extension workers into formulation of meaningful farmer education processes. The tricky situation is how the NVTC can accommodate the local farmers' economic characteristics since they may not afford the training now, but if the situation improves, they could afford to pay for training. All of these findings address the wider context of food security as it relates to ongoing histories of political change and economic instability for the farmers, as revealed in the contextual and historical analysis in Chapters 2, 4 and 5. What the study has done is identify critical leverage points or formative intervention pathways for seeking out alternative futures for the irrigation scheme.

It is important to particularly discuss the methodological decisions carried out in this study specifically the insider formative interventionist approach chosen as it may be seen to be subjective and 'biased' in some cases. Here I note that the concept of bias originates in the natural sciences, and may not be as relevant as reflexivity in relation to subjectivity. As well explained throughout the study, I purposefully took up a role as insider formative interventionist researcher in this study. As noted in Chapters 1 and 3, the study was conducted qualitatively, designed as a case study using insider formative interventionist research (Sannino, Engeström & Lemos 2016). As discussed earlier in Chapter 1 and Chapter 3 the insider-formative interventionist approach resonates well with the aim of the study which was to mediate and examine expansive learning in the context of multidimensional complexities

affecting household food security activity systems in Nyanyadzi irrigation scheme. I feel that my positionality as the researcher, located in the insider-formative interventionist is one important and unique aspect of this study. This study's strengths and benefits lies in terms of procedural aspects and my access to research participants in the farmers' activity system and legitimacy among this group. As such the insider-formative interventionist approach offered access and connections, enabling me to engage with the community which was further emphasized by the fact that I am a third-generation farmer, and this also benefitted some certain aspects of the study.

I understand that the choice of insider-formative interventionist approach poses challenges in terms of involvement and critical analysis of the ongoing practices in the farmers' activity system. Especially the challenges associated with mobilizing a critical perspective on the practices and activity in which I (the researcher) have toiled in. But I view this as an advantage more than a challenge, in that because of my lived experiences which I shared with the participants, the participants were motivated to provide truthful details and honest contributions. With the familiarity both in terms of relationships and experiences the participants were accommodating, sincere and keen to maximize the kind of help the research process could result in. In essence, the participants were able to connect and provided truthful details and honest contributions. A good example of how the insider formative interventionist approach has characterized the study is evident in the fourth objective of the study. The objective can be read as embracing the insider formative interventionist position being to "*use*" the contradictions rather than *explore, analyse or study* them regarding asking the questions *why, how, when, where, and with whom* contradictions embedded in the multidimensional complexities can become a source for expansive learning.

The relevance and motivation/choice of insider formative interventionist approach rests to a large extent on accounts for the chosen approach and its effects on the research process and the knowledge claims that can be made based on the study as well as how and to what extent the research quality is upheld. It also highly depends on epistemological or ontological questioning. In this case asking the questions, is the study principally concerned with "what is true?" or "What to do?" and praxiology questions as well as other themes in the text especially the benefits and challenges of the insider formative interventionist approach. Considering that the onto-epistemological perspective taken in this study was that of "What to do?" it gives a more praxis-oriented understanding of the purpose of the study. Hence, the insider formative

interventionist approach chosen is more suitable for answering “What to do” as it aims to understand the practices from the insider, both historically, to inform the potential future practice development through social and expansive learning processes in irrigation scheme.

To add, since this study was aimed at generating knowledge and mediating expansive learning rather than exploring the truthfulness of the topics/themes farmers communicated about with the researcher. As I engaged in practices together with the participating farmers and having experienced the same complexities, contradictions and collective learning, these experiences were at the center and the experiences of the farmers were honest and truthful. As such the insider-formative interventionist approach allowed for original contribution in knowledge creation regarding the views and perspectives from the inside of activities grappling with educational and sustainability challenges that previously primarily been experienced from a distance.

In conclusion, being an insider formative interventionist researcher with intergenerational engagement and perspective on the history of the object and integrational engagement with the transforming object, I became part of the intergenerational transformation of the irrigation scheme’s object. The intergenerational co-construction of the history of the object, coupled with the insider formative interventionist researcher approach introduced and allowed me as a current generation agent or actor to develop an in-depth understanding of the multidimensional nature and historicity of the object. This was crucial for the manifestation of the transformative agency pathways. It also produced a responsibility for me as an insider formative interventionist researcher to carry the summative findings of the study back into the social context to widen the engagement and mediation of the transformation needed in the community. Overall, not only does the study offer an intergenerational perspective on multidimensional complexities of the object and how this can generatively be mobilised via expansive learning into emerging transformative learning agency pathways, but it also offers a new vantage point on the role of the formative interventionist research. Through this, the study offers insight into how we as third generation members can be brought closer to our communities through the application of our skills. Finally, it offers a new type of engaged research with its roots in the community.

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Appendix A: Ethical Clearance Certificate



RHODES UNIVERSITY

Grahamstown • 6140 • South Africa

EDUCATION FACULTY • PO Box 94, Grahamstown, 6140
Tel: (046) 603 8385 / (046) 603 8393 • Fax: (046) 622 8028 • e-mail: d.willmott@ru.ac.za

PROPOSAL AND ETHICAL CLEARANCE APPROVAL

Ethical clearance number 2017.12.08.05

The minute of the EHDC meeting of 05 December 2017 reflect the following:

**2017.12.8 CLASS A RESTRICTED MATTERS
DOCTOR OF PHILOSOPHY RESEARCH PROPOSALS**

To consider the following research proposal for the degree of PhD (Education) in the Faculty of Education:

Mr Robson Mukwambo (11M7058)

Topic: Mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe.

Supervisor: Professor H Lotz-Sisitka

Decision: Approved

This letter confirms the approval of the above proposal at a meeting of the Faculty of Education Higher Degrees' Committee on the 5 December 2017.

The proposal demonstrates an awareness of ethical responsibilities and a commitment to ethical research processes. The approval of the proposal by the committee thus constitutes ethical clearance.

Sincerely

Ms Zisanda Sanda
Secretariat of the EHDC, Rhodes University
8th December 2017

Appendix B: Application and Approval from the Chimanimani Rural District Council (CRDC)

 **RHODES UNIVERSITY**
Where leaders learn

915 Mbizo 19
Kwekwe
Zimbabwe
+263 773 640 082
+263 717 480 345

The Chief Executive Officer
Chimanimani Rural District Council
P. O. Box
Chimanimani
Zimbabwe

19 November 2017

 
Approved

Ref: Applying for permission to conduct an Educational Research Study in Nyanyadzi Irrigation Scheme.

I am writing for the above mentioned cause. I am a student at Rhodes University (South Africa) currently in my second year studying a Doctorate in Education. I am proposing to conduct a study on, **“The Multidimensional Complexities in household food security in a multiple activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. The main purpose of the study is to examine the multidimensional complexities in smallholder farmers’ activity systems in learning crop production and marketing in the irrigation scheme. Therefore, the study aims to historicizing the multidimensional complexities and learning of crop production prior to 1980 and beyond 1980. It also seeks to identify and describe farmers’ activity system and surface the contradictions in the smallholder farmers and key stakeholders’ activity systems. Lastly, the proposed study aims at findings ways and strategies of collective learning to tackle the multidimensional complexities in the irrigation

scheme using the Expansive Learning Process. In essence, the study proposes a strategy to engage the smallholder farmers and other key stakeholders to collectively.

I look forward to work hand in hand with your organ AGRITEX, the ZIMWA, the ZESA and other willing NGOs like Tsuru Dzechimanimani. I have attached my proposal as well. Your quick response to this application is highly appreciated.

I look forward to your favourable response.

Yours Faithfull

Robson Mukwambo



Approved

Appendix C: Application and Approval from Nyanyadzi AGRITEX



RHODES UNIVERSITY
Where leaders learn

915 Mbizo 19

Kwekwe

Zimbabwe

+263 773 640 082

+263 717 480 345

The Head

Nyanyadzi AGRITEX Extension

P. O. Box 29

Chimanimani

Zimbabwe

19 November 2017

Ref: Applying for permission to conduct an Educational Research Study in Nyanyadzi Irrigation Scheme.

I am writing for the above mentioned cause. I am a student at Rhodes University (South Africa) currently in my second year studying a Doctorate in Education. I am proposing to conduct a study on, **“The Multidimensional Complexities in household food security in a multiple activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. The main purpose of the study is to examine the multidimensional complexities in smallholder farmers' activity systems in learning crop production and marketing in the irrigation scheme. Therefore, the study aims to historicizing the multidimensional complexities and learning of crop production prior to 1980 and beyond 1980. It also seeks to identify and describe farmers' activity system and surface the contradictions in the smallholder farmers and key stakeholders' activity systems. Lastly, the proposed study aims at findings ways and strategies of collective learning to tackle the multidimensional complexities in the irrigation

scheme using the Expansive Learning Process. In essence, the study proposes a strategy to engage the smallholder farmers and other key stakeholders to collectively.

I look forward to work hand in hand with your organ AGRITEX, the ZIMWA, the ZESA and other willing NGOs like Tsuro Dzechimaniani. I have attached my proposal as well. Your quick response to this application is highly appreciated.

I look forward to your favourable response.

Yours Faithfull

Robson Mukwambo



Appendix D: An Example of a Participants' Consent Confirmation

APPENDIX : INFORMED CONSENT FORM FOR PARTICIPANTS (NYANYADZI AGRITEX EXTENSION OFFICER)

Research Project Title:	The Multidimensional Complexities in household food security in a multiple activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe
Principal Investigator(s):	Robson Mukwambo G11m7058

Participation Information

- I have been oriented and came to an understanding of the purpose and objectives of the study
- I understand that my involvement is strictly on voluntary basis and as such I may withdraw from the study at any given time and stage if a need arise and there is no penalty for such action.
- I understand the risks and benefits of participating in this study.
- I have also come to an understanding that information, insights and knowledge gained during the study may be published but my identity will remain anonymous and no reference will be made to me by name.
- I understand that feedback reports, minutes from meetings, photographs and voice recordings from interviews and focus group discussions will be done and might be used in the study but still my identity shall remain anonymous and confidential.
- I understand that I will be given the opportunity to read and comment on the transcribed interview and focus group discussion transcriptions.
- I confirm that I am not participating in this study for financial gain

Information Explanation

The above information was explained to me by: Robson Mukwambo

The above information was explained to me in both Shona and English as I am in command of this both languages

Voluntary Consent

I, S. Gudyanga hereby voluntarily consent to participate in the above-mentioned research.

Signature:

Gudyanga

Date: 20 / 11 / 2017

Investigator Declaration

I, Robson Mukwambo G11m7058, declare that I have explained all the participant information to the participant and have truthfully answered all questions ask me by the participant.

Signature:

Robson Mukwambo

Date: 10 / 11 / 2017

DEPARTMENT OF AGRITEX
Irrigation Scheme

P.O. NYANYADZI

DEPARTMENT OF AGRITEX
Irrigation Scheme

20-11-2017

P.O. NYANYADZI

Appendix E: Interview Guide for the 1st Generation of Farmers



I am Robson Mukwambo currently studying Doctorate in Education at Rhodes University in South Africa. It is in partial fulfilment of my studies that I am supposed to conduct a research study hence, I am **“mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. Your corporation, honest, truthful response are highly appreciated in this proposed study.

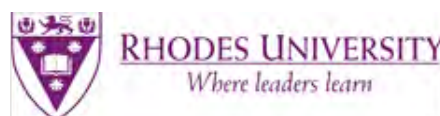
Interview Guide for the 1st Generation Farmers

1. Please can you introduce yourself and give a brief history on how you became an active participant in the irrigation scheme.
2. I want to believe you partake in the establishment of the irrigation scheme. Can you elaborate on the role you played in the establishment of the irrigation
3. Do you know of any other pioneers in the irrigation scheme who are still alive and who can give detailed narrations on the development of the irrigation scheme?
4. Coming back to you, can you elaborate on the farmers' activities in the irrigation schemes prior to the independence?
5. How was the irrigation managed and in question of land ownership how was power and rights to land ownership distributed among the farmers.
6. Were there any challenges you can pick during the pre-colonial era which farmers were faced with in their learning of food production.
7. Can you actually say farmers have been in continuous learning process since the establishment of the irrigation scheme to the independence era?
8. If yes: How enabled or facilitated their learning process and what major areas of learning did they engaged?
9. If no: What were the major hindrances to effective learning?
10. Let's look at the period after independence. What were the major changes in the irrigation scheme management styles?
11. What challenges do the farmers faced and hindered them from their full participation in crop production in the scheme?

12. Which period could you point as the most problematic time and what were the major challenges of that time.
13. Can you give a detailed narration on how the challenges of this period of your choice evolved over time to this point in time?
14. Can you say after independence the farmers engaged in learning. If so in which areas did they learnt more?
15. What were the major enablers of learning during this period?
16. Again what were the major hindrance to effective learning of crop production and ensuring of household food security?
17. As pioneer in the irrigation scheme and also considering the current state of operations in the irrigation scheme, what would you want to see happening?
18. What will be your recommendations to the current situation?

Thank you

Appendix F: Interview Guide for Second Generation of Farmers



I am Robson Mukwambo currently studying Doctorate in Education at Rhodes University in South Africa. It is in partial fulfillment of my studies that I am supposed to conduct a research study hence, I am **“mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. Your corporation, honest, truthful response are highly appreciated in this proposed study.

Interview Guide for the 2nd Generation

1. Please can you introduce yourself and give a brief history on how you became an active participant in the irrigation scheme.
2. Can you elaborate on the farmers' activities in the irrigation schemes prior to the independence?
3. How was the irrigation managed and in question of land ownership how was power and rights to land ownership distributed among the farmers.
4. Were there any challenges you can pick during the pre-colonial era which farmers were faced with in their learning of food production.
5. Can you actually say farmers have been in continuous learning process prior to the independence era?
6. If yes: How enabled or facilitated were their learning process and what major areas of learning did they engaged?
7. If no: What were the major hindrances to effective learning?
8. Let's look at the period after independence. What were the major changes in the irrigation scheme management styles?
9. What challenges do the farmers faced and hindered them from their full participation in crop production in the scheme?

10. Which period could you point as the most problematic time and what were the major challenges of that time?
11. Can you give a detailed narration on how the challenges of this period of your choice evolved over time to this point in time?
12. Can you say after independence the farmers engaged in learning. If so in which areas did they learnt more?
13. What were the major enablers of learning during this period?
14. Again what were the major hindrance to effective learning of crop production and ensuring of household food security?
15. As an Elder in the irrigation scheme and also considering the current state of operations in the irrigation scheme, what would you want to see happening?
16. What will be your recommendations to the current situation?

The End!!!

Thank You

Appendix G: Interview Guide for Third Generation of Farmers



I am Robson Mukwambo currently studying Doctorate in Education at Rhodes University in South Africa. It is in partial fulfillment of my studies that I am supposed to conduct a research study hence, I am **“mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. Your corporation, honest, truthful response are highly appreciated in this proposed study.

Interview Guide for the 3rd Generation

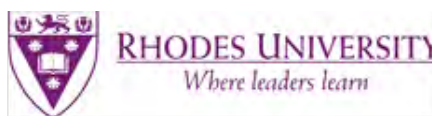
1. Please can you introduce yourself and give a brief history on how you became an active participant in the irrigation scheme.
 2. I want to believe you partake in the functioning of the irrigation scheme. Can you elaborate on the role you play in the irrigation?
 3. I want to believe you are regarded as the young generation (born after independence) in the irrigation scheme. Can you elaborate on the farmers' activities in the irrigation schemes after independence?
 4. How is the irrigation managed and in question of land ownership how is power and rights to land ownership distributed among the farmers.
 5. Can you actually say farmers are continuous learning in the irrigation scheme since independence to date?
 6. If yes: How enabled or facilitated were/are their learning process and what major areas of learning did/are they engaged?
 7. If no: What were/are the major hindrances to effective learning?
- Are there any challenges of your own time you can pick which farmers are faced with in their learning of food production?
8. What are the major changes in the irrigation scheme management styles?
 9. What challenges do the farmers face and hinder them from their full participation in crop production in the scheme?

10. Which period of your own time could you point as the most problematic time and what were the major challenges of that time?
11. Can you give a detailed narration on how the challenges of this period of your choice evolved over time to this point in time?
12. As youth in the irrigation scheme and also considering the current state of operations in the irrigation scheme, what would you want to see happening?
13. What will be your recommendations to the current situation?

The End!!!

Thank You

Appendix H: Focus Group Discussion Guide with Female Farmers



I am Robson Mukwambo currently studying Doctorate in Education at Rhodes University in South Africa. It is in partial fulfilment of my studies that I am supposed to conduct a research study hence, I am **“mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. Your corporation, honest, truthful response are highly appreciated in this proposed study.

Focus Group Discussion with Female Farmers

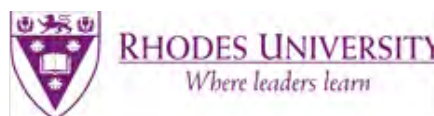
1. Please can we introduce ourselves by a brief history on how have we become active participants in the irrigation scheme?
2. What were the major issues to talk about in the history of irrigation schemes in Zimbabwe?
3. What were the farmers' activities in the irrigation schemes prior to the independence?
4. How were the irrigation schemes managed prior to independence in terms of power and land ownership rights?
5. What lessons can we draw from that period which can directly benefit the current complexities in our scheme?
6. What challenges did the farmers faced prior to independence which affected effective learning of food production?
7. How enabled or facilitated were their learning process and what major areas of learning did they engaged?
8. What were the major hindrances to effective learning during this period (prior Independence)?
9. Let's look at the period after independence. What were the major changes in the irrigation scheme management styles?
10. What challenges do the farmers faced and hindered them from their full participation in crop production in the scheme?

11. Which period could you point as the most problematic time and what were the major challenges of that time?
12. Can you give a detailed narration on how the challenges of this period of your choice evolved over time to this point in time?
13. Can you say after independence the farmers engaged in learning. If so in which areas did they learnt more?
14. What were the major enablers of learning during this period?
15. Again what were the major hindrance to effective learning of crop production and ensuring of household food security?
16. As farmers in the irrigation scheme and also considering the current state of operations in the irrigation scheme, what would you want to see happening?
17. What will be your recommendations to the current situation?

The End!!!

Thank You

Appendix I: Focus Group Discussion Guide with Male Farmers



I am Robson Mukwambo currently studying Doctorate in Education at Rhodes University in South Africa. It is in partial fulfilment of my studies that I am supposed to conduct a research study hence, I am **“mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. Your corporation, honest, truthful response are highly appreciated in this proposed study.

Focus Group Discussion with male farmers

1. Please can we introduce ourselves by a brief history on how have we become active participants in the irrigation scheme?
2. What were the major issues to talk about in the history of irrigation schemes in Zimbabwe?
3. What were the farmers' activities in the irrigation schemes prior to the independence?
4. How were the irrigation schemes managed prior to independence in terms of power and land ownership rights?
5. What lessons can we draw from that period which can directly benefit the current complexities in our scheme?
6. What challenges did the farmers faced prior to independence which affected effective learning of food production?
7. How enabled or facilitated were their learning process and what major areas of learning did they engaged?
8. What were the major hindrances to effective learning during this period (prior Independence)?
9. Let's look at the period after independence. What were the major changes in the irrigation scheme management styles?
10. What challenges do the farmers faced and hindered them from their full participation in crop production in the scheme?
11. Which period could you point as the most problematic time and what were the major challenges of that time?
12. Can you give a detailed narration on how the challenges of this period of your choice evolved over time to this point in time?
13. Can you say after independence the farmers engaged in learning. If so in which areas did they learnt more?
14. What were the major enablers of learning during this period?

15. Again what were the major hindrance to effective learning of crop production and ensuring of household food security?
16. As farmers in the irrigation scheme and also considering the current state of operations in the irrigation scheme, what would you want to see happening?
17. What will be your recommendations to the current situation?

The End!!!

Thank You

Appendix J: Focus Group Discussion guide for Irrigation Management Committee (IMC)



I am Robson Mukwambo currently studying Doctorate in Education at Rhodes University in South Africa. It is in partial fulfilment of my studies that I am supposed to conduct a research study hence, I am **“mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”**. Your corporation, honest, truthful response are highly appreciated in this proposed study.

Focus Group Discussion with Current Committee Members

1. Please can we introduce ourselves by a brief history on how have we become active participants in the irrigation scheme?
2. I want to believe the committee is made up from diverse people of different generations we can we begin by discussing the evolution of irrigation schemes prior independence. What were the major issues to talk about in the history of irrigation schemes in Zimbabwe?
3. Are there any specific policies or incidence you may want us to discuss on the management styles of irrigations prior independence?
4. How was the irrigation scheme managed prior to independence in terms of power and land ownership rights?
5. What were the farmers’ activities in the irrigation schemes prior to the independence?
5. What lessons can we draw from the management styles of that period which can directly benefit the current complexities in our scheme?
6. What challenges did the farmers faced prior to independence which affected effective learning of food production?
7. Would you say by then the farmers were in constant and continued learning of food production and household food security.
If Yes: How enabled or facilitated were their learning process and what major areas of learning did they engaged?
8. If No: What were the major hindrances to effective learning during this period (prior Independence)?

9. Let's look at the period after independence. What were the major changes in the irrigation scheme management styles?
10. What challenges do the farmers faced and hindered them from their full participation in crop production in the scheme?
11. As the current Committee what are your major roles, are they different from the previous committees and if so, How?
12. Which period could you point as the most problematic time of your own tenure and what are the major challenges of that time?
12. Can we discuss how each of the challenges of your tenure cropped and evolved over time in magnitude and complexity?
13. What were the major constraints to the management of the irrigation?
14. How were the farmers affected by these problems and their complexities?
15. Again what were the major hindrance to farmers' effective learning of crop production and ensuring of household food security during your tenure?
16. As the current committee of the irrigation scheme and also considering the current state of operations in the irrigation scheme, what would you want to see happening?
17. What are your recommendations to the current situation?

The End!!!

Thank You

Appendix K: Change Laboratory Workshop (CLW) Plan

Three-Day Change Laboratory Workshop Plan (July-August 2019)

Session	Focus/thrust	Case Details	Research participants
Day 1	Orientation to the workshop and tools and doing a historical timeline of the practice in the area under study	This involved sharing the activity systems and the expansive learning cycle. It also involves jointly making a working plan for the subsequent workshops. The participant will be put into four plenary working groups.	Smallholder farmers, Irrigation Management Committee (IMC), Agricultural, Technical and Extension Services (AGRITEX), Zimbabwe Electricity Supply Authority (ZESA), Zimbabwe National Water Authority ZIMWA and Non-Government Organizations (NGOs) i.e. SAFIRE and Tsuru DzeChimanimani. Plenary Groups (1. Farmers +Committee (2. Government Departments- AGRITEX ZINWA, ZETDC, CRDC (3 NGOs- Tsuru+ SAFIRE
Day 1	Identification of contradictions by participants and presentation of mirror data (contradictions) by researcher	Issues will be identified in three sessions with the four plenary working groups respectively. The participants prioritize or rank their issues. The participants are brought in together and they present their issues in order of their ranking as a group. The researcher would present mirror data in the combined session. The workshop participants will then be asked to rethink and rank the issues.	
Day 2	Analysing contradictions	Contradictions will be analysed as a mixed group (all participants involved) to take advantage of distributed cognition. The contradictions are analysed in terms of history, causes and effects. Contradictions are prioritized (3)	
Day 2	Developing model solutions (and critiquing them)	Participants will break into three groups, and each group collective work to develop solutions to three problems (3 contradictions). Each group work shall write a summary to the contradiction/problem its causes, effects and the model solution suggested. Three plenary presentations shall be done and this stage a critique shall be collectively done on the adequacy of the model solutions.	
Day 3	Way forward	Participants shall be led into a collective way-forward plenary discussion. The idea is to spearhead collective effort into sufficing new knowledge, finding solutions or tools to deal or address the problems Targets are to be set and assessment tools be put in place.	
Day 3 (later in the year)	Feedback workshop	Research participants reported on the progress they had made in implementing their modelled solutions. Report back on what is also coming out from the study.	

Appendix L: Farmers' Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)
Education Department
Rhodes University
P. O. Box 94
Grahamstown
Vat Reg: 488 010 5657

Dear Sir/Madam
Nyanyadzi Irrigation Farmers
Manicaland Province

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

Ndino kukokayi kumusangano wevarimi kubva musi wa 20-22 August 2019. Uyu musangano ndewe ongororo dzangu dzekuchikoro (Rhodes University, South Africa). Ndiri kutsvaga kunzwisisa matambudziko amuri kusangana nawo sevarimi uye kubatsira varimi kutsvaga nzira dzekugadzirisa matambudziko aya. Pamusangano uyu ndichakuudzayi zvakawana mutsvagiridzo yangu yekutanga uye nhorondo yematambudziko atinawo. Muchidimbu uyu musangano wakanangana nekuunza shanduko mumanzwisisire edu ematambudziko atinawo uye kuunza shanduko mumashandiro edu sevarimi uye mamwe mabato ehurumende kana maNGOs atinoshandizana nawo.

Chikafu chichange chichi pihwa pamusangano uyu. Musangano unotanga na 09:00hrs musi wa 20 August 2019 uchipera na 16:00hrs musi wa 22 August 2019. Rutsigiro rwenyu runotendwa chaizvo.

Ndini Wenyu

Mr. R. Mukwambo
Phd-candidate (Rhodes University)
+263 773 640 082
+263 717 480 345
rmukwambo@gmail.com

Appendix M: Chimanimani District Administrator (DA)'s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)
Education Department
Rhodes University
P. O. Box 94
Grahamstown
Vat Reg: 488 010 5657

The District Administrator (DA)
Chimanimani District
Manicaland Province

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you and your office to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers' change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. On the same note, accommodation and transport arrangements will be organized for you for the entire workshop. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. You are expected to check in the accommodation facilities at 5pm (20/08/2019) and check out 15:00hrs (22/08/2019). Because of the limited budget only one participant from your office shall be covered but, you are welcome to bring more people with own accommodation arrangements. Please notify me of your attendance, and the number of those who intend to come with own accommodation. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo
Phd-candidate (Rhodes University)
+263 773 640 082
+263 717 480 345
rmukwambo@gmail.com

Appendix N: Zimbabwe National Water Authority (ZINWA)'s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Manager

ZINWA

Mutare

Manicaland Province

Zimbabwe

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you and your office to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers' change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. On the same note, accommodation and transport arrangements will be organized for you for the entire workshop. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. You are expected to check in the accommodation facilities at 5pm (20/08/2019) and check out 15:00hrs (22/08/2019). Because of the limited budget only one participant from your office shall be covered but, you are welcome to bring more people with own accommodation arrangements. Please confirm your attendance, and the number of those who intend to attend with own accommodation. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

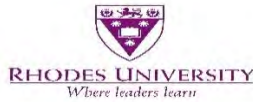
Phd-candidate (Rhodes University)

+263 773 640 082

+263 717 480 345

rmukwambo@gmail.com

Appendix O: International Fund for Agricultural Development (IFAD)’s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Manager

IFAD

Mutare

Manicaland Province

Zimbabwe

Ref: Invitation to attend and participate in a 3 Day Farmers’ Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you and your office to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers’ change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. On the same note, accommodation and transport arrangements will be organized for you for the entire workshop. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. You are expected to check in the accommodation facilities at 5pm (20/08/2019) and check out 15:00hrs (22/08/2019). Because of the limited budget only one participant from your office shall be covered but, you are welcome to bring more people with own accommodation arrangements. Please confirm your attendance, and the number of those who intend to attend with own accommodation. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

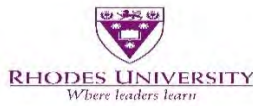
Phd-candidate (Rhodes University)

+263 773 640 082

+263 717 480 345

rmukwambo@gmail.com

Appendix P: Southern Alliance for Indigenous Resources (SAFIRE)'s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Manager

SAFIRE

Mutare

Manicaland Province

Zimbabwe

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you and your office to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers' change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. On the same note, accommodation and transport arrangements will be organized for you for the entire workshop. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. You are expected to check in the accommodation facilities at 5pm (20/08/2019) and check out 15:00hrs (22/08/2019). Because of the limited budget only one participant from your office shall be covered but, you are welcome to bring more people with own accommodation arrangements. Please confirm your attendance, and the number of those who intend to attend with own accommodation. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

Phd-candidate (Rhodes University)

+263 773 640 082

+263 717 480 345

rmukwambo@gmail.com

Appendix Q: ZESA (ZETDC)'s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Manager

ZESA

Chipangayi

Manicaland Province

Zimbabwe

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you and your office to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers' change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. On the same note, accommodation and transport arrangements will be organized for you for the entire workshop. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. You are expected to check in the accommodation facilities at 5pm (20/08/2019) and check out 15:00hrs (22/08/2019). Because of the limited budget only one participant from your office shall be covered but, you are welcome to bring more people with own accommodation arrangements. Please confirm your attendance, and the number of those who intend to attend with own accommodation. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

Phd-candidate (Rhodes University)

+263 773 640 082

rmukwambo@gmail.com

Appendix R: Tsuro DzeChimanimani Trust's Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Manager

Tsuro Dzechimanimani

Chimanimani District

Manicaland Province

Zimbabwe

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you and your office to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers' change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. On the same note, accommodation and transport arrangements will be organized for you for the entire workshop. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. You are expected to check in the accommodation facilities at 5pm (20/08/2019) and check out 15:00hrs (22/08/2019). Because of the limited budget only one participant from your office shall be covered but, you are welcome to bring more people with own accommodation arrangements. Please confirm your attendance, and the number of those who intend to attend with own accommodation. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

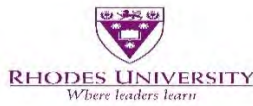
Phd-candidate (Rhodes University)

+263 773 640 082

+263 717 480 345

rmukwambo@gmail.com

Appendix S: Agricultural Extension Services (AGRITEX)’s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Manager

AGRITEX

Nyanyadzi

Manicaland Province

Ref: Invitation to attend and participate in a 3 Day Farmers’ Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers’ change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for

locals. Please note that because of the limited budget only three staff members are invited from your office and they will be provided with lunches and refreshments. Please confirm your attendance, and the number of those who intend to attend and participate. Your presence and participation will be highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

Phd-candidate (Rhodes University)

+263 773 640 082

+263 717 480 345

rmukwambo@gmail.com

Appendix T: Nyanyadzi Vocational and Training Centre (NVTC)'s Invitation to a 3-Day Change Laboratory Workshop (CLW)



Environmental Learning Research Center (ELRC)

Education Department

Rhodes University

P. O. Box 94

Grahamstown

Vat Reg: 488 010 5657

The Principal

Ministry of Youth, Sport, Arts and Recreation

Nyanyadzi Vocational Training Centre

Manicaland Province

Private Bag 15

Tel: 026 - 2471 *Cell:0775811130/0734939708*

Ref: Invitation to attend and participate in a 3 Day Farmers' Change Laboratory workshop (20-22 August 2019) at Nyanyadzi Vocational training Centre.

I do write to invite you to the above-mentioned workshop. This workshop is a continuation of my PhD study with Rhodes University, South Africa. This change laboratory workshop with farmers and relevant stakeholders is part of my last data collection process. I will feedback on the preliminary findings and insights drawn from fifteen (15) interviews that I conducted with three-line generation of farmers working in the irrigation scheme and from three (3) focus group discussions with various farmers in the irrigation scheme. In this farmers' change laboratory workshop the history of Nyanyadzi irrigation crop production and marketing shall be closely reviewed and discussed. The contradictions within the farmers activities and across activity systems with other stakeholders shall be discussed. In essence, this workshop is aimed at mediating transformative agency and change through an expansive learning process in the irrigation scheme.

Lunches and refreshments will be provided. The workshop begins at 09:00hrs on the 20th of August and ends at 14:00hrs on the 22nd of August for those who travel far and 16:00hrs for locals. Please note that due to the limited budget only three staff members are invited from your office and they will be provided with lunches and refreshments. Please notify me of your attendance, thank you in advance. Your presence and participation will be highly appreciated.

Therefore, your presence and participation are highly appreciated.

Yours Sincerely

Mr. R. Mukwambo

Phd-candidate (Rhodes University)

+263 773 640 082

+263 717 480 345

rmukwambo@gmail.com

Appendix U: Ethics Application

EDUCATION FACULTY ETHICS COMMITTEE (EFEC) ETHICS APPROVAL APPLICATION FOR MEd AND PhD THESES

TITLE OF RESEARCH: Mediating and examining expansive learning in the context of multidimensional complexities affecting household food security activity systems in Nyanyadzi Irrigation Scheme in the Manicaland Province of Zimbabwe”.

DEPARTMENT: Education

DATE: 19 November 2017

RESEARCHER AND STUDENT NUMBER: Mukwambo Robson G11m7058

SUPERVISOR: Prof Heila Lotz-Sisitka

IMPORTANT: The following form needs to be completed by the researcher and submitted with their research proposal to the Education Higher Degrees Committee. The details to which this form relates should also be evident in the text of the proposal. You must read the Faculty of Education Ethical Guidelines for Educational Research *prior* to completing this form.

Level of thesis (please tick)

MEd – half thesis	MEd – full thesis	PhD ✓

Funding (please tick)

Self-funded	Funded Please specify: ✓ ELRC Departmental Bursary

Ethics protocol code (please tick)

	YES	NO	N/A
Research ON children The research requires direct engagement with minors (as defined by the Health Act) This requires EFEC and RUESC approval		✓	
Therapeutic		✓	

Research that includes interventions that may hold out the prospect of direct health-related benefit for the participant.			
Non-therapeutic Research that includes interventions that will not hold out the prospect of direct health-related benefit for the participant but may produce results that contribute to generalizable knowledge. In the event that this research involves minors it requires ministerial approval		✓	

Research WITH children The research requires limited engagement with minors. This would include having minors as research participants but the research would not be about or on them. This only requires EFEC approval (unless the research is classified as high risk as per RU ethics handbook)		✓	

Research ABOUT children The research requires indirect engagement with minors. This would include reviewing information about minors from documents and school files. This only requires EFEC approval (unless the research is classified as high risk as per RU ethics handbook)		✓	

Research with adults The research requires engagement with humans other than minors, such as teachers, education officials This only requires EFEC approval (unless the research is classified as high risk as per RU ethics handbook)	✓		

Please indicate below how the research supports the indicated ethical principle of:

Respect and dignity

My role as an Insider Informative Interventionist in this proposed study will be of great importance and advantageous on guaranteeing and maintaining respect and dignity to the research context, its people and the participants at large. The research design positioning allows me as an insider researcher to use my contextual and indigenous knowledge to fully negotiate, maintain and honour the participants the respect and dignity they deserve. I will be working closely with the Nyanyadzi Station AGRITEX Extension Officer as well as the local KraalHead leader (Mr. B. Dziwandi) to ensure all the cultural, political, social (including the traditional customs) are observed and respected during and after the proposed research. In the proposed study, I need to orient the participants on their roles, my role as an insider informative

interventionist and the overall objectives of the proposed study. A fair negotiation of permission and access will be done with the local Chieftainship, the AGRITEX who are the overall managing organ of the scheme, the current Management Committee, the farmers through the Famous Union Board. Lastly, since the proposed study involves local communities the researcher will seek for individual participants' consent. This will be achieved through a consent form, which will be self-administered to the participants to read, understand and sign to indicate their willingness to participate in the proposed study (see Appendices attached). The negotiation is meant to respect, ensure trust and mutual understanding between the researcher, the proposed study and the participants (Farrante, 2001).

Furthermore, Bassey (1999) reminds us of freedom researchers in democratic societies are likely to encounter such as, freedom to give and receive information and the freedom to publish research findings. Like said earlier on the researcher will be mindful of respondents' freedom and such freedoms will be clearly explained in the consent letters and will be observed in the proposed study. Participants will be briefed about the proposed study, its aim and objectives and informed consent will be requested and access negotiation will be done accordingly (Cohen, *et al.*, 2007).

Transparency and honesty

McGarry (2017, p. 4) points out that, it is important to create a “reflexive, empathetic, imaginative and caring space” for the participants in the process. In this light, the researcher is going to achieve transparency and honest by reflexivity in the research process. In this case through the Expansive Learning process in which eight change laboratory workshops are to be held. The change laboratories will be anchored on the reflections on the data and insights generated from the 15 face to face interviews with three generations and four focus group discussions. These reflections not only do they provide the double stimuli in the change laboratory workshops but will as well serve as an instrument for honesty and transparency.

Furthermore, study transparency and honesty will be achieved during the consent negotiation phase. During this phase the researcher will take some time to orient, explain and make the participants understand the aim and objectives of the proposed study. Through the use of the consent letter a detailed trail on the proposed study's aim and objectives will be clearly stipulated and the participants will be asked to sign if they understand and willing to participate in the proposed study. Hence, the consent letter is another form or instrument to be used to observe and maintain transparency and honesty of research.

Lastly, since this study is an informative interventionist, there is no way these two important variables are going to be neglected. Hence, feedback reports to various stakeholders including the participants will be done. Feedback and planning meetings will also be held at each phase of the study with the AGRITEX, Irrigation Management Committee and the Farmers Union to discuss, plan and prepare for the oncoming phases in the Expansive Learning Process. The interviews, focus group discussions' transcripts and interpretations will be returned to the respective participants for them to read, clarify and appreciate as a form of being honest and being transparent to the participants and the research at large. Furthermore, the research findings will be discussed with the participants and this won't be a challenge since, this study involves active participation of the participants themselves to iron out their own multidimensional complexities hence, they will be kept updated and well versed with the proceedings of the research.

Accountability and responsibility

Through the informative insider interventionist approach the researcher will be held accountable and responsible. The researchers' role as a facilitator more than a participant should give more responsibility to represent fairly the data findings, protect the most vulnerable participants especially the women and the children. The researcher should also be versed with issues of power gradient in the scheme and shall not succumb to any political alignment or for any political mileage.

At the level of actually conducting interviews and observations, I will be conscious of creating an open, democratic approach to my interactions so that people feel they trust me as a researcher, and that their perspectives are well reflected. McGarry speaks of the "ethical obligation and response-ability to share and transform the narrative democratically" (2017, p.4). This is the responsibility of the researcher that the process of gathering and information sharing, is for the common good. In order to achieve this, the researcher will negotiate with key stakeholders who lead multiple roles within the irrigation scheme and as a researcher I commit to represent less dominant narratives more fairly.

Integrity, academic professionalism and researcher positionality

The researcher positions himself as an Insider Informative Interventionist in this proposed study. This is because the researcher was born and bred in Nyanyadzi communal area, marking the third generation of practising crop production in Nyanyadzi irrigation scheme. As such the proposed study was motivated by the deep feelings, desire to facilitate change and seek collective solutions and strategies towards current multidimensional complexities preventing effective household food security.

However, as noted by McGarry (2017, p.5) “the research should present both academic and practical value”. In this study the researcher will distance himself much both as an insider and as an interventionist becoming more of a facilitator. This will help to maintain the proposed study’s integrity and academic professionalism. Adding on to academic professionalism, most of my interaction with the participants and relevant stakeholders will be professional mostly in meetings, interviews or group discussions and any other important gatherings. Furthermore, as an insider researcher I hope that my presence will ‘naturally’ influence the setting of the research and that my own biases, motivations and assumptions will not compromise fairly representation of the findings or influence the way things unfold.

Further, please provide the following specific details of the empirical research design:

- ***How many participants will participate in this research?***

Sample	Description	Number
Interviewees	1 st generation (born 1910-1920)	5
	2 nd generation (1950-1960)	5
	3 rd generation (born 1980-1990)	5
Focus group discussions	female headed households	10
	male-headed households	10
	out-going management committee members	10
	current sitting management committee members	10
Change Laboratory Workshops	AGRITEX	5
	ZESA (ZETDC)	5
	ZIMWA	5
	NGOs	10
	Smallholder Famers	10
Total		90

- ***What are the selection criteria for selecting the participants?***

The proposed study is interested in in-depth understanding of multidimensional complexities rather than in numbers. As such the proposed study will employ the purposive sampling technique. Purposive sampling is also known as purposeful, judgmental or convenience and refers to the intentional seeking or selecting of individuals or situations likely to yield a greater understanding of the phenomenon of interest (Creswel, 2003).

- ***What is the rationale behind selecting these number of participants?***

Firstly, the fifteen interviewees will be selected to cover a three generational space. This is meant to generate an in-depth knowledge and understanding in historicizing the multidimensional complexities. In essence, this intends to capture and tell a story on how the current multidimensional complexities bemoaning the scheme have evolved in time and space in and between generations.

Secondly, the forty participants will be selected to participate in the four respective focus group discussions. These will be chosen to give a fairly representative population which is also gender sensitive (males vs females). Furthermore, this is to capture dissonances in practice across sectional activities from the out-going and the current sitting irrigation management committees. Overall, this population was chosen to gain a better understanding and to answer the question what multidimensional complexities are hindering or enabling learning crop production and marketing towards household food security? This information is important to the Expansive Learning Process where the findings and insights might be used as double stimuli in the change laboratory workshops.

Thirdly, the thirty-five (35) participants will be selected to participate in the change laboratory workshops. These are the participants who will help to achieve the How do Multidimensional Complexities impact learning of food production and marketing in interacting activity systems? This phase will be mostly the Expansive Learning Process aimed at finding collective solutions and strategies to resolve current multidimensional complexities and improve the household food security.

- ***How will confidentiality and anonymity of the participants be ensured?***

Participants' confidentiality and anonymity will be achieved through the use of pseudo names when reporting focus group discussion findings and while, interviewees' anonymity will be achieved through the use of codes used on the transcripts. Use of coding and codes is meant to

keep a trace of the data. Interview and focus group discussions' transcripts and the audio records will be stored in a private, secured room and the soft copies will be stored in secured e-folders with passwords

How, and for how long will security of data be ensured?

The data will be kept for at least 5 years. This will be achieved by saving the data on external hard drives, a flash stick clearly labeled and also saving all the documents electronically in e-folders secured by passwords and uploaded in Google Drive, Drop Box among other servers.

- ***Please attach a copy of an example of the letter(s) of consent for the research participants.***
- ***Please attach a copy of the letter(s) of consent for the participating institution.***
- ***Please provide a copy of the permission letter to be sent to the gatekeeper seeking consent (eg from the EC Education Department).***
- ***Please provide copies of the following research instruments:***
 - ***Interview schedule***
 - ***Questionnaire/survey***
 - ***Observation schedule***
 - ***Other {PUT IN THE OUTLINED OF YOUR DATA GENERATION TOOLS E.G. WORKSHOPS; FOCUS GROUP INTERVIEW SCHEDULE ETC. I.E THE TOOLS YOU WILL USE TO GUIDE YOUR FIELDWORK}***

Signature (researcher)



Signature (supervisor):



Place: Kwekwe, Zimbabwe

Place: Grahamstown, South Africa

Date: 20/11/2017

Appendix V: Analytical memo1

Data Source	Theme	Manifestations	Supporting Evidence	Source
Change laboratory Workshop	A primary contradiction within the farmers' inheritance rules over the three generations of farming	Complex land tenure systems (i.e. multiple plot holders, leasing)	Participant E3: On top of that imimi vanhu vemuNyanyadzi misoro yenyu haidhonzi mushe pamwe pachu. Why because tirikuti, mirai ndikutaurirei tiri kuti munhu anofanira kupinda muIMC anofanira kunge ari plot holder. Asi unotoona munhu asina neplot ari kurima pamunda pasekuru kuti ngaapinde mucommittee zvine musoro here? Zvinoshanda here izvozvo, torai vanhu maplot holders moisa mucommittee motevedza zviri mubumbiro remutemo. Participant F12: Eeeh ndaida kudai, munhu asiri plotholder haafaniri kutonge munhu une number(plotholder). Ngekuti tinedambudziko rekuti wandotaura zvatidakadza maningi tinomuda iyeye. Apa munhu iyeye haana number vazhinji vatiri kutongwa ndivo vanhu ivavo Havana kana number. Participant F18: Researcher ndoda kumbodzoka panyaya yataurwa na extension officer apo. Mk first generation yanga iine maplots aya yakaenda (kufa) kwasara vana vavo nevana vevana vavo. Plotolders hamuchina, akapuwa munda naAlvord wakafa kwava kusiya mwana wake, mwana wake uyu ndiye aane vana vakewo ane plotholding ndiani? <u>Explanation to inheritance/land ownership</u> Participant F22: Right ndinokumbirawo kukubatsirai ipapo pana 1931-1947 kuti vanhu ivavo generation yavo hatisisina ka. Toenda pa 1965-1980 generation iyoyo tinayo anditi. ngatiendei pana 1980-2018, regai ndisvike pa point yangu yandiri kuda kutaura. Ende ndizvo zvimwe zvatiri kutaura zvinokwanisa kundotidondhedza. Izvi zvinoda kutoti management panezvazvo ndozvandiri kuda kuedza kuti zvibude pa point yangu. Kuti ava vari kuti maplot holders hakusisina inini ndinoti variko. Sei ndichiti ariko kana baba vangu vakafa inini, vakafa anditi urikuteera mukoma wangu ndiye uri pachigaro under bumbiro renyika ndosvarinotaura kuti zita remunhu wakafa harishande pamunda. Pouya munwe odai ndopanoni good management kana yava kunzi poor management ndopatasvika pana 1987-2018 zviri ku illustrator nechart number three. Muri kuzviona here kuti matambudziko atava nawo abarwa neyi, kuna 1931 zvanga zvakanaka nepa 1965 panga kakanaka saka inini ndiri kuti maplot holders aripo. Participant F18: Okay pane patakaita meeting pa AGRITEX paya pakanzi pabuda Constitution panga paine panga pakanzi kana usiri plotholder usaigner constitution. Pane pakadaidzirwa nemukomana waiverenga wacho (Brighton), pane paakati kana usiri plotholder this constitution sezvinotaurwa ne bumbiro reirrigation kuitira kuti ripase. Nemhaka yeyi pari kuti vaMaj muridzi weplot iri riri apa iri paane vana vavo, vana vavo vavakushare plot anoenda ndiani akamirira A72 plot. KwaMushaba kuna Chris, kuna Tendai, unonyorwa ndiani? Participant F16: okay point yavo ndainzwa. Point yavo haisi kuexitir kuti hakusisina owner, owner aripo. Ownership yeland iri pacrew rekubarwa kwakaitwa ana baba vedu amwe akabarwa pasina vakomana ungori musha wevasikana chete anditi saka vasikana ivavo ndovava kubata land iyoyo anditi mazviona kuti vazopawo vana vavo saka mune mumwe machine matambudziko ekuti hanzvadzi yainge pamwe iri ku Harare kana kuAmerica atete vosara vakabatira minda vachirima, vatete vofa vosiire muzukuru mwana wawo. Sekuru achizouya manje avakuti iya muzukuru takauya kuminda yaana baba vedu iyi muzaya woti aaah aah minda ndakasiirwa ndimai. Saka munenge mava kuchishaya maAcre asi ownership iripo vanhu vanenge vachinatsa kuziva kuti nhingi ndiye ari paminda yakati, nhingi ndiye ari paminda yakati. Hapana minda isina vanhu ba ndozvandionatsa kuziva minda yese inemunhu.	Participant E3 Participant F12 Participant F18 Participant F22 Participant F18 Participant F16

		Participant E3: Maybe regai tivajekeserai isusu tinogova nhaka. Zvinoitika ndezvekudai AGRITEX haigovi nhaka but toti for example paMr M, vaM vakafa ndoplot holder A43. Vafa kudaro vanhu vanogara mumba mawo tisipo voti baba zvavafa todiii ivo voti alright baba vakanga vaine vana vakomana four saka toti umwe neumwe Acre rake. Mawirirana here vouya naSabhuku nemuCommittee member. Isu tobvunza saka mafambirei, votaura nyaya yavo, mawirirana here ehe, mawirirana kuti chiii zvakati, part ye Acre 1: Patrick, Acre number 2: Chrispen, Acre number 3: James number four Amai, apa I three boys ndezve mumba mawo nemaAcre awo. Saka chrispen unomira ne Acre rake saka zvinenge zvichinzi inhaka zvakarongeka. Vanozviziva mukangoitirana nharo tinoti dzokai mozouya. Participant F2: Saka plot number watova nayo here munhu iyeye? Participant E3: Ehe watova nayo. Tobva tatomupawo plot number yake. Participant F2: Ndokuti plot number, uyu wave plotholder saka unogona kuvoicer. Haikona kuti munhu unovoicer asina plot number kumuti uneplotholder number here umwe haaizivi. Participant F16: Vamwe malodger Participant F10: Unozotoona kuti umwe mulodger asi watoti tende mumangement. <u>Input allocations</u> Participant F22: Right inini pamwe pachoda panoda kuti tibatsirane, panhaurwa yekuti ndezvemadzinza zviri kuti tambudza muirrigation scheme medu umu anditi ka. Eeeh uye kutanga nemalearning ngatiti ma workshops anoitwa anenge akatarisana nedonzo rekuti kana tiri kurima beans tinodzidziswa nezve beans production anditi. Pamwe pamakasvikawo pameeting iyoyo panga paine kamwe kaseggregation kakanga karipo. Nganditi ndiri lodger ini pamunda waMr Mk ndosvika inini parikunyoreshwa mainputs ndonyoresa zita rangu inini va Mk havasi kuziva kuti kwakauya mainputs. Saka Mr. Mk pavachazoenda vachida kunonyoresa mainputs vachasvika vachinoona pakanyorwa zita rangu inini. Zvava kutanga kuita mhere mhere ndosaka vaitaura kuti tinoda plot holder. Tisingati mumaAcre umu hamuna maplotholders aiwa, maplotholders arimo. Participant F6: Apo haisi nyaya yema inputs chete. Isusu takaroorwa tichinzi misangano yeminda hakuendi vanhu vose vose. Asi kuri kuti nhasi tine musangano we minda munoona nyika yese yava yematongerwe enyika. Ndiani uri kuchair wacho saka muchizoona hakuna kana kwazvinoenda nekuda kwevanhu vava manje. Vamweni vanoendera kuti toda kunovhiringidza vamweni vanongoendawo isu takangokura tichiziva kuti kumisangano kunoenda varidzi vepamba ipapo, baba ndivo vanoenda kumeeeting yacho. Madanwa nani kumeeeting kwacho, vobva kumeeeting vaitsanangura zvataurwa kumeeeting zvotedzwa zvakambaindonaka. Zvino ikozvino umwe wava kumbaindoti nevakunda nevakunda, vazukuru kunoti chee kumeeeting kwacho nezvinotaurweko hazvichanzwiki. Saka zvamwataura zviya zvekuti AGRITEX iri kutizawo yakadai nafarmer zvoreva kuti patoshata. Nekuti panozara kuti rwi nevanhu vasina nechekuita nemeeting yacho. <u>Illegal leasing</u> Participant F4: inini ndambudziko randakaona rava muirrigation scheme medu umu ndere vanhu veku renter (leasing) ndovanhu vatosara. Zvema plotholders izvo zvinozouya, munhu wekurenter atosvika pamunda pako atova plotholder yakatogwinya kudarika iwewe wacho. Vanhu vekurenter ndodambudziko ndinosimbotaura kuti kana uchida kurenter munda nangisa munhu uri kukupa mari kuti munhu wangu uyu unoenda pasi pangu here. Kana kuti iye unochitoita iye muridzi wemunda and iwo vanhu vekurenter ava ndivo vanotitambudza futi kumvura kumagate. Ndiwo futi vanhu vari kuti pwanyira mugero nekuti vanhu vanodarika. Vazhinji vavo vaav kutogara munomu vachirenter nedzimba	Participant E3 Participant F2 Participant E3 Participant F2 Participant F16 Participant F10 Participant F22 Participant F6 Participant F4

		kundofambira kuti kana mvura yaoma ini ndorongedza twangu ndodiii ndotoenda. Osiya atiurayira migero, osiya atiurayira system yedu yemunomu yekupanana mvura. Saka ndakaona hangu kuti muirrigation nyangwe ukada kuzvitaure azvizwiki asi iproblem yevanhu vekurenter ava. Ndiwo vari kucheka mafence vanhu vekurenter, ndivo vari kupwanya magates. Mukazviita follow up ndiwo vanhu vanyanya kuti uraya. Researcher: Constitution yedu inombotii? Participant F18: Mr. Researcher constitution iyo haisati yava kushanda ba because pane part iri kumbogadziriswa nekuti yanga iri padraft. Researcher: the old constitution inoti chii pamusoro peleasing? Participant F18: Pamusoro pe leasing handizivi hangu. Inini ndiri kutotsvagawo munda uri open imo munomu. Participant F22: Asi pataurwa nambuya ka, kwekumhanyira kunobata magate, kowambomhanyirei kunobata magates ndopane nyaya. Vamwe vacho ndivo maploholders varimo. Participant F9: ehe asi parizvino manje hausati wava kushanda. Saka pane mubvunzo wa Researcher manje ndepikuti yekare constitution iripo here? Ndiyo yatiri kuti iripo yenguva yaana Chamatowo, ehe. Researcher: Ndoyandiri kubvunza kuti inomboti chii paleasing? Participant F16: Inini ndinoda kuti, ehe ndipo pandiri kuda kuuya. Isusu patakakura nyika yai ... Researcher: Aaah aaah constitution inoti chii panyaya ye leasing? Participant E3: leasing haibvumidzwi Participant F22: inini ndoda kutaura ipapo panzi haibvumidzi. Panhau ye leasing munda unorenteswa haaa hazvibvumirwi ndochokwadi chiripo. Munda haurenteswi kwai kare kacho kwaitobvunzwa kuti nei iwewe wazoita kuti urendese munda. Chii chakushupa kuti ugosvika pakuti ndava kurendesa munda. Nekuti kune vaitoti vanodawo minda yacho kana waona kuti wakundikana waitonzi regedza tipe vanokwanisa kudii kuparima constitution I do believe kuti iriko ya2013 uye ndiyo yakazotiunzira zvaana gully reclamation. Zvekugadzirwa gadzirwa kwemigero yakabuda pa radio if im not mistaken handizvo here ichitaurwa nezvayo? Constitution iripo kudaro nhaurwa iri munomu muNyanyadzi ndeyekuti tine kamwe kakuti kana tikanzwa shoko ka torivharira mumba medu. Kana ari Mr Mk oto vharirira mumba mawo oti aaah aah handichapiwo mumwe but isusu tinofanira kunge tiri in touch nechii neAGRITEX hatifaniri kuburitsa information but bible remaAcre ndinodaira kuti riripo. Kugadzirwa mucourt eho ririkugadzirwa hatisi kuramba asi ratinoziva ndera 2013. Hameno ndomaziviro angu. Participant F9: Mapanzwisisa here? Participant F4: Ehe <u>Researcher reflections</u> Researcher: Right inini ndakatarisa Nyanyadzi irrigation scheme ndakaendza kutsvaga tsvaga nanhasi tine time yatakambogara naProfessor wangu tika mbodrawer drawer zvima triangle zvedu zvakati wandei chaizvo zvimwe zvacho izvi but takasvika pataka confuser nenyaya ye Nyanyadzi irrigation scheme. Zvazvakatitaridza manje ndezvekuti takasvika patakazoonza kuti issue hombe yeNyanyadzi irrigation scheme inyaya ye leadership and management. Its either kuti hapana kumbobvira kwanatsa kuita, but pane time yakwakamboita zvako but a fluent, yavanoti fluent leadership and management ye irrigation scheme. Varipo ehe vanogona kupika kuti apo neapo ehe zvinhu vange zvakambonaka nechii nechii but if you look across the irrigation scheme yedu one committee inogona kunge yakapinda ikaitawo it could have improved issue yewater management but zvimwe zvole zvakamira. Imwe inongopinda ichi concentrator uku but kumwe kose	Researcher Participant F18 Researcher Participant F18 Participant F22 Participant F9 Researcher Participant F16 Researcher Participant E3 Participant F22 Participant F9 Participant F4 Researcher

			kwakamira. Then ndozvimwe zvakaite kuti tigotsvaga zvimwe zvakati wandei. Including ma issues ese eleasing aya andanga ndichibvunza. This issue yeleasing is very complicated and ukanatsa kuitsvaga inodzoka futi back to the issue yaana farmer education yatakambotaura nezvayo inodzoka futi kuissue yemagenerations iya yatanga tichitaura. I think kwainonyanya kutangira kufarmer education ndokwayakatonyanya kuwandira ikoko. And ukazozvitsvaga AGRITEX yamira pakuti isusu mukauya mukati, tinokwanisa kudai anditi. The role yava kutorwa neAGRITEX especially panyaya ye farmer education ndoimwewo futi yava kuti sungira zvakaawanda muirrigation medu. Saka because of the lack of synergies atinawo neAGRITEX and NVTC tiri kuona zvinhu zvakaawanda zviri kutanga kudai, they become runaway object mablocks akawanda ava kutiza and one issue ndeyi leadership nemanagement yedu. Ukatarisa kuleasing kunoku kunema issues akawanda atiri kutaura iwawo then ukatarisa inheritance policy iripo neconstitution yenyu ndozvimwe zviri kuwedzera ploholders number muirrigation so by the fact that munhu anenge ava ploholder plot irro can be seen as an individual plot anditi but kuzomabatanidza kwatinozoita kwekuti taisa mvura paplot rekwaMukwambo tinenge tava kuzviitawo hedu but ideally ndinenge ndava kufanira kumira neplot number yangu umwe ne plot number yake. So inshort tiri kuti tiri kupatsanura irrigation scheme into zvima smallholder, smallholder plots. Zvekuti munhu iyeye anenge aine right yekuti inini ndakamira apa kuti ndiri kuda kudiridza Antony anenge akatomirawo paside achiti ndotodiridzawo achipedza. Because ane ploholder number yake atozvimirira asiya neni.	
	Superficial water shortages	Participant F10: Papoint iyoyo manje, yaaah iri pawater shortage manje. Participant F16: Ehe nekuti kwawedzera maploholders ka. Researcher: Ehe ndozvandiri kutaura ndosaka ndichiti inini issue iyi yemanagement yenyu iyi inodzoka ndosaka yakati confuser stereki because patinongoti let's look at the management how is the irrigation run. Tikatarisa period iyi (ist generation) wouya paperiod iyi (second generation) wouya paperiod iyi (third generation) you can't ignore maissues epopulation, and you can't ignore issue ye inheritance and you can't ignore what the constitution says. Saka maplots (area) haana kuwedzera tiri kungoramba takazvimaintainer but maplot holders awanda and on top of these ploholders aya awanda aya tavane masub-lets (leasing-tenants). Vari kupindawo ndiye uya wekuti iwewe ukamusawo, izvozvo zvokuti unofanira kutarisa kuti uri kuisa munhu wakadii wakadii constitution yenyu inototi this is illegal. It's illegal munhu iyeye haana kana right yekusvika pagate. Ndopane machallenges edu ipapa ndopatiri kutangira so the role ye leadership and the management haisi kunatso kwanisa kujekesa mapolicies iwayo. Imwe yacho we can't ignore it its natural vanhu vanofa and vakafa painheretance policy yedu ndizvozvo inotanga kuna mai, mai vopihwa vomirawo mai vakazofa tava kugova vana vese every individual senge mutori mufamily medu tinenge tatova kuma 13 children saka zvinoreva kuti umwe neumwe unofanirwa kunge aine plot holder number yake. Saka isusu tikauya tikamira tiri 6 kudai so tikati tinoda kudiridza maAcre edu two ekumusoro hapana anofanirwa kuti nguva yenyu yakwana chiregedzai tese tinofanirwa sezvo tiri ma same ploholders arimusame line saka tese tinofanirwa kuti tidiridze. Umwe uri pakati uyu akati this week ndakabatikana ndinokwanisa kuzodiridza next week iploholder futi anokwanisa kuuya oti aaah pangu chimbomirai pakadaro. Anditi muri kuona ndipo panotangira machallenges edu. Constitution yedu zvairi kutaura paissue yeinheritance how does it affect the ploholders number then tine activity iyi hombe hombe iri kuitika iyi ye illegal leasing. Participant F22: Ndoda kuuya kune iri kunzi water shortage pane umwe munda wokuti ukazvika pauri unenge wakadai (inclined) painofanira kupedza one hour insviko pedza 4 hours iri ipapo.	Participant F10 Participant F16 Researcher Participant F22	

	A central secondary contradiction between the subjects and the mediators on tools (land and water)	Water and power management crisis	01:09:30: 7. Poor water management- munogona zvenyu ku expander ikoko. Participant E3: Tiri kuti izvoni mvura yedu tikada kuona schedule yedu isusu chaiyo chaiyo tinofanira kudiridza 14-21 days yazorebesawo 30 days but ukada kuona kune imwe minda iri mukati umu mazita hatichatauri zvedu yekuti every 7 days ari kuisa mvura which is very wrong kurima it's not a matter yekuisa mvura but kushandisa ruzivo mvura ingatoita shoma asi pachiswa zvinhu zvinodiwa. Saka tiri kuti mvura ngainge iripowo asi ngaishande mune zvakanaka haikona kuti every seven days uripo haaa kana no no no. Participant E3: Inini chandanga ndichida kucommentor hangu nyaya ye water management ndoda kuidzoka futi kuti izvoni... chimbomirai ndingazokanganwa ndakaifunga nezuro point iyoyi iri mumusoro. Sometimes tinoti mvura ngaivharwe na 6pm kwaturwa wozona kuti 8pm mvura ichiri kungodzika ndofonera Mr. G wonzwa kuti ndafunga kuti mvura yavharwa wozofonera Mr. T zvonzi chimirai tinovhara. Saka chionai tiri kuti mvura ishoma asi tiri kuirasa. Kana tiri kuti gate ngarivharwe na 5 pm ngarivharwe na 5pm kuitira kuti dam redu rifume rakazara. Participant F4: Inini dambudziko randakaona nderekuti hatichengetedze mvura nemari. Dai tichitsvaga munhu wekubhadhara anoenda kunovhara mvura on time. Saka vanhu ivava taivati vana mamvura yet havasi kungochengetedza mvura ba but mari. Nekuti mari yacho iyoyo yatinoshandisa inochengetedzeka. Kunongoda munhu anomukira kuenda kwaChitinha wonovhura womonitor mvura kusvika yava pa dam kana muma canals. 01:18:44: Power cuts- like now time yatava kupinda, mava kuda kushandisa yekwaOdzi river. Saka nekuda kwemapower cuts haizokwani. Participant F22: hameno kwaChitinha nekuti kunoti IMC vevarimi vayo vane chikwereti chemagetsi, necheZINWA so far target yavo chikwereti chemagetsi. Ivo vanoda kuti chikwereti chidzike eho Chitinha haineyi nemagetsi asi irimowo mu IMC so at the end of the day vanonzi bhadharai mari yemagetsi nemaintenance.	Participant W6 Participant E3 (Water use vs water need)
			01:43:56: Shortage of water- mvura hongu kuuya inouya zvayo, ZINWA iri kutipa mvura asi iri kushota. Umwe murimi anogona kuita masondo maviriri matatu akamirira mvura uye awana mvura anoda kudzikorora umwe uya haasati aiwanawo. Saka mvura haisi kufamba zvakanakwana. 00:09:28: Participant F10: Water Shortage, ndoyatinoona sechallenge hombe yatinayo munomu mu irrigation scheme yedu. Participant E3: haaa handiione se challenge maybe ndaitofunga kuti tingati water management. Mvura tinayo yakawanda but management ndoiri ku lacker. So tingangoti poor management. Researcher: Poor water management. Participant F10: Ndokumbirawo kutsanangura varume. Apo ndinodai pandati water shortage ka apo, eeh ndingasvike patinoti eeh karwizi kedu katinako Munyanyazi aka kanosvika pakanoita kachioma ndo water shortage iyoyo. Management inozoitika chinhu chacho chiripo manje inotomboshaika mvura yacho. Nodsaka ndichiti water shortage tine nguva yatinotomboshaya mvura muIrrigation scheme through zvinhu zvakasiyana siyana.	Participant F13 Participant F10 Participant E3 Researcher Participant F10

		Participant E3: But, mirai ndikupindurei MrX handisi kukupikisai but, inini zvandinoziva hangu ndezvekuti izvoni scheme ichitanga even Alvord paakaigadzira aiziya kuti igravity now and then mvura inopera ndosaka makazoono akagadzira mapumps, ema desiel pumps aya paodzi. Anga ari ekuti kana mvura yemaMunyanyazi iri shoma then opomba. Then ma desiel pumps paakazosakarawo ndopakachizovakwa new pump house iya. Zvinotongoziikanwa kuti as long as tisina dam mvura inotombopera maMunyanyazi. Participant F10: ...Pavane challenge ndepokuti tavakuona kuti nemvura yekwaOdzi mvura inofamba neone side. Haikona kuti ikwane irrigation yose its not feasible ba. Ingori water shortage yakanga yakaitirwa izvozvo mu irrigation yose. Participant F14: ...Ndinoda kubvunza kuti Alvord achiripo maAcre ekwaChitinha aingepe here? Participant F8: Ehe anga apo Participant F14: Anga apo saka ndirikuona sekunge dambudziko redu chairo zvaitika mvura aicha manager nekuti pamwene tinotonzwa kuti kwaChitinha mvura iri kutorasika mvura yaakutodzika mwaMunyanyazi vanhu vekwa Chitinha vatorasa mvura. Isusu kunoku kwairi kusvika kune zvima gurekure zvainzi hazvirimwi izvezvizvi zvavakutorimwa zvimakure kure zvedu zviya. Vanhu vakaenda kunooxternd maAcre uko kwaMunyanyazi mvura iri kurasika. Saka isusu tiri pakati nepakati tiri kuti mvura iri kutishotera. Participant F17: Right ndokumbirawo kuchimbura inini ndiri umwe wekwaChitinha inini. Right pane nhaurwa yewater ngatiti poor water management, pane gate rinonzi power gate riri kwaChitinha uko riri kuduzhe nekuintake. Pane gate rinoshandiswa kurasa mvura kuisa maMunyanyazi kana mvura yadhira saka kune vanhu vange nemagardens kupi ikoko saka vane nguva dzavanovhurawo gate iroro mvura yodii yorasika yoenda kusiko. Ye water challenge iyi takanga tiinayo pasati pauya donor SAFIRE ichiita zve desilt nekuvaka new weir yakazoiswa uko nemugero wacho nekuti mugero wanga wangozara ivhu mvura yavakundoenda iri 30cm asi ichinyura mudhaka. Asi pakaitwa desilt mvura iri kufamba, nhaurwa yedu chaiyo chaiyo iri pa poor water management. Gate rikangovhurwa mumwe unosiya rakadaro ndozvimwe zviri pa water management ndofunga kuti ndopane nhaurwa zhinji. Tiri kwaChitinha ha mvura chaiyo mvura irimo zvekuti kunyari kwenyu kunoku inosvika nei ndichidaro magate magadzirwe aakaita pakauya SAFIRE ndivapo, akagadzirwa aine mechanism yekuti mvura inopinda pagate yosara yopinda pagate yosara yopinda rinoteera kusvika yauya kwenyu haizoperi yose sezvataita kare zvekuti mvura inoshaikwa zvamuchose inobva yasarawo shoma iri kuuya kudam. Ndozvandakaona ndozvimwe zvandiri kuona zviri kuitika. Participant F10: infact ka isusu tiri kuda kuti tibatsirike Munyanyadzi, tiraise mapoints ekuti kana vaMukwambo vaine mastrategies avo avanavo tibatsirike. Chii chinomboita kuti tisawana mvura yakakwana chii? Tiraise mapoints kuti pamwe tingavakirwawo dam kumusoro uko. Manje tikati tine mvura yakakwana isu tisina hazvichataura chiro ba. Zvino toti tauiyeyi muno manje kana tiine mvura yakakwana. Participant F18: Eeeh tiri panyaya yemvura, mvura yedu ishoma pakuti izvezvizvi tiri panguva yechando ndopamunoono senge yakawanda asi kuti dai tanga tiri panguva yechirimo tinoti mvura yakawanda nekuda kwemvura inonaya yakawanda inopfuura woosara Munyanyazi usina mvura. Saka isusu tine mvura shoma nekuda kwekuti hatina dam asi dai tanga tiinano ha mvura tiinayo yakawandisa. Kana kwonyatsopisa chaiko hatina mvura. Participant F16: aaah inini hangu ndoda kuti ndionini ndiuye panyaya yekuti mvura haisitori shoma ba mvura hatitorina muirrigation. Mvura hatitorina tinodaro neyi, izvezvi mukatarisa mvura takarima chibage, tikarime beans tikaburitsa beans dzedu zvakanaka nekuti kwakaitika cyclone Idai iya ka. Kwakaita mafashamu mvura ikawandisa anditi mazvionona, mvura yawandisa nanhasi ndiyo mvura yatichindori nayo mawzviona. Kukasanaya mvura Munyanyadzi hamuna mvura ba. Izvezvi mvura yekwaOdzi iya haichaiti ba 1. Yavakudhura magetsi acho 2. Mapumps acho, mapipilines edu arikurasa	Participant E3 Participant F10 Participant F14 Participant F8 Participant F14 Participant F17 Participant F10 Participant F18 Participant F16

		mvura yakawandisa kuti izosvika kudam. Saka mukazotarisa, hongu kusingazi kunaya mvura yakawanda tinenge titori nedambudziko remvura. Panotoda heavy harvest iri kumusoro kwaMunyanyazi panonaya mvura paya paya toziva kuti mvura yabatwa yakawanda tinorarama kunoku tochitaura kuti tinemvura yakawanda. Ndotatino chitaura kuti Nyanyadzi yaane mvura, chinotongodiwa I water harvest mwaMunyanyazi imomo. Participant F20: Mvura ishoma, kwete zvatava kuona izvi zvekuti tinoita majana ekuenda kunorarireyo. Kunenge kuchitwa majana ekuti chimboendaiwo munorarireyo kumvura ikoko. Participant F9: Eeh anditi kana tiri kutaura nenyaya yekuti mvura ishoma tiri kutaura nenguva yatiri inoyi nenguva yatinenge takatarisana nayo. Izvezvizvi tiri kutarisana nenguva yatiri izvezvi, ngatichiti kana tichiti mvura ishoma kune here kwatingatarisira kuti kune kwaingabve. Nekuti tiri kungototarisa hameno nekuti igore ripi zvinoreva kuti muNyanyadzi mvura hamuna. Wambaindotaura kuti Munyanyadzi mvura amumbaitorina wambaindonatso taura chokwadi nekuti hatitorina. Yatoda kumbaindodai kuti kumusoro uko mvura hakuchina kutombaindogara kwavakutimirira kunaya kwayo. Participant F16: Inini ndiri kutoti, kubva pane wakatoita design ye irrigation scheme iyoyi haina kuzoperera ba why aifanirwa kunge akaisa dam kumusoro uko why dai rakapedzeredzwa dam iroro taitoti muNyanyadzi mvura tinayo. Kuitira kuti kana mvura yonaya inopinda mudam then yobuda bijana bijana. Participant F10: Aiwa hatina efficiency. But zvamurikuedza kuti pangidza apo kuti tishandise mvura muungwaru manje manje tinenge tatova kudrip irrigation ndoingatotite kuti tishandise mvura shoma. As long ingori flood basi ichidiridza inozara and the seepage inongoramba ingori the same of which zvamuri kutaura zvinoti improver kuti chisiyayi flood irrigation yenyu iyi. Researcher: Aiwa inini ndiri kungokuonesayi kuti zvamuri kuchema izvi anditi nezviripo kuti isusu tingati panapa tine shortage here yemvura but isusu tichikwanisa kudiridza neapa pasina chinhu. Hatisati tataura zvedu neinozorasika kuroad kunoku. Apa tiri kungotaura zvedu iyi yatiri kubvumirana tose kuti zvesure tiri kudiridza. Participant F9: Eeeh ngatiti eeh mashandisiro atinoita mvura isusu eeh mvura ishoma, asi pamashandisiro tichiti tiri kushandisa matauriro auri kuita iwawo mvura inenge yakawanda. Researcher: So we have water use vs water need. So issue yedu iri pakuti we have the water we use and water we need ndopane challenge yedu ipapo. Of which isusu pamachallenges edu tikatora water shortage iyi tikati isusu tine water shortage muNyanyadzi let's look at the water use yatinayo tochizotarisa water need yatinayo then iyi zvodzoka zvotiudza kuti mapractices edu (maleaking pipes, + the canals + issue on earth canals). This is where our big challenge lies apa. Participant F16: ne type ye irrigation yatiri kushandisa yacho, ndiyo itori nyaya hombe iyoyo. Participant F10: Ngatidai mvura yakawanda inodzika neapo pamateps pekutanga apo, vanhu variapo tese tine madays kuti nhasi iri paana nhingi chipiri apo, chiatatu apo china apo asi nenyaya yambotaurwa iya yema two hours muchingoti ibvei toti ndimi vana Mamvura isati yatosvika kwaana Mushaba kwairi kuenda uko kunoku inenge yatotorwa. Asi imimi murikuti mvura ishoma ingasvika here iyo ichiti after two hours isati yatosvika uko kwacho inenge yatotorwa kunoku Management. <u>Researchers Reflections</u> Researcher: Right tombo analyser here. Right inini pandakatarisa ma tools edu panapa, marules edu panapa so issue yandakaona ndeyekuti, challenge yemvura haisi issue but kuti poor management. So basically, issue yandakaona ndeye poor water management. So zvazvinoita manje ndezvekuti zvose izvi zvamatsanangura ma manifestations of poor water management. Hakusi kuti ndopane dambudziko apa but it's a manifestation. Zvichireva kuti tikaona isusu mafarmers tiri	Participant F20 Participant F9 Participant F16 Participant F10 Researcher Participant F9 Researcher Participant F16 Participant F10 Researcher

		kumanager irrigation scheme yedu and we allow the local communities kuti vaiti maillegal gardens along the canal what we have done is tabvumidza kuti mvura iri mucanal medu kuti ibude. 1. So to the main target ye irrigation kunoku haisi kusvika because mvura iya yatodii yatorwa. 2. Isusu sema farmers tikaona tichibvumidza muirrigation medu kuti muiite maleakages mumacanal nechi nechii on top of that ndinoda kuti ndiwedzere ma earth canals. Irrigation scheme iyi ichigadzirwa you will find kuti pamaperiods atanga tiri kutaura kunoku kwakambouya program yekuisa cemen mu scheme anditi. Mumwe munhu aitura anoti (ndoda kuti tifambe napo apa zvakanaka) mumwe munhu anoti “isusu challenge yedu hombe kunana B block yanga iri yekuti paunopihwa mvura kuzoona mvura yosvika pamunda pako apo zvinotora more than 30 minutes kuti mvura isvike and reason ndeyekuti mvura inotanga yamwirira pasi yoita saturation ndokuti ichizokwanisa kufamba kuenda mberi.” In short tiri kuti patinenge tiine ma earth canals aya 30 % of the water is lost and 30% iyoyo ikatorwa kutodiridza neumwe munhu inotocover ndima hombe. Right tine ma earth canals chero mukatarisa chokwadi chaicho chaicho, kubva pagate rekumusoro paana chipiro paya inouya nepachimba cheap ZINWA paya ukatarisa pamuonde paya mvura yaitosvika pakutomira asi ukapinda mucanal macho mvura inenge ichikusvikira muchiuno asi yakati ndi kumira. Ende ukazvitsvaga mavhu anoondomoka kuwira kubva uko achipinda mumugero achiuya uko ende pairwadza kupachera. Ende ndava yanga ingoripo ndeyekuti macanalas ipapo one akatadza kudesign, inyaya yekuti haamhanyisi mvura. Mvura inoti ikasvika ipapo inotanga kuungana yotanga kunyura pasi ichichi ondomora gomo. Konzi kwanaya nhasi totoona tichitanga kuda kunoscooper. And on top of this one tozotaura futi nyaya yema settlements. Ka area ikako kainetsa stereki because ukatarisa area iyoyo panonetsa nekuti panoti misha uko the canal apa and road apa kunatso patarisa pati kukanaya area yacho yose kunosvika paka bridge kaya kari apo paizara mavhu ende kupachera pa area ipapo pairwadza nekuti maizara mazivhu ende paiita nhope chaiyo chaiyo pa area ipapo. Anditi so issue imwe yatinayo ndeye ma earth canals mumugero wenyu. Ndakafamba nemugero iwowo kunosvika paMabika uchibva nawo padam paya, ukati fambe fambe pane pakazombonzi gadzirwe kuzonodai so I earth canal yese. Kunosvika paunoti pamabika paya kunoti cha I earth canal yese mvura zhinji inorasika ipapo ichimwirira ipapo. Ukaenda ku B block kuNyanyadzi primary school ndakasvikako ini kuma Acre ese ari kunaana Chatema kose kuya kunosvika kwaana Mbuya nezandoni kuzhinji kose kuya maearth canals. Aya ma earth canals aya ndoimwe issue yandakaona. 3. Macanal edu aya ukafamba nawo unoona kuti anoleaker. Mazhinji ose akatsemuka tsemuka pasi pose apa ukazodongorera pasi pawo unogona kuona paiine zimwena riripo anditi haana kubankiwa macanal aya. Zvinhu zvose izvi zviri kundodzoka panyaya yepoor management. Kuti tinatse kuti mvura chaiyo chaiyo, chimwe chinhu chandakabatisisa paitaurwa neumwe mutauri witi izvoni “isusu tichitanga irrigation scheme iyi, tainge ne”, zvanzi tichitange kupihwa minda idzi “taiite flood irrigation ngatidai so (illustrations -To insert the picture of the actual drawing) iAcre remunhu one iri pakazouya maDhumeni a Alvord the first thing chavakaita ndechekuti no no no irrigation yenyu kana yakadai yakaipa” nekuti zvainzi “taingo vhura tosiridza riri zirozhi Acre racho rose kaone. Kutangirira mvura umwu mwaishupa ndokubva atanga kuti no ngatitangeyi madhunduru.” Ndokuchitanga madhunduru kudai so (illustrations to be incorporated) kwava kuchi subdivider ndokuchi measure measure zvose zvavakaita ndokuchiita madhunduru aya anditi. iye anoti “kubva patakaita madhunduru aya mvura yanga isinga chatinetsi nekuti ukangoisa masiphon ako,” asi iye akati kwakwe kwanga kusina masiphon. “Asi tikavhura apa topinga apa mvura inozara kuti ndi.” Saka mvura haina kuzombobvira yavanetsa anditi. but tobva tati isusu munhu anosvika obva ati Nyanyadzi irrigation scheme haina mvura, Mr. Extension Officer dam redu rinotora how many units ... ngatimboti 35-40 Mega litres toziva zvatiri kureva ka ipapa. Irrigation scheme yedu ine	

		chii 414ha, mumwe mutauri andakatura naye akanditi izvoni irrigation scheme yenyu nemvura inopindamo unoziva here kuti mvura inopinda umu inogona kudiridza 3 marrigation schemes akadai. 01:48:11: High cost of ZINWA –Odzi Catchment charges- Participant W6: Ndange ndazobuda hangu but pane pandanga ndaona pakalabel ZINWA pa number 7 (Lack of communication between farmers and the extension officers, ZINWA & ZESA) nepa number 11 (High cost of ZINWA – Odzi Catchment charges). But ndichida hangu kutaura nyenyaya yepa number 11 iyo; yakanzi High cost of ZINWA charges. Ndingangoti pane workshop yatakamboita kwaChitinha primary uko, pakauya Urban Officer ve ZINWA. Vakange varipo vamwe vacho varimunomu, makaudziwa macharges emvura kuti akamira Seiko ndochinhu chakachipisa nekuti mvura yeZINWA vari kucharger pa megalitre iya yatinoti 1 million litres inotita Z\$2.00 pondo yegreen iyayi pa 1 million litres that is about 3766 madrums ma 200litres aya ndiwo anoita pondo (Z\$2.00). Vakapa example vamwe vacho vari munomu vachiti ichi chemvura ichi (500ml) unogona kuchitenga Z\$1.50 kungomwa chete asi iwewe unokoniwa kubhadhara mari iyoyo pamwedzi Z\$2.00. Asi uchikwanisa kutenga izvi every day, saka pa water charges apo pakanzi its high ndiri kurambirana nemi apo. Maybe munogona kuti ZESA kwete kuti ZINWA pamwe makanganwa. Mvura yakacheaper. 01:45:50: High cost of electricity- magetsi arikuti dhurira. Ipapa tikashaya mvura yemwaMunyanyazi (Nyanyadzi river) tinoenda kune yekwa Odzi (Odzi river). Paripo pamwe patinoti tinogona kuita 3-4years tisina kubhadhara mari kuZESA (electricity bills) zvino vamwe mari dzacho havachadziwani. Maintenance of pump house- ... kuti zvanzi mati hamusi kubhadhara ba. Ehe hamusi kubhadhara ba because ndiri kuziva kuti some years nyika ichakanaka ku pump house kwaitombova nevakomana veZINWA vaitobhadharwa ne ZINWA vachiita zvole imimi maingotakura ma siphon kunodhiridza but as time goes on zvinhu zviri kundochinja farmers ndimi makatanga ...kunzi chizviitirai. Kana ndichiri kutondera pakanzi mafarmers ngavaite block rakatanga kuunganidza mari I B block, B-block ikati isusu zvekuendako hatidi ngatibatanidzeyi mari dzedu totsvaga vakomana vanonosevenza uko kwava kubva yazviitawo. Mamwe mablocks ndokuchizo teedzerawo kuti ngatisvagei vakomana vanoenda kunoshanda ikoko ndo answer yandinga kupai. Participant F1: Eeh mubvunzo wangu Mr. Water mubvunzo pane pamwatura paya muchiti engine inoda kugara ichimbonzi bourwe kuti zvisazoite ngura. Right ngatichiti semaziire amunozviita ngatiti yaite jecha sezvazvaita eeh nemaonere nemaziire enyu zvinotore nguva yakadiii zviri mujecha asi zvichida kuti zvizonzwi bourwe. Participant W6: Eeh jecha haritodiwi hazvitombofanirwi kunge zviri mujecha nekuti haasi mapump emujecha. Anofanira kugara ari mumvura musina silt. Ari mumvura kudaro tinofanira kunge tichimbofana tichiita on kuitira kuti kana akasticker timbomafambisa kuitira kuti asaramba aka sticker.	Participant F13 Participant W6 Participant F13 Participant E3 Participant F1 Participant W6
	High political interference	01:08:20: 5. Political inference. Pakurima paane politics mukati. 1. For example ndimbotaurawo sekuside kwangu uko kumapumps uko, like especially mafarmers havasi kubhadhara mari kuZESA. Saka vanozobvunzwa nevanhu vepolitics vemusangano vaye For example, pachina VaMutezo magetsi makaita gore musingabhadhara asi pakazobva vaMutezo kwavakupindawo mumwe magetsi akazotanga kuvhariwa nekuti bill rainge rakura saka political interference ino affect wo futi	Participant W6 Participant F13

			01:50:41: Political interference- paita vanhu, paita mapato vanozviti vane masimba akawanda kudarika vamwe vose nekuda kwezve matongerwe enyika. Patinopinda pakurima, isu tiri kuda kurima as a business iye anoenda onotaura zvaanotaura zvo affecter mafarmers muno. Tichidzoka panyaya yatataura apa ndeyekuti takashandisa mvura pa Command agriculture nanhasi uno chimwe chikwerete chiripo ndechakasiwa nevanhu vakashandisa mvura pa Command. Ipapo manje anenge ati mvura imvura ukaramba manje zvinokukanganisa nekuti anenge aiine chaanoda ku gainer kubva kwauri. 02:24:44 No.2; Researcher: second challenge yandakaona besides financial management is the failure to disassociate politics and development. Ndopane challenge yenyu yemanagement apa. differentiate the project and political intereference, appointment vs selection. Dzimwe nguva unonzwa vanhu vachinzi vaka appointed havasi kudiwa Havana kusarudzwa nemafarmers. Committee iyi yakango appointed, iyi yakazo selector iyi ndoyaidiwa. But issue iripo hombe ndeyekuti vanhu havasi kukwanisa kudifferentiater politics and development. Zvazvinongoreva ndezvekuti inini ndikauya ndikati ndoda kukuisirayi chibhoranin kana kuti pivot apo rinokwanisa kukupai mvura kuti dam renyu rite kana kuti ndinoda kungo scooper dam renyu riite unonzwa vanhu voti wambobva akanangana nei. Wambotuma ndiani wacho. Right ngatimbo breaker tichidya chikafu then tozo continuer tichipedza zvedu. Ndoziva vakawanda muchiri kuta taura. Participant E3: Inini vaMukwambo ndaida kutaurawo hangu panyaya ye leadership, ndaizvivungira hangu nezuro manheru kubva nguva ye land reform tichidzoka kumashure uko muna 2000 nekuti zvanga zvakati nakei. Even IMC yedu yaisarwa zvakanaka this time IMC yedu iri kutsarwa on political lines. Mukanatsa kuona vanhu vanoitwa maIMC pane time yekuti vekwamai X ndovanongopinda voga. Rimwewo gore vekwaMai Y ndovanopinda neasingazivi, wekuti haatombozivi kuti scheme inorunner sei but because anosupporter Mr. X ngaapinde. Saka that mentality dai taibvisa tinofanira kutsvaga munhu anogona basa. Izvo zvekuma party zvagara zviriko but ngatitsvagei munhu watinoziva kuti unogona kuti batsira. Because dambudziko repolitical interference ratiri kutaura kuti maleaders edu atiri kutsara tiri kuto tsara on political lines. Participant F10: Point taken. Participant F22: Ndimbotsigira panga pachitaura Mr. X. mumashure umu maparties akanga arimo asi vava kuenda pamusangano havaisada kunzwa zvepolitics. Havasaimboda kana kuenda kuirrigation chaiko kunoti ngatigadzire wire iyoyo wainzwa vachitaura kuti hatidi kumbonzwa anotaura nezvepolitics. Vapedza vava kuenda kudzimba dzavo vavav kuchienda Zvino asi mazuva ano hiii. Participant F16: Eeeh ndinoda kumbotsigirawo hangu point iyoyo inoda kuziikanwa point iyoyo. Mukazvitarisa ndopandambotaura paya kuti pamwe pachu vanhu havasi ku attender because panenge paita counsellor aripo dzimwe nguva ndiye anenge achizonzi wafambisa shoko iroro. Saka vanhu vanongoti musangano wa counsellor iyeye saka zvaane politics zvinhu zvacho. Hazvisisiri gwara rekurima ba. Zvadaidzwa ndiani aaah kuenda kumusangano wacounsellor nhingi kana kuti kumusangano waana nhingi ende mavapo zve vana nhingi vanenge vachingobira bira pamusangano we irrigation hazvichatobudi asi zvinhu zveNyanyadzi. Participant F18: Eeeh ndakamirira pa leadership apo, pane nhaurwa ye power hungry yekuti kana uri weku marketing wava kuoneka wava kuda kuoneka futi uchi chair irrigation hauteereriwo zviri kutaurwa newekupedzisira murima wakashooreka. Kutu haiwa ungandipa zano rekuti chiii? Point number 2. Political interference iyo yati kure muNyanyadzi ende yatopper. Ndakarerekerera side rekwa Chitinha unonzwa zvichinzi vanhu vekwaChitinha. Vanhu vekwaChitinha havanzwe asi under constitution tese tiri kuverengwa sevanhu veNyanyadzi irrigation scheme. Nemapoliticians are dividing us vari kuuya vachiti tichazokuitirai zvakati tiri kubato rakati. Kana triri padevelopment leadership dai yaregedzana nezvematongerwe enyika tovaka budiriro yedu yezve kurima tiri kuona kuti zviri kushatira papi and those leadership itori autocratic havatodi kunzwa kuti zviri kufamba sei ukabvunza wotonzi saka iwewe urikufunga kuti hatisi	Researcher Participant E3 Participant F10 Participant F22 Participant F16 Participant F18

the irrigation farmers.		kuzviona here? Sekufunga kwangu kwanza kuve mukuru unokudzwa newako, hainga rarami hove pasinga mvura saka nyaya yelack of leadership management skills it's a big issue iri kunetsa. <u>Uncensored discussion</u> 02:29:47: Participant F22: Pane imwe nyaya yandakamboti onei asi, awanda macommittee atachinja. Nemhaka yeyi pamwe pacho tiri kundomarker zvaitwa necommittee. Yaana Rwizi ka tanga tavamuno, yakabvisirwei? Rwizi wakanga agona akati hatidi politics ba. Asi vanhu makaramba muchida kuita politics mumaAcre. Participant E3: Ndopolitics inorehwa yacho. Participant F16: Aiwa iye ndiye wainge nepolitics dzacho. Wanga ari politician asi haana kuda kupangidza vanhu colour yake ba. Munoziva zvakaite 02:30:21: Participant F4: Munomboziva here zve politics zvamuri kutaura ndezvezvigaro. Apana ba pamweni pacho panenge pasina politics, chinotika ndechekudai kana mukanga muri committee inini ndinenge ndoto simudza musoro kuto bvongonyodza kuti ndiendewopo. Zvinonzi panodyiwa apo kuba mari, nanhasi panodyiwa. Saka hapana nenyaya yakaoma kuda kuenda powo, vanhu vanenge vachida kuendapowo, chimbobvawopo ndimboendapowo. Uyu wawapo akati chimbobvawo ndiendepo.	Participant F22	Participant E3	Participant F16	Participant F4		
	Poor manage ment of the scheme	01:11:43: 9. Stray animals- mbudzi, mombe dziri kungopinda muma Acre. Participant E3: Nehuku, Nema toki 01:45:15: Stray animals- protection yezvirimwa zvedu. Macrops edu arikudyiwa nemombe ne mbudzi nekuda kwekuti wire yemu irrigation scheme medu haina kumira zvakanaka. Ndopatinotadzira ipapa, tinogona kublamer mafarmers kuti ndovane problem asi tichikwanisa kusheedzera kuhurumende kuti iti batsirewo zvirimwa zvedu zvirege kudyiwa. Participant E3 ... nyaya yema stray animals, eech maziire andinoita hangu stray animal imombe isinga ziikanwe yekuti mukatoenda nayo kumapurisa inotonzi ngaichengetwe kana kwa Sabhuku after 3 months yo auction. Saka dambudziko rizhinji, 99% yemombe dziri umomo imombe dzinotoziikanwa kuti imombe dza Mr. Y or Mrs. Z mbudzi idzi ndedzekwa X kana kuti ndedzekwa Mbuya M. asi dambudziko ratakaona takatomboitawo imwe survey some years back tikaona kuti mombe zhinji adzisi mastray animals. Imombe dzisiri kuvharirwa mumatanga saka panenge pavakuchiti ngapashandewo mutemo wekuti varimi ngatione kuti tavharira mombe dzedu mumatanga here? Communications within and between the activity systems (farmers, IMC vs ZINWA) Denial: Participant F14: Musanyanye kukudza bad baa ngaandotaure kuti mafarmers asina kutaure kuti IMC haisi kuunza vanhu. Dai angotaura maproblems aripo anditi ka kuti kwaane jecha omira. Pane mataurire aaita, aiwa ka ndoda kumugadzirisa kuitira mangwana kuti presentantion yaaita ari mangwana waindoti kunoda kubvisiwa jecha. Participant W6: Ipapo muri right Mr.G mataurire andaita ka ndeekuti ndakatotaura ne IMC vanozviziva. Saka ini ndiri kutaura kuti IMC inozviziva, ende andisi kutaura pano izvezvi aiwa takatombozvitaura saka ndanga ndiri kuti dai maikwanisa mamboita something kuitira kuti mapump enyu arambe akanaka. Participant E3: Mirai ndinoda kuwedzera. Chain of command yavo vano communicator ne IMC, kana IMC vakati vhara mvura anovhara. Takatombozvitaura paya takati vanhu vanga vava kungofona fona vakawanda mumwe oti vhura umwe oti vhara kusvika Mr. Water vazotaura ne IMC kuti ndoteerera ani? Ndokubva tazovapa munhu one wekuteerera handicha ziva hangu kuti ndiani so ndo point iri kutaurwa na Mr. Water saka point iripo ndeyekuti IMC inoshanda naMr. X. Mazvinzwa here? Participant F14: Aiwa wawa kuita senge wanga avakutaura inini.	Participant W6	Participant E3	Participant F13	Participant E3	Participant F14 (denial by IMC-pump house). Participant W6	Participant E3:

		Participant F10: Mwaita henyu Mr. Water nekuti zivisa kuti IMC haisi kubhadhara mari kuZINWA hataizviziva isu taifunga kuti pamwe zvinhu zviri kuendeka. Participant W6: Tiri ipapo kudaro ndingangoti tine mastatements atinofamba nawo tomboti kuri kudzimba dzedu kuya vamwe venyu makatomawana manje manje ipapa apa. Participant E7: Ehe akauya last week. Participant W6: Ehe unfortunately irrigation scheme haana kuuya but ndakataura navokuti vamaunze. Pane mastatements ose andakaunza hapana kana one rakambobhadharwa. Im sure makabhadhara ka1 muna January \$500. Participant F10; F9: Ha watopedza, tatozwa maiwee matogona matotiudzawo. <u>Understanding management as a whole</u> Researcher: Ndofunga ndambotaura ndikati lets not look at management as IMC but ngatitarisei management in its whole system. Iwewe munhu ari paplot pako management yako yakamirawo Seiko? Participant F22: Ndopane dambudziko nekuti kuneumwe munhu anoti inini kumberi kangu handina committee. Ndozvino kwanisa kutaurika hainini varume committee handinzwisisi. Researcher: Munhu iyeye anoda kutorwa mumudzidzise. 02:41:10: Participant F10: Hubenzi hwawo. Rimwe dambudziko ndere kudayi, toti ndiri mucommittee anditi, ndabviswa mucommittee popinzwa imwe committee instead yekuti ndito advisor committee new one yapinzwa iya inini handichaiti advisor, ndava kuvadigger (kuderredza). Ndava kuita zvekuti vashoorwe instead yekuti ndiva advisor. 01:48:11: High cost of ZINWA –Odzi Catchment charges- ino collector mari kubva kuma farmers in return towana chii vatora mari iyi. Tozonzwa zvichinzi mafarmers havasi kubhadhara mari kuZINWA or Odzi Catchment asi mari yatinobhadhara paya paya tichidiridza imari inonzi inoenda kwavari. Vanozodiwo pakugadzirwa kwemugero yedu or kushomekana kwemvura kuti vati supporter. Macharges ekudiridza pose pata diridza anozobatsirei achitirwadza tazokohwa totengesa zvirimwa tiri kuwanei uku isu tinenge tabhadhara mari yakawanda ndorimwe dambudziko riripo. Tinenge tabhadhara mari yakawanda pakudiridza paya pakuzotengesa produce hazvicha balance. Asi isusu tiri kuti farming it's a business but tikagara tongomora muhomwe mangu hazvichabuda manje. 01:47:05: Repair and maintainance of the irrigation cannals- migero yedu yafa ichida kugadzirwa nenguva todii apa ichingofa nguva ne nguva gore ne gore 01:47:20: Maintainance of main pipeline- kubva ku pump house kuenda kudam. Mukatarisa mapombi anounza mvura kubva kupump house kuuya kudam akafa ari kuwa manje nguva yekumaintainer mapombi acho yoshaikwa yava nguva yeku diridza mvura yacho yoita shoma todii idambudziko hombe ratiinaro ipapo. 01:12:14: 10. Infrastructure damages- mukati imomu miminda medu mune macannals saka mombe idzodzi dzinopinda dzinopwanya macanals. Participant E3: Zvinoti tinoti mati mombe asi nevanhu vacho tiri kuputsa and tinotozviziva vanhu vacho vari kuputsa. Nemombe dzekurima dzikanonoka kuturner dzino putsa futi. Nemitu nemakubanana aya amuri kusima aya zvinoputsa futi macannals nekusa banker. Participant E7: Tobva taita futi nyaya ye fence ukatarisa tine fence yatakabva kuisa isina kana 3 years but isusu varimi vacho tisu tiri kuba tichiendesa kudzimba kwedu kana kuti iri kuto biwawo nembavha. Saka tiri kuti zvinokonzeresa futi pama stray animals apo, mbudzi ne mombe dziya dzinenge dzichitopindawo futi muma Acre.	Participant F10 Participant W6 Participant E7 Participant W6 Participant F10, F9 Researcher Participant F22 Researcher Participant F10 Participant F13 Participant F13 Participant W6 Participant F13 Participant E3 Participant E7

		01:18:07: Infrastructure damage- ...But isusu tiri kwedu kuside re ZINWA tinoti pump house ne pipeline ndeya farmer. 01:35:41- Lack of irrigation water in the centre.- ...But pane pamwe time yekuti mvura inenge iri shoma pamwe pacho tinogona kurequester mvura se institution tinoda kudiridzawo kamunda kedu kadiki totopihwa but unozongoona yavharwa imo mudenga mudenga umo nevamwe varimi vanenge vachiiridza. Votovhara mvura iya tobva tatotorerwa, time time Mamvura vanobva vauya voti nguva yenyu yakwana matodiridza isu kudiridza kwacho hatina nekuti mvura yacho tatorerwa. 01:13:38: Pump maintenance- IMC nyaya ye sump services. masump anopinda majecha so majecha iwayo anoda kuti abvisiwe. Because kana akaramba arimo isusu tikapomba mvura tinopedza imperial yenyu. Zvichireva kuti capacity yemvura yatinoburitsa inenge yasiyana ne original capacity ye pump. Imimi munenge muchi biller mari ye original capacity nekuti tinenge tichingoti ndiyo iri kushanda. Number 2. Even ku ZESA inenge ichingo biller maenderane ekushanda kwayo. Ndosaka ndichiti kana ndikakutiyi uyayi tibvise majecha please uyayi nekuti ndinenge ndichiitira kuti musaite problem. Iyoyi, iwawo majecha iwayo anokonzeresa futi kuti aiite overheat zvotokonzeresa futi kuti auraye ma conducts kumagetsi. Conductor rimwe rikafa kana musina rinenge richida \$5000 saka kana akafa ose ari 3 zvinoreva kuti panodiwa \$15 000. Saka zvinoda kuti imimi wacho muuye kuzokupa majecha. And now tine cyclone Idai yakauya ikapinza majecha musump tichangobva ku scooper majecha. Taka scooper on wednesday and majecha akauya kunoiswa ne Friday. Izvezvi majecha akazara musump. Saka tinogona kutaura ne IMC yedu kuti uyayi nekuti tiri kuitira imi kuti muwane mvura zvisina kana problem. So izvezvi sekutaura kwandiri kuita ndati majecha akazara mumapumps. Tinoti majecha iwayo an moisture anokonzeresa corrosion ne rust asi tanga tasiya mapump edu akanaka. But now tavakuda kupomba mvura imimi munenge muchiti takasiya mapumps edu akanaka but because of the jecha riya simbi dziya dzinenge dzavanengura ndopanozonzi pump yenyu yava down asi makasiya dzakanaka. Saka ndozvatinoda kuti masump edu agare akachena... Isu tiri kuti uyayi tibvise majecha vanhu varikungoti tichauya right now tine maintenance tiri kuita desilt kubva last week kusvika two days dzapfuura saka varikuuya futi musi wechina ne chishanu. Saka imimi zivai kuti maifanira kuti pamakangodzima iyi mouya moscooper sump yogara yakachena kuitira kuti yeuku ichiuya yobatsirana neyekuno. 01:10:22: 8. ZINWA-ZESA bills- ndofunga munogona ku expander ikoko. 01:45:50: High cost of electricity- magetsi arikuti dhurira. Ipapa tikashaya mvura yemwaMunyanyazi (Nyanyadzi river) tinoenda kune yekwa Odzi (Odzi river). Paripo pamwe patinoti tinogona kuita 3-4years tisina kubhadhara mari kuZESA (electricity bills) zvino vamwe mari dzacho havachadziwani. Participant E3: tiri kuti izvo muno munyanyadzi tine ZESA, Odzi Catchment ne ZINWA yacho zviri kuda mari. Asi zvinoita sekuti imi varimi vemuno tinenge tisingade kuzvibatirika. Asi mukada kuona magadzirirwe akaitwa scheme ineyi yakatogadzirwa ichizivikanwa kuti one time or another mvura yekwa Munyanyazi inoite shoma ndosaka pakatoiswa mapipes ne mapumps okuita augment mvura yekwa Munyanyazi. Saka maservices awo anoda kuti abhadharwe. 01:17:08: IMC havasi kubadhara ZINWA debts- ...zvinhu zvakanonaka kuti muzive kuti ZINWA iri kuda chimari chayoyi.	Participant W6 Participant NV11 Participant W6 Participant W6 Participant F13 Participant E3 Participant W6 Participant

		Saka mongono bhadharawo even though muchiziva kuti makasiya chikwerete chaka kura asi munongono bhadharawo. Dai manga muchibhadhara bijana bijana yamunayo haikona kuzoto regera zvachose, zvinhu zvinenge zvisina kunaka kuti mafarmers agosvika pakutsvirwa. Participant F14: Kumvura tiri kumbombadhara marii? Participant F16: Imi one tiri kubhadhara magetsi, ne maintenance nechikwerete chemagetsi. Participant W6: Saka ichallenge yekuti pamunenge mozoda ka. Nekuti neZINWA ka maitire atinoita yenyu makatopedza takato distributor. Manje panozonzi magetsi ne ma pipe avepo hatina mvura yatinokupai pasina payment. Anditi zvapera hazvo here? 02:32:33: Participant W6: Inzwai Mr. X problem ndiIMC wenyu uyu haisi kubhadhara mvura, ndaida kuti mundibvunzw kuti why ndichiti haisi kubhadhara mari. Eeeh ZESA inoziva cycle inoziva kuti muchabhadhara nesu (ZINWA) tinozivawo but ZESA yakauya kuzovhara zvakadhara magetsi anditi. Vakazodzoka kuti rwechitwo after a month zvikanzi tauya kuzovhara futi magetsi. Kutaridza kuti hapana mari iri kuenda. Same applies ku ZINWA havasi kumbobhadhara vakango bhadhara \$20 ndokubva zvakwana up to now, havasi kubhadhara. Saka isusu tichitaura tinenge tichinatso ona kuti hakuna mari chairikushanda.	W6 Participant F14 Participant F16 Participant W6 Participant W6
	Lack/poor marketing strategies	01:06:15: 2. Informal Market. Makorokoza ndiwo arikuuya achitenga zvatininge tarima. Saka vanotenga nemari iri pasi zvekuti dai pamwe tanga tiine vamwe vataikwanisa kutengesa tichiita ma contract farming naana Cains pamwe vaitenga zviri nane. Then number three yedu, 01:44:44: Marketing of crops- matomatoes, beans nezvimwe zvakadaro. Paita makoronyera hatina musika wekutengesera zvirimwa zvedu nenguva yakafanira. Toti ndarima beans ndotengesa beans dzacho dzakangomira pane zvikonzero zvakati wandeyi. Buyer woshaiwa, support yekubva kuhurumende yekutengesa zvinhu zvedu yoshaiwa saka todii tongoramba takatsikirirwa ndodambudziko ratinaro Participant E3 ... nyaya yema informal markets ndofunga kuti ana Baba Mk ava vava vekare ndinofunga kuti makore amairima beans munomu. Ndaiziva kuti kwaiuya Midlands buyers, Gloria, Victoria foods, Blue ribbon nekuti kwanga kusina makoronyera nekuti munhu waitotakura ngoro yako wotoenda kunotengesa ngoro yako mari uchiipuwa ndofunga pama challenges ose tatoikanganwa. Nyenyaya yecash yekuti cash haisi kuwanikwa ichallenge iyoyo unozongotengesa kuti ndodii. Then nyaya iri kutaurwa nyaya yemakoronyera iyi, makoronyera atotiuraya but am happy kuti kunoku zvatombova nani because for example taiziva kuti makoronyera vana Wallace naana Grant vaiuya vachitora saka varimi vakazoti majaira kuuya muchititorera kunoku tava kuuya tega. Asi still kungorohwa pasi petsoka why because vachada matomatoes ako, 1. Vacha hire vanhu vanokaya 2. Akaya uchatenga macardbox 3. Wohire ngoro kuti abve muma Acre auye paroad 4. Asvika paroad ucha hire gonyeti kuti asvike pa Sakubva market. Pane vakomana vanoti haudzise tisu tinodzisa vobvisa voisa apo haubate uyu wocharger mari yake Z\$2:00 per box vana Grant vamira manje masales representatives. Iye unokutaurira kuti hautengesi ba ndini ndini ndinokuengesera. Box rega Z\$5: 00 pasina chaashanda. Saka farmer iyeye anotorohwa pasi petsoka apa haasati atengesa. Then mowirirana ndiye unotengesa iwewe wakangomira kudai achiisa mari mubaga apedza shamwari hambai iwe wakandomira kudai. Mapedza kumuti mari ototi 20 boxes x \$5 = \$100 yemahara. Ndosaka tichiti panguva yaana Cains waingoziva kuti kuendesa maboxes ako zvatopera kwava kutomirira chii. Handisati ndapedza, saka ndiri kuti dai hurumende yadii yasheedza macompanies vauryawo vasimudzira varimi ava nekuti varimi ava hapana chavari kuwana ava. Researcher: okay in a situation yekuti Hurumende haina kuuya kunosimudzira mafarmers iwo mafarmers acho ari kuiteyi kuzvisimudzira? Zvandiri kuendza kureva ndezvekuti ukaona munhu ari kwaMutare achikwanisa kuprotector market yake.	Participant W6: Participant F13 Participant E3 Researcher

		obva aita Sales Rep wenyu nekuti ndopabasa pake ende anotryer by all means to protect market yake nebaso rake pane livelihood yake. Iwewe farmer uri kuiteyiwo kuti usanosvika kwaari ikoko kunoda kuzvitengesera. Nekuti farmer basa rake nderekurima hazvisizvo here Mr. MK. Unorima woisa paMukwambo paya wobhadharwa mari paCains paya anditi, wodzoka wonorima, ava vosimudzawo zvavatenga zviya voendawo nazvo zveiyu hausisina basa nazvo anditi. Saka iwewe semurimi uri kuiteyi paground ndopane mubvunzo wangu muhombe ipapo. Participant F16: inin ndimbotauro ipapo sevarimi taka former inonzi Marketing Committee. Marketing Committee iyi inozondooneka panoitwa meeting, tinozondoonekwa pamameetings chete asi chandisingazivi ndechekuti pane here pavaka mbozoonekwawo vachiti tauya ne mabuyer aya. Izvezvi pane mabuyer akabva kuMozambique but they failed kuti vanegotiate iwo mafarmers iwayo nemabuyers iwayo vauye ku Nyanyadzi. Because its just 100km from Mutare – Nyanyadzi, hapadyi petrol yakawanda then vodiii vouya votenga matomatoes from mafarmers edu voenda nawo ku Mozambique kwawo but they failed. Iyo marketing committee yataka former manje manje haina time. Researcher: Muri kuona kuti problem iri kunaani here? Participant F16: Iri kwatiri tese takandoita gudza musha. Asi tinozonyanya kutarisa inonzi functioning committee nekuti kana kuti muzonzi mava committee ka, mwava kumirira the whole community ka pachinhu chamunenge maona. Saka ivo havasi kucommunicator ba vanhu ava vandori vanhu vandorimo. Participant E3: Eeeh Mr. H. Mataura zvakanaka chimbomirai ndimbotauro. Committee iyoyo ka semaziire angu handimi makaisarudza ba imimi. Yakando appoiner neumwe munhu, zviri nyaya dzepolitics kuti ndewe kwa mai nhingi, saka as long as muchi appoiner vanhu hazvishandi. Vanhu vanofanirwa kuvhoterwa pamucha apo kuti ndivo vanhu vatinoda, because mukada kuona izvezvi mabuildings enyu eCorperative arikutodonha apo, marketing committee yacho muchndoti iripo. Saka imimi wacho zvataura hazvo nava Researcher kuti muri kuita chii committee yenyu zvaisiri kushanda muri kuita chii muchiti kwai tiri kushanda muri kuita chiii? Kana isinga shande zve ngaibve ka potsvaga vamwe vanhu. Participant F4: inin hangu maonere angu harisi dambudziko recommittee ba kuti committee iripo ndoiri kuti kanganisira ba. Inini ndakaona kuti munomu munedambudziko rekuti mukauya kana munhu anotenga chaiye unoswera atova nevanhu vake. Vanotaura zvavanenge vachitaura, vamwe vachipa mitengo. Zvekuti iwo ma Mozambiqueans akapinda munomu ne maboxes awo vanogona kubva nemutengo kwawo, asi kana akanditengera inini kana oda kuenda kwa Mr. C ndava kuto kutsira kuti apo enda unotenga nemari yakati. Pane kuti ouya munhu, otenga kuda kuzoti kunosvika kwanguyo bhaghidhi ratodzika mitengo. Saka munomu mune uroyi hwakashata muNyanyadzi, ndohunosaka hunopinda futi nekuma mvura nekumaminda kuti mombe dzidye. Munhu unombaindotema wire kuziva kuti Mr. C warima gwere rake rakanaka, kwava kumbaindotema wire kwava kutinhira mombe. Nyanyadzi ine uroyi hapana chinombonatsa simukira ba munomu. Takanatsa kuzvibata izvozvo iwo makoronyera iwayo dai vasinga taurirwa mitengo ba achingonzi tenga neyatengwa apo zvichindodaro taigainer nekuti chinonzi koronyera haisi mari yacho ba, mari ndiyo yatinoda yakakwirira. Saka isusu tisu tiri kuenda kunopa koronyera mitengo. Participant F13: Dambudziko randakaona inini ndere kudai, hongu marketi inogona kutinetsa kwekutengesera zvinhu, Cains haina kuuya nechii chii problem iri kutangira pamurimi arima zvinhu zvake. Ndini inini ndarima matomatoes angu pamunda apo ndikaenda kwa Mutare ndiri ndega hazvina kana IMC mukati kana committee iri kutarisa kuti zvakanamira sei mukati, ndiri kutotsvaga kuti market yakamira Seiko kwandingaendesa matomatoes angu ndekupi, ndikavika kumabus ndakishaya ndosvika kuna buyer oti matomatoes ndinotenga asi hatidi riogards apa inini ndoandinawo start ndoyandisina ndodzoka kuuya kuno rima riogard nekuti ndo yandinayo.	Participant F16 Researcher Participant 16 Participant E3 Participant F4 Participant F13

		Researcher: Right apa mavakudzoka kune zvambotaurwa naExtension Officer paya kuti munotanga marima mozodzoka. Participant F13: Ehe nemhaka yekuti inini ndaka kurira muno saka taiti chirimwa chikakohwa chaienda kumarket ka one. Than kuti murimi umwe neumwe unorima chirimwa chake. Researcher: In short tinondodzoka pane zvanga zvichitaurwa na Extension officer wedu kuti mava kuita zvinhu zvenyu mega, uyu unoita chakewo one umwe waitawo matomatoes ake and issue iripo manje ndeyekuti ndinoda kukutangira vanhu vese kuti ndinge ndiine matomatoes ndega anditi. But, kuzo marketer kuya kwodii kwonetsa yet, mukaita chinhu one muri group rese u can easily look for a market. I think pane vanhu vandakambo discusser nawo ndichiti kana maungana ka even maOK chaimo imimi muchingoti hakuna market hakuna market. Mukasvika kwaOK vanokuudzai kuti tinoda mafarmers ari registered muise product yenyu. Saka chii chinoramba kuti mungo buritsa 3 tonnes dzenyu dzematomatoes, OK tine 3 tonnes dzedu dzematomatoes oti alright idzi ngadziuye apa idzi ngadziende apa mari yenyu yopinda. Participant F13: Mastandards e product ndoproblem. Nekuti patairima hapana pataimborima masame levels. Zviri kuitika munomu ka patino rima matomatoes mumwe anoisa 2 bags dze fertilizer mumwe aisa one mumwe haana, asi product ndeimwe at the end of the day mumwe ane four boxes. Zvanga zvakanakira Cains iyaiya yaitorera murimi wose ane 2 boxes, ane 4 boxes, angatora masamples. Manje zvonetsa inini ndikarima andidi kuenda kure ba ndoda kugumira paroad ndotora chingoro tosonga mabox kubva apa kusvika apa. Manje kana kwava kwaMutare andova mazvake mazvake zvinenge zvisina kumira mushe. Participant NV 11: Tiripo pamarketing apo, inini chimwe chinhu chandakagona kuidentifer muNyanyadzi mafarmers mazhinji tinorima just kungo coper kuti uyu warima chakati kwavakutopindawo ipapo. Hatigoni kuita market research kuti ndiri kuda kurima matomatoes angu ndarima matomatoes aya ndozodii nawo munhu anotozofunga kuti ndodiii nematomatoes atoibva apa arikutsvuka ari mumunda ndopaanotanga kumhanyamhanya. Last time iya ndopatakato siririsa vanhu vachichinjanisa matomatoes nehuni. Munhu anobva kumhiri uko nesvinga rehuni ouya opiwa bucket rematomatoes. Saka pamarketing apa murimi chaiye anofanira kurima akaita preparation otanga aitatawo market research ozorima crop yake. Vazhinji vacho tiri kungorima zvedzungu dzungu zvekungodhumhira wozofunga yava last minute. Participant F16: Ini ndinoti poor advertisement yeirrigation scheme neyema produce edu. Participant F4: Pamarketing ipapo dambudziko redu riri kubudira pakuti kare tainge tiina vana Cains, National foods, Victoria foods vaiuya kunotora maproduce edu saka maonini iwawo hakusisina bas aka tava kutoshandisa makorokoza as vana Cains ndodambudziko ratapinda kuona kwangu. Hazvichafambi zvakanaka ba nekuti macompanies mazhinji akavhara. Researcher: So hatisisina contract farming + the economic and political environment iripo haisisina kumira zvakanaka. Participant F14: Ndiri kuona kuti pamarketing apo hatisisina vatenge vekunze (exporters) vanouya vachitengawo zvinhu zvedu munomu zvinobatsiridza kuti pamarketing apo zvinhu zvedu zvimire zvakanaka. Participant F6: Mira ndimbokudzosera kumashure chinoita kuti vamwe vanhu vasaita contract farming iyoyo ka inyaya yemanagement yatambotaura iya . Takamboita Command Agriculture vanhu vakaita chibage chakanyanya but havadzoseri ivava. Matsotsi ndozvinonetsa, iyoyi Cains yamunotaura yakatsotswa muNyanyadzi munomu yaunza ma fertilizers avo, mbeu dzebeans rimai makohwa mozotipa. Ivo vanhu vakohwa vavakutonotengesera Grain Marketing Board (GMB) saka ipapo ndopanenyaya mune matsotsi. Participant E3: Yaah iyoyo yamataura Mataura chokwadi, mirai tione pane buyer akauya tikataura naye point iyoyo tikamuti imimi muri kuda beans but isusu vamwe mafarmers edu varikushaya mainputs madii kuvatsvagirawo mainputs	Researcher Participant F13 Researcher Participant F13 Participant NV11 Participant F16 Participant F4 Researcher Participant F14 Participant F6 Participant E3

		but iye akati iii, Nyanyadzi haiwa. Nekuti varimi zvavanoita manje mukavapa mainputs munenge matopinda pa loss nekuti instead yekuti vava kutengesa vakutengeserei havachakutengeserei. Saka varimi vemuNyanyadzi hatisati tavimbika not Nyanyadzi only but, vanhu vazhinji hatisi kuvimbika. Participant F14: Researcher mati dzokerei kumashure period yekutanga iyo takatargeter irrigation scheme vanga vaine market yavo here vanhu ivava. Cains yanga yaveko ichitenga kuvanhu ichi contractor vanhu. Participant F14: Researcher mati dzokerei kumashure period yekutanga iyo takatargeter irrigation scheme vanga vaine market yavo here vanhu ivava. Cains yanga yaveko ichitenga kuvanhu ichi contractor vanhu. Researcher: In the first period apa, paiva nepoor marketing vaingorima chibage, ndochavaingotengesa Participant F14: Handeyi pa next period, panga paneyi, panga paane market yanga yava ready here kubva kunaana Cains, National foods vaitenga maproduce kuvarimi. Researcher: Ehe this period market yanga yakanakisa. Participant F14: Market yanga yakanaka iyoyo zvekuti munhu aigona kuuya nemainputs ake opa kumurimi. Researcher: Plus, futi kwaive neCooperative basa rayo raive rekukweretesa varimi mainputs vakohwa vodzosa zvinhu zvacho. Marekt yavo ava yainge yecontract farming yaitwa yemaPawpaw, vana Zunzu yaitwa. Participant F14: Okay ipapo tati painge paine market yakanaka vachipa varimi ma inputs avo vachiita contract farming vachizovatengesera maproduce awo. Chii chakaita kuti contract farming iyoyo ife patange side marketing. Researcher: Pane two maissues aripo apa, pane 1. Poor political environment -ndoyakachinja kwakatanga kuita hondo, UDI declarations then masanctions aSmith, Participant F14: Asi inini ndiri kuti kana vanhu varima zvinhu zvavo hakutangi side marketing ba pane chinotangawo. VaMajoni vanouya ne beans dzavo vobva vandipa kuti ndirime vobva vati \$5 per kg kwobva kwauya vaMukwambo vanenge vachitenga beans dziya ne \$8 per kg. VaMajohn zvavakandipa beans kuti ndirime ndichawana chii kubva kwavari ndo \$5 iya ka nezvavapo hazvichapindirani ndoto tsvaga mumwe arinane wandingapa asina nezvaakandipa ndichi gainer. Budgeting haizonatso buda ipapa because zvatakawirirana pakutanga hazvisisirizvo zvava kuitika manje hapasisina a win win situation pane avakuda kungowinner chete. Researcher: Handina kunatso nzwisisa hangu zvamuri kunatsotsanagura. Participant F10: Marketing ka tikada kunatso zviona marketing ka eeh kuti market ivepo ka kunge zvinhu zvakamira zvakanaka economy iri stable. So that kuti market tizoiona, for example vana National foods ivavo kuti vazouya kuno there is no money yekuti vatore vazouya kuzonotenga maproduce edu so zvimwe zvacho tisanyanya kumahanya nekuti market iri kunyanya kufira pa economy pedu kuti yakamirawo Seiko. Participant E3: Ini ndaida kumbobvunza hangu MrX, bhururu wangu uyu, pane nyaya yandambotaura yecontract farming ndoda kupa example, pane company yaDr. Cain yainzi Agro seeds. Agro seeds yakauya tikagara pasi neIMC ikati tichakupaiyi mbeu certified seed mbeu yakauchikwa but agreement iri yekungoti ndikakupa mbeu 1 bag unondidzosea bag rangu 1 then the rest wochinditengesera. By then it was about \$2.10 per kg mazuva zcho mari yacho yanga ishashanda ndekunaana 2000s. kwavakubva kwauya imwe company yakati \$2.50 mafarmers zvavanga vavakuita manje vanga vodzosea Agro seeds chiyi 1 bag ravo then 18 bags dzimwe dzoendeswa kune imwe company. Saka Agro seeds ndokubva yaenda, munoziva vanhu vanokanganwa vabva kudaro the following year ndokubva vauya futi vakati tiri kudawo kuti tipihwe mbeu naDr Cain. Tikamufonera Dr. Cain akati iiiNyanyadzi kwete. Zvinhu zvinoitika kuti vanhu hatitembeke kare kana tangobvumirana kuti \$2.10 ndiyoyo.	Participant F14 Participant 14 Researcher Participant F14 Researcher Participant 14 Researcher Participant 14 Researcher Participant 14 Researcher Participant F10 Participant E3

		Participant F10: Ini zvandaimbonzwa hangu kudhara dhara ndingati pa phase number 2 yema rounds enyu amataura (illustration on history of the object) zvainzi time, inyari beans chaidzo zvainzi muNyanyadzi tinoda so much tonnage zvaizivikanwa izvozvo. Madhumeni hameno kwavainoita ma meetings awo kunyari kunaana Harare vachichiudzwa kuti Nyanyadzi simai so so vachichipuhwa ikoko, inyari cotton vachiudzwa kuti tinoda yakawanda so so. Ndozvaitika pa phase number two iyoyo manje ikozvino murima wava kundozvimirira pachezvake nepfungwa dzake.(from collective object to fragmented objects). Asi kare manje kune waitimirira kuti kunyari pa peak yakadii ouuya munomu oonesa maDhumene kuti kana paine vanoda kurima papeak apa tinoda number yakati. Vanhu vorima vakadaro so market yaitsvagwa not nekuti ndini ndinoida asi taitsvagirwa kune vaienda kumberi kwedu vachiti tsvagira market. Dzinyari beans dzedu idzodzo Nyanyadzi was the best area yaibuda beans saka dzaitoc=zvimarketer beans dzitori panapa kana kuti dzisati dzatomborimwa. <u>Researcher insights/reflections</u> Researcher: right inini mukazondibunza manje. Zvandakaona pa irrigation scheme yedu ndezvekuti, pane issue yandinoda kubvumirana na MrX its issue ye Representation then tozoita issue ye lack of value addition. So issue number 1. Lack of representation: then point yaMrX inobatana ne point ya Mr. Extension officer yavakataura nezuro then ne point ya Madam (NVTC) yavabva kutaura. Dambudziko ratinara chokwadi chokwadi ndere poor marketing iri apa but tikazofambirana nayo chaizvo ndobva ndazorambirana nezvataurwa na baba ava. Poor marketing yedu inozonovika pakuti hatina munhu uyu (Marketing strategist), munhu uyu ndiye anodzoka iota zvataurwa naSis vangu ava (market research), munhu uyu ndiye basa rake futi iri rekumanager mavaluue chains edu (value addition), ndiye futi anofanirwa kuti batsira pavaluue addition yedu nekuti manager mavaluue chains edu. Value chain inoti izvoni murimi anorima opasawo kune umwe, umwe otorawo product opasawo kune umwe zvoenda zvakadaro. Asi isusu tinoooneka tavakuda kuenda nemaproduct edu kunosvika kanda mubhaira ku Cains kwacho. Ndauya nematomatoes edu ekuNyanyadzi aya ndava kudirawo. So munhu uyu ndiye dambudziko redu so marketing yedu ndopairi kufira apa. Because this person uyu ndiye futi anebasa reku manager apa (value chains) saka tikawana munhu uyu ndiye futi anokwanisa kuti turner apa (poor market) kuti iite upside down. Instead of focusing on local market economy anokwanisa kuti svitsa uku (export market/international market). Ndiye munhu watisina saka dambudziko redu isusu sure sure riri pa poor marketing hameno kana muchibvumirana neni. “kare kacho pane aiuya achiti kwanza kurikudiwa 200 tonnes dzebeans” munhu iyeye aiuya otaura izvozvo imimi varimi morima, achiuya aisvikira kuAGRITEX anditi vopedzerana ikoko voonesana ikoko nemunhu iyeye vachiudzana ikoko anditi. imimi varimi monzi kuri kudiwa 200 tonnes dzebeans anditi 200 tonnes dziya dzanzi dzabuda munhu uya waiuya watora oenda imimi matoita part yenyu modi moenda. Value chain yenyu yaive nemunhu aiimanager kana kuri kunzi aiuya nembeu, aiuya nembeu accordingly to magreements amadi amaita. Imimi dambudziko renyuwo futi ranga riri apa (paTrust). Kutu zvamabvumirana nemunhu kuti muchizovaiita, iye akupai mbeu yacho, akupai fertilizer otomirira 3 months kuti ndigomirira vanhu vepaNyanyadzi. Auya mobva matochinja nepfungwa ne trust iya ye 3 months dzose yobva yapera nenyaya ye \$0.50. because imimi mapihwa mafertilizers zvese anditi mwatorima zvose beans dzatova mumbuva, uyu wakati kana ndakupai zvose ndichazokutengerai ne \$2.00 anditi, asi panozouya munhu anosvika oti \$2.50 asi haana chaakupa. Asi iwewe ukazogara pasi uka calculator value ye seed, value yefertilizer anditi, I think ndochimwe chinhu chandakaona chinoti netsa anditi. because tikashaya munhu uyu watiri kutaura bezvake uyu zvinodzoka futi zvava kutidzosa kune imwe manifestation ye ma crop choice. Hatichazivi zve kurima ndopatinodzoka toita mazvake mazvake uyu worima chakati uyu worima chakati (fragmented object) nekuti hatina munhu uyu. Because uyu munhu uyu tikamuwana anofanira kuti udza kuti varume tinofanira kuendesa matonnes edu akati ot maboxes edu	Participant F10 Researcher

		1200 ematomatoes kwakati type yakati dziri kudiwa muna October saka vanhu ngava chitanga kudyara kungava dzakati anditi. ma extension officers edu oti veduwe kuri kudiwa matomatoes. Varikuda kurima matomatoes tsvagai mbeu yakati, isai mbeu musu wakati kuitira kuti inobatirana nedate redu remusi wakati anditi. matomatoes aya achingobuda otodii otoenda so you will find kuti kazhinji majority of the people vacharima crop iri kudiwa and crop iyoy ikazoitsvaga I cash crop. Market inenge yatovapa hausisina need yekuti ndinoda kuzvitsvagira market ndoga. Ende munhu uyu anotogara anegotiator maprices acho, kana munhu uyu akangwara uyu akati manager value chain yedu anotokwanisa kutiudza kuti right price inoita imarii per kg nekuti acha calculator zvose anditi. panodiwa fertilizer dzakati, panodiwa chakati, ngati converter mari tiise kuma us\$, ngatishandeyi ne. us\$ iri stable today today saka atleast price yedu isusu inofanirwa kuenge iri pamari yakati anditi in us\$ risinga chinji chinji. Ndiye munhu watiri kuda kuti uyu uyu timutsvage, atipedzere dambudziko redu. Participant F10: Ndiye munhu atinofanira kutsvaga. Regai ndikudzoseyi panumber two apo, eeh tichiri pacompany yaitenga beans kana yaitenga zwayaitenga kare kacho nyaya yaisiyana here ipapo. Researcher: Maprice aisiyana, masiyanire aaita manje ndeekuti mumwe aiuya oti muri kutenga ne\$1.50 umwe oti \$1.75 umwe oti \$1.65 ndichikupai masaga. Participant F6: Kusiya nema \$0.10. Researcher: Ehe kusiya nema \$0.10, Participant F9: Chimwe chinhu chandakati onei futi varimi vemunomu zve Contract farming havazvi fariri. Researcher: Aiwa haisi nyaya yekusazvofarira, kusatozviziva. Participant F9: Kusatoziva? Ndiri kudaro nekuti panemumwe murungu wakamboti uyeyi muno muNyanyadzi muno pamakore ati pfuurei anenge ava kusvika kumashanu. Akange achitaura nezvekusima mhiripiri asi takazviramba kumbaiti shuwa shuwa kumbaisima mhiripiri here? Asi izvozvo vanhu vakazoti pepu pavakazoon paBirchneough yava kurimwa vachitaura kuti vaite mari ndiyo. Researcher: izvozvo zvese mukazonatsa kuzvitsvaga zvine chekuita nyenya ye farmer education. And its also because aya mabboxes aya ari kutizana but ose aifanira kucontributor. Ehe turi kutotizana ende vanhu ava because hapasisina this thing ende uyu haapo and hapana futi munhu ari kuadvisor apa saka at the end of the day uyu watovhuraake informal market yake, uyu zvekurima haachatoda nekuti zve contract farming haazvinzwisisi uyu and unit hapasisitorina and trust chaiyo hapasisina nekuti hapachina chaachada and at the end of the day we cry of the market and we don't even put value addition. Value addition ndeyekuti ukatengesa beans dzako kune umwe munhu we always expect that person to go and add value ku beans dziya agotengesa. So isusu sevarimi kuti tifungewo kuti tinokwanisawo kuita ka industry kedu and can beans dzedu totodziisawo label yedu yeNyanyadzi. Kana ari matomatoes to processor matomatoes edu toisawo matins akanzi Nyanyadzi. Izvi hatitozvifungi ba izvi. Ende ukazozvitsvaga kuti nemhosva yeyi tisinga nyanye kuzvitsvaga unozoon kuti tine maNGOs akaita saana Tsuro dze Chimanimani they are based in Nyanyadzi maoffices avo ari muNyanyadzi but I doubt kana paine any value addition yavanopa kuvarimi vemuNyanyadzi. Participant F16: Havachaiti ba, maoffices avo aripo but vakarega. Vakatangira vachiita hameno chii chakazoitikawo vakarega. Ndozvutiri kutaura izvozvo kuti tine mablocks iwawo akaita seawa but ese anofanira kuunza paeducation apa but ese ari kutiza. Saka dambudziko ndeuyu munhu uyu. Saka iyi ndoimwe challenge yatinayo hameno kana paine asina kuinzwisisa. Inini ndiri kungokujekesera kuti munatse kuona.	Participant F10 Researcher Participant F6 Researcher Participant F9 Researcher Participant F9 Researcher Participant F16 Participant E3

		Participant E3: Inini ndinoda kupa zvangu example, paTsuro dzeChimanimani Mataura nyaya ye value chain and value addition, vari kunyanya kuita nyaya dzeuchi nemauyu. But even though zvakadaro ndoda kumbotaura nyaya, last year ndakamboenda kwa Baba Mutunzi vaine gamba reuchi ndikavati mariwana kupi zvikanzi ndapihwa naStellar. Kune imwe project iri kuitwa neSAFIRE kwa Chapanduka ku Buhera uko. Vakatovakirwa ka office kawo kehuchi saka vari kuto packer, voisa mumagaba volabel votoisa muma supermarkets. The same mukada kuona yepaChaeyama iri paside peroad ndeyeuchi futi.	
	Lack of financial management structures	Researcher: ...Management iyoyo tinodzoka futi toenda kufinancial management. Kuti inomanger sei mari dzemvura inobhadharwa sei uye neyeyuko neyeuko anditi. So you find kuti, imwe yandaida kutobvunza kuti constitution yenyu inotii pamusoro pema finances emu irrigation scheme. How are the finances are held and used? Then the other one ndeyekuti mune account here as Nyanyadzi irrigation scheme and ino auditor here? So financial management yatinenge tichitaura ine mastructures here ekuti at this quarter tiri kuita mafinancial audits edu next quarter tava kuita maudits edu tiri kuita so tiri kuona kuti mari yedu yatinayo imarii, mapayments edu anoitwa musi wakati nguva dzakati. Pane mapayments and we know kuti musi wa28 wega wega tiri kubhadhara ZINWA tiri kuibhadhara mari yakati and we make sure kuti by 28 mari yabuda muaccount yaenda kuZINWA. Tinazvo here? Participant F16: Aaah inini chandinongoona hangu ndechekuti chakanyatsotokura hacho muNyanyadzi munomu icorruption pafinance ipapo. Researcher: hamuna corruption mune lack of financial management structures. Participant E3: Hamuna corruption Participant F16: aaah ndiyo yavekuchibara denda zve ratinaro. Participant F10: Ipapo matotimutsa maningi kuti kana tichitsara vanhu tisatsara ngekuona hope yacho kudai kumutsa mutsa ba, wototarisa boots ne motokari hazvirevi chinhu ba. Nyanyadzi ino yakakomborerwa ngekuti ine vanhu vakafunda zve financial management tinawo vanhu vakafunda vanoziwa zvefinances vamwe vatove pamapensions zvekuti vanhu vanokwanisa kuti batsira muNyanyadzi munomu. Asi nekuti isusu tinofarira zveubenzi, isusu maplot holders acho tiri mabhenziwo futi tinoda kutsara munhu ngekuti unotaura zveubenzi paruzhinji vanhu vachiseka. Ndiye munhu watinoda kutendeka kuti atakure 1 million kuenda nayo kwaMutare benzi iroro. Munooona kuti chii here zvandiri kutaura hatina kana breakdown yekuti mari dzatiri kubvisa apa ¼ yacho iri kuenda kupi, iyi iri kuenda kupi hapana anoziva zvakati dii. Iwo wacho pachezvawo vosvika kuoffice kwavo vanondoti iyi \$4 tadii kuti imboenda kwakati zvisinga zivi inini muridzi wemari yacho wabvisa. Saka wotoona kuti hazvina systeme imari iri kundoenda. Takabvunza eZINWA nezuro zvikanzi hakuna asi tiri kutorerwa mari dzedu sema farmers. Zvongonzi mari dziri kuenda kuZINWA asi hakuna chinhu. Participant F18: Mr Rsearcher pane pandakabvunza panapa ndichidya kuna Mr. G ndikati tine ZINWA, ZESA ne Odzi Catchment mari dzatinobvisa dzinofamba sei sei. Mr. G vakangoti tsenge tsenge ini ndikati inguva yekudya tangobvunza chete kuti zviende. Ndozvava kudzoka futi nhasi kuti financial management iya yava kubida futi tiri kubhadhar \$8 per Acre kuZESA kune chikwerete chemarii? Uye chakasvika sei pachakasvika and we are forgetting Odzi catchment but targeting ZESA mari yatiri kubhadhara izvezvi iri kunzi after forty night or weekly ngaiende kuZESA, koZINWA iyi iri kumbowanawo zvakadii, ko Odzi catchment iri kumbowanawo zvakadii. Ndosaka Mr. Water vakati bhadharai yenyu yeZESA there is no problem when it comes to ZINWA mavakuda mvura magetsi avapo hatikuvhurirei mvura because tiri kungo attaker one side forgetting the other side asi zviri kufambidzana ZINWA ne ZESA ne Odzi catchment hazvisiyani. Todiii manje ndopambotaurwa poor financial management paya zvatangira pakuti isu tabvisa kubhadhara mari yedu, I	Researcher Participant F16 Researcher Participant E3 Participant F16 Participant F10 Participant F18

		have managed to pay my money vandapa mari vacho are they able to pay the appropriate authorities at the end of the day zero. Participant E3: Ndaida kukupindurai zvangu nyaya financial management hatingakwanisi kutaura nekuti munozoti ndakati zvakati haina kumira zvakana. Because 1. Imimi wacho mafarmers ndimi munotofanirwa kunge muchito pusher kana Bumbiro rakati 3 months tinoda kunzwa financial report munofanira kutoti kana 3 months dzakwana munofanira kuti hatichabhadhare mari kusvika matipa financial report. Financial report yopresenter mochora maballpoints muchichinyora mobvunza manje kuti mari dzamuri kutaura dzakamira sei sei. Ndoda kukupai example iyoyo financial manegment iyoyo ndizvo mukasateerera munobirwa mari musingazivi. IMC inofanira ichiti kana pakabuda basa inoflighter tender kuti tiri kuda vanhu vanoti repair magates edu unzai mapapers voita maquotations awo. But unozongonzwa kuti tatsvaga Katsaura kwaRufaro wacharger \$300 ounza zvimagete zvakadai kutsonga three woti i\$300. Ndokubirwa mari makanyarara ndozvinhu zvamunofanira kuti pafinancial reporting muvabvunzw izvozvo. Kutikwa flighter tender here tiri kuda kuona matender documents acho apa. Uyu makazomusarudza sei because ipublic fund ka iyi. Inoda kuziikanwa kuti uyu makazomupira pakuti chii. Participant F16: Ehe ndipo pavari kudyira ipapo. Participant F18: Mr. Extension officer lets go back panyaya yekuti haisi kubata ba constitution iyoyo kuti iti guide kuti iburitse kuti apa neapa. Researcher: Umwe mubvunzo wandinawo as farmers mune group here like a communication group rekuti lets say IMC inokwanisa kuposter kuti tiri kuda tender yechakati message one yoenda kumunhu wese. Participant F4: iii hapana. Researcher: Nekuti dai zvanga zviripo even financial report yaingofanirwa kunyorwa kunzi financial report zvekuti munhu wese unokwanisa kuiaccess kana kuti constitution yacho munombozivawo here? Participant F22: Right Mr. Researcher kuuya kwenyu kwakambaindonaka and tinombaikubonga yamho zvakanzi zvivana zvembwa hatuoni twese zvichireva kuti tumwe twakatosvinura so tumwe twakachandoti tsikitsiki. Eeh chokwadi hachiputsi ukama financial reports idzi, dai ari kunzi mafertilizers ari kunzi nhasi class ino iyi idoko iyi. Idoko class ineyi, eeh nhaurwa yambotaurwa nemurume uyu kuti tiri kusarudza vamwe vanhu nekugona kutaura zvoubenzi pamberi pevanhu, toti uyu unokona. Inini ndinoda kuuya pamunoono mese pamusika paNyanyadzi nemacommittee amibvisira mari muchiti vagadzirise zviri kunetsa vaite marepairs asi pari kutengeserwa madomasi paya mombe dziri kundopinda nengoro dzevanhu dziri kuita zvekungopinda neapo anditi toudzwa kunzi takashanda zvakati mari. Macommittee members are taking the posts as basa kuti ndikabva kumeeting ndinofanirwa kubva ndiine ka 2kgs of which kacent ikako kaari kutora ndokari kuuraya irrigation yedu. Unoenda kuona kuti macommittee iwawo pamisangano yakadai seiyyi vanofanira kudai varipo vachisangana nezvirikutaurwa izvozvo ndokuti tifambe tisingtarisi kuti zvabva kupi anditi ka. Ma parties ataurwa ana ZESA, ZINWA, Odzi Catchment maparties atiri kushanda nawo atisinga kwanisi kutiza maari. Isusu tavakutarisira ku SAFIRE iya yapedza kugadzira mugero. Vakauya vakati ticha kutsvagirai mabuyers nanhasi varimi vazhinji vakarima beans vari kuchema. Nekuda kwemaNGOs vatinenge tichiti haa ava tofanira kumira nawo tichisiya vanhu waitipa chii zvineupenyu tichifurirwa ne that political interference yekuti inini handifanirwi kutora chinhu chabva kuna Mr X nekuti ndewe kwamai nhingi. Anditi muri kupaona saka chokwadi chokwadi nyangwe Bumbiro remitemo rikanyaunzwa kune vamwe vatoremwa vekuti akangoti anototi ndinhingi uyo atiiti naye. Saka pafinancial reporting apo panouya vanhu five zvonzi takaita nevanhu five ende hamuzvirambe. Ngakuuyewo ma cellphones ane whatsapp vanhu voitawo magroups then vanhu vozivawo information handizvo here. Nekuti mukabvunza macommittees kuti zvakaita muchitora mari dzema	Participant E3 Participant F16 Participant F18 Researcher Participant F4 Researcher Participant F22

		maintance fees zviii? Ndokuzoti \$300 kurikutaurwa uku paka gate kakadai. Munhu oenda kwaMutare kuti ndiri kuenda kunobhadhara \$1000 anditi Participant E3: Motuma vanhu vaviri kunzi endai ne\$1000 Participant F22: Ehe asi you are saying mune ma accounts nemaecocash why cant you do zvinhu zvandoreruka kungo transfer asi munoda kungokwira bus kuti taenda nemari \$1000. Participant F16: Hachandinoona muNyanyadzi, munedambudziko rekuti vanhu varikuita semvura yekuti payakambonaya zuro nhasi ikanaya ndipo painondoteedza mangwana ikanaya ndopainongoteedza futi. Ndopari kufira system yedu muNyanyadzi munomu, pama committee members anouya achiti ana nhingi akashaisha akashaisha anditi ka. The moment yaanongonzi avoterwa committee yatofomwa amuchaoni. Ikozvino tine new committee iripo yakapinda ichiti committee yanga iripo yakashata yakanga yapinda ine zvmatongerwe enyika zvikazodai zvikazodai but kubva zuva ravakavhoterwa nanhasi hapana kana zuva ravakazombogara pasi kuti takazoita financial report iyi takazodai hakuchina. Kuzovateera tsvedzu tsvedzu yatove mvura havachabatika. <u>Researcher's reflections</u> Researcher: iti is because imi wacho hamuna mastructures anoita pull up. Structures hatisi kuti munhu anongoti ga ga ga aiwa let's say if you have quarterly audits financial audits reports should simply tell you kuti musi wakati makabanker mari yakati, mari iyi ikabuda ichinobhadhara chakati imwe ika transfer ichienda kwakati Mabank charges anga akamira so, mari inofanirwa kunge iri muaccount imari yakati anditi. Ndosaka uchizonzwa kuti vamwe nanhasi vari kutsvagwa kunzi makaba 80 million. Haina kubiwa zuva one imari dzinenge dzichingoparutswa parutswa bijana bijana kusvika pa period inozonzi term yako yose ndosaka vanhu vachizogara pasi voti ikozvino tava kuita annual financial audits edu. And munofanirwa kunge muine mareports inini kwandaishanda ndainyora mamonthly reports angu ema activities and operationals ataita then taita futi mafinancial monthly reports ekunatso ziva kuti mucompany makapinda mari yakati, mari yakabuda ichienda kuZESA imari yakati mareceipts acho ayo. Kana ari mainvoice anonyorwa nema invoice numbers for recording purposes. Mari yakabuda ichi bhadhara nhingi imari yakati macontacts ake aya, maservices ake anga akamira so ma quoutaions ake aya, invoice number yake iyi mari iri mu account izvezvi imari yakati. Petty cash yatinayo pano imari yakati anditi, hatina munhu anonzi nhasi ndiri kuda kutenga chalk otomhanya kutora mari ototenga chalk odzoka receipt hapana zvose hapana. Pane mari inofanirwa kunzi ye petty cash iyi, kana tazouta zvose zvokuti taita mameetings kudai so tomwira madhoru edu nemadrinks hazvirambidzwi zviya zviriko kwese asi that monie must be accounted kuti mari yakaenda kumarefreshments imari yakati panga paine function yakati anditi muri kuona. Toita futi maquarterly reports kuti okay first quarter from January kusvika panokwana our four months anditi imarii yataita ipapo kwatanhadhara ndekupi zvikwerete zvatinaivo ndezvipi vanoti ower ndivanani anditi. tozoita annual report yekuti gore rose taita mari yakati, why ndiri kuemphasiser zvinhu zvakaita seizvi tiri kuti isusu kana mazowana munhu uya watanga tichitsvaga paya munhu iyeyi anofanira kuti akasvika kune company imwe lets say asimuka aenda kuMalawi kana kuti kuZambia akasvika akati veduwe inini ndiri representative yabva kwakati tine constitution yedu yabva kwakati ndizvo ka yakapasiswa irrigation scheme yedu iyi. We are a registered irrigation scheme mapapers edu aya, VAT clearance yedu iyi anditi ndizvo ka. We need to think of these things vana VAT clearance vana CR14, CR7 zvese tinazvo izvi zviri apa anditi. ndauaya ndakamirira Nyanyadzi irrigation scheme isus kuscheme kwedu tinokwanisa kuita matonnage akati per season echakati. This coming season tinorima chakati but we can also have another plant yakati which might be of your interest anditi. these are our statements aya tinowana mari yakati pagore kana kuti first quarter tinokwanisa kuwana mari yakati tatengesa beans dzedu. Tadzitengesawo asi market yedu yakadhakwa ikozvino asi tinokwanisa kuraiser mari yakati into your	Participant E3 Participant F22 Participant F16 Researcher

			account saka isusu taida kuti mukwanise kuti batsirawo paprogram yakati. Munokwnaisa kutipawo mainputs tokurimirai tozodii but we can give you on these accounts aya. Tinokwanisa kufano bhadhara mari dzedu dziripo dziri uko kumaaccounts edu aya. So you can use those accounts for surety purposes and the moment yamunotanga kuburitsa ma CR14 you have now start to become an authentic organization inokwanisa ku bidder pane zvimwe zvinhu zvinenge zvichiitika anditi. because mava kurecognizer and now you can start to say tokwanisa kukuprowider nezvakati these are our financial reports mapapers edu ndeaya constitution yedu iri kuti constitution yedu iri apa iyi.	
	A quaternary contradiction between intersecting complex object(s) of the farmers and the technical advisory organs (AGRITEX & NVTC).	Lack/poor farmer education	01:36:45- Lack of support by the community- e.g Command farming inputs- Ndiri kuti izvoni isusu se NVTC support yatinowana from the community yakaita shoma. Kana kukaitwa maprogram ekuti vanhu vari kupihwa mafarming inputs isusu se institute tinomashaya. Maybe inyaya yekuti tinenge tichinzi tengai hameno hatizivi zvedu but takatoona kuti zviri kuitika kakawanda. Saka ipapo tinotoona kuti community nesu hameno kuti zvakambomira seiko kuti munotitora se Training Centre yekupi, yekuBocha here? But isusu tiri Nyanyadzi saka nekumwe kutaura ndiri kuti kana kuchizonzi kuri kupihwa mainputs efarming musazokanganwawo kuti kuna NVTC. Maita basa ndapedza vane mubvunzo chibvunzai zvenyu. Participant F13: Ini ndinofunga zvangu kuti panyaya iyi inyaya ye marketing yenyu, ye Institution yenyu inoyi kuti marketing haina kumira zvakanaka. 01:50:18: Ruremekedzo rwevanopa mvura –dambudziko rimwe ratawana ndere kusaremekedza vana mamvura, vanopa mvura vava. Mamvura apa vanhu mvura mapire aaita poitawo mumwe munhu anozviti anemasimba akawanda kudarika aMamvura. Anotora mvura iya opa umwe munhu kana kuti iye woshandisa kuda kuti utaure naye panotaurwa mazwi makobvu nematete ipapo. 01:32:02-Farmers are not giving trainees to the NVTC especially to the Agriculture department. Pano paNyanyadzi Training Centre basa redu ndere kudzidzisa vana kuita maskills kuita mabasa emaoko. Tinenge taka target kuti mumisha umu dambudziko reurovha richaita shoma. Mumisha umu dambudziko revana vachaita mbavha richaita shoma. Saka kana mwana akaita course nyangwe akashaya basa pacompany paanonzi a employer pa company ya nhingi iye pachake anokwanisa kuvhurawo company yake oto tanga kushanda kana kuto employer vamwe vanhu. But tiri kunoku kunyanyadzi it's not like that because vanhu vazhinji kunoku kunyanyadzi vano prefer kugara nevana vavo kudzimba vakafoira O' level asina chaari kuvaitisa as a result zvava kutipa matambudziko akawandia. Inini nditori panapa ndinodzidzisa horticulture. Ku horticulture mastudents andinodzidzisa inini ndiri kutaura akanangana ne department rangu, vanobva kure uko kunze uko kwete muno munyanyadzi. Yet muno munyanyadzi core business riri muno ndere kurima saka you will find kuti ndosaka zvanga zviri kuverengwa apa nevambobva pano itori nyaya yekuti vanhu vanenge vasingazivi. Saka in short iyoyo solution yacho ndeyekuti imimi vabereki varimuno motonoudzawo vabereki vasara kudzimba kuti unzai vana kuchikoro kana musingadi kuti mwana aite agriculture tine macourses akawanda anoitwa pano. Agriculture iyoyo, clothing, carpentry, building ne motor mechanics saka musagara nevana kumadzimba nekuti zviri kutoti affect enrolment yedu iri kudzika nekuti vana munogara nawo kumadzima uko macustomers edu Participant F12: ... makamboitawo research here kuti chiichiri kukonzeresa vana vepa Nyanyadzi vasiri kuuya pa centre yenyu? Haisi nyaya yema high costs here? Haisi nyaya yekuti muri kucharger asiri in affordable to the local farmers kana kuti muri kungo charger kuti munhu ngaauye semurima nekuti kuuya tinoda but we are failing to pay fees pa macharges amuri kuita imimi.	Participant NV11 Participant F13 Participant F13 Participant NV11 Participant F12:

		01:34:25-Little land for crop production & demonstrations pano paNVTC kamunda kedu katinako katinorima kadikiki saka isusu se gorvenment institute hatichatarisirwi kunzi hatichafaniri kutenge chikafu chekubikira vana veku bording. We are a bording school hatitarisirwi kutenga chikafu cheku feeder vana tinonzi isusu munofanirwa kurima tichi feeder vana vedu but nekuda kwekuti land yatinayo ishoma shoma idiki se organization. Zvinozokonzeresa kuti tipedzisire to tenga chikafu yet pamutemo chaiwo hatibvumiri tinongobvumidzwa kutenga zvakaita saana sugar ana mafuta zvatisinga gone kurima. But zvakaitawo se sadza tinenge tichitarisirwa kuti tizvigadzirire toga. ... chinhu chihombe chandakaona nyaya yayitaurika ndechekuti vabereki vazhinji havade kuti vana vavo vaite mapracticals vano prefer kuti mwanwa ngaaite 7 years achinyoresa form four achifoira kuti agozoenda kucollege anoenda kunoita teacher Then pama fees ipapo ndine vanan vakawanda vandinoziva inini vari kudzidza pa Magamba VTC, Magamba VTC it's our Provincial Training Center. Magamba itori nema fees atori very high kudarika edu. But ndine mwana ari kutobva munomu mu Nyanyadzi muno kuenda kunoita mechanics kuMagamba same syllabus neiri pano kwaari kunobhadhara mari yakawanda. Participant E3: Inini kuwedzera ipapo, vana vemunomu havadi kudzidzi pa Centre because padhuze vanoti vanozosekwa vanoda kure ndingazosekwa kuti ndiri pa training centre. Ndosaka vachizozenda kunaana Magamba kana kuChipinge kunotodhura Participant F13: Ini ndinofunga zvangu kuti panyaya iyi inyaya ye marketing yenyu, ye Institution yenyu inoyi kuti marketing haina kumira zvakanaka. zvimarketer muri pa Birchenough, mono zvimarketer muri kuChipinge ne Chimanimani Nemunomu macho kuti pano tine college tangai yakadai inoita zvakadai zvakadai ndokuti zvifambe. Tinoda kuti centre ifambe, irrigation ifambe but titange taziva kuti zvakanamira sei. 01:46:14: Lack of communication between farmers and the extension officers, ZINWA & ZESA- apasisina kubudirana pachena. Dzimwe dzenguva mafarmers masangana nezvirewe mo reapter to the extension officers vaya vaya, zvina basa nekuti watura nguvai hachauyi kunoona zviri pa ground. Vanoregedza kuuya, zvoreva kuti chirwere chiya chinoramba chirimo nekuti achiona uya aka reporter haawane response on time. Kana kuri kuZINWA or ku ZESA unonatsa shaya kuti chinoita kuti magetsi acho agodzimwa na 11 oclock chii? Like apo pataidridza, atisati tatopedza kudiridza kana kuti tatoshayawo mvura, pane dambudziko ipapo. Participant E3: Yaah ipoint taken zvayo. But maybe handisi, but zvamatura zvakanaka but, tiri ipapo tinewo point yekuti eeh muchiDhumeni chedu isusu, ndoda kupa example kana farmer uchida kuita chinhu chako or a new crop unofanira kutanga wauya kuna Mudhumeni wako woti vamurimisi ndafunga ndirime crop yakati zvinoita here zvinhu zvindiikanwa. Saka varimi vemazuvano zvavanoita vanotanga vaita then vachizoitika problem vachizouya. Saka ndochallenge, (aiwa chimbomirai muchazondipindura). Ndiri kuda kupa example yepa Nyanyadzi primary school pakaitwa project yemabanana ...saka isusu ka pamwe pachu kana watambawo bhora rako inini ndinongodai, ndinongoti ita hako ndosaka vamwe vachizongoti mujahwo wemujecha ndewe kutangira pamwe chete. Tiri kuti murimi kana uunewo zvaunodawo nditaurirewo kana ndisingazivi ndomboitawo maresearch angu then tobatsirana	Participant NV11 Participant NV11 Participant E3 Participant F13 Participant F13 Participant E3 Participant E3

		 saka muri kuda kuti Mudhumeni auuye ateme here. Ini basa rangu nderekuti kana ndikakutaurira kuti pisa wopisa kana waregera waregerawo. Saka isusu tiri kuti izvo Madhumeni nevarimi zvatininge takutauriraiwo moitawo saizvozvo nekuti chidhumeni chekare necha nhasi chasiyana. Chaiitwa kudhara naana Mudhara Mushiri change chiri chiDhumeni nekuti maimanikidzwa kuita. Ikozvino ndava kukunyengerera kuti wadii kudai kuti zviite. Researcher: But inini ndinozoita question ndepikuti muirrigation scheme medu tine vanhu vakuru vabve zera tozoitawo vanhu vadiki vachangobvawo muzvikoro vamwe Havana kuitawo agriculture asi ndiye ava kurima, imimi mukasa demonstrator mukaita extension yamuri kureva vanhu ivava vanozodzidzawo Seiko. Participant E7: Eeeh point yamuri kutaura ndiri kuinzwisisa, zviri kuitika manje kudepartment kwedu kudhara taitopihwa zvinhu zvekushandisa kuita ma demonstrations acho. Saka apa inenge yatova nyaya yekuti tinenge tava kutofanira kuenda panemurimi wacho kunoti uri kuda kusimawo magwere riini uri kuda kusima variety ipi? Ndanga ndichikumbirawo kuti musi waunosima ndaida kuti ndiunganidzewo vanhu panapa tiitewo ka demonstration yedu ndo nyaya inenge yavapo because isusu hapana chatiri kupiwa right now. Hapana chatinenge tiinacho kana book kana pen hatina. Researcher: Asi imimi hamuna ma demonstration plots here? Participant E7: Parizvino hatina. Researcher: Akaendepi? Participant E7: iiii taive nawo padhuze dhuze pano. Akatorwa madays e land reform. Researcher: Anofanira kugadzira workshop apa ndiani? Varimi here vanofanira kugadzira workshop, ma Extension officers here, I training centre here? Participant E3: Chimira ndikutaurire wandibvunza. Mu department medu isusu AGRITEX ichakanatsa kubatana zvakanaka kwete zvayaita ikozvino haisisina kumira zvakanaka, kune branch rainzi Training Branch rinototangira kuHead Office ritori naChief Training officer rodzika pa Province paiva nava Jukwere ndofunga munovaziva mukwasha wekwa Mbano uya. Paakangofa hakuna, saka training branch ingori pazita but nemamirire akaita nyika. Munoziva kuti kare ndoda kuzvipa inini nguva yandakapinda basa inini 1993 tigara tiri paRuwa training centre, waigona kuita 6 times pagore kuDomboshava tichienda, Kadoma training centre tichienda, Dorongwe training centre tichienda. Tavamuno tikazombotiwo EU payakavaka maAcre paGudyanga yakatitorawo Madhumeni tichiendawo kuMapari maNGOs saka from there Government pachayo training branch hakuna apa ndivo vanenge vachi organizer maworkshops nekuti maDhumeni ka, because hatizivi zvose tinomati marefresher course. For example, vanogona kuti tiri kuda kutrainer maDhumeni about fall armyworm then tonzi endayi kuRowa for five days then kwouya maSpecialists. Vouya voti trainer tichita mapracticals acho tichienda kana kuti muZimunya muya munenge makarimwa tichiita mademostrations acho. Tichinatso ona kuti ndiyo here fall armyworm yacho ndinofunga kuti Mr. C vanonatsa kuziva kuti pavakaenda kuKadoma training centre munotoopinda mumunda kunzi endayi munotsvaga stogofitier, endai munotsvaga mazai acho moona so that paunidzoka unenge uine practical experience yacho saka theory experience haina zvainoshanda zvekuti unonzi zai racho ndere blue, apa blue yacho hauizivi. Saka isusu tiri kuti on the other part dai Hurumende yaita toti chi, ndava kushaya kuti ndotii, asi kuti yaite, ngaidzoke payanga iri kare. Yekuti training branch inge iripo itrainer maDhumeni zve crop, livestock production, conservation anditi ka. Saka isusu zvimwe zvacho tatovawo murima nekuti kuchikoro kwachowo takabvawo kare. Ndofunga kuti ndakupindura ka muzaya. Participant W6: Nyaya iripo ndeye kudai pane nyaya yambotaurwa naMr. Extension Officer X yekuti ndakazosvika pandakakumbira kuti dai makwanisa kundipa munhu wandino communicator naye pamaererano nemvura. Because mumwe aikwanisa kuti vhara mvura na 2pm especially dai chairman wacho aive pano ndiye mumwe waito kwanisa	Researcher Participant E7 Researcher Participant E7 Researcher Participant E7 Researcher Participant E3 Participant W6

		kuzviita. Ava vaida mvura vepanapa paBlock A apo chairman vakati vhara inini ndikavhara anditi maona saka ipapo ndopatinofanira kuti tive tinojekeserana kuti tive nemunhu anokwanisa kuti adaii, munhu andinenge ndichisahanda naye uku nekuti kana pasina futi vanhu vakafona fona unoita confused nekuti vanenge vafona futi vari vakuru veIMC yacho kana kuti any member yeIMC number 2. Magetsi anogona kuenda imi muri pakati pekudiridza ende magetsi akaenda imimi hamuzvione number 3. Kana akenda during peak time magetsi andhura saka takanga takawirirana nawo kuti kana akadzoka ari pa peak hour hativhuri nekuti anozodhurira mafarmers unless kana paane mumwe muono wekuti kana akadzoka chingovhurai achinge auya ari papeak hapana problem. Then pump yedu tine macooling systems edu anocooler bearin rinenge riri muoil but rinocooler nemvura. Saka pump yedu kuturner kwainienge ichiita paya pacooling system pakapinda majecha kana anything chinovhara tinotombodzima kuti tichi blower kuitira kuti cooling system yedu ienderere mberi because tikarambatichipomba pavhara pacooling system paya pump ichipomba bearing rinofa.	
Crop failure – non adherence to crop calendar & diseases and pest control calendar	01:09:6: 6. Outbreak of (tuta Abusoluta) Fall armyworm- tuta inobata matomatoes, magwere. 01:43:22: Pests and Diseases - zvirwere zviri kuita mumaminda medu, nehudyi hurimo hunosanganisira ana tuta, maguta guta nemakonye muchibage nematomatoes zvitipa dambudziko hombe rekuti tikoniwa kuzvipedza nenguva yakafanira. From season to season we suffer same disease or same pest ipapo. 01:51:24: Pest & Disease resistance to pesticides and chemicals- pari kubuda pakuti varimi vatinawo umwe anemari yekutenga mishonga. Asi mishonga yacho yaanenge achinotenga inogona futi kunge yawandisa zvekuti chirwere chacho hachichaperi futi chava kuramba chiripondiro rimwe dambudziko ratava naro. Nekuti ukavhura mabooks unoona kuti chirwere chimwe chete chinoita gore ne gore chingoripo hachichaperi saka unotoshaya kuti pamwe mishonga yacho yapera simba. Participant E3: Right pamusoroi varimi, pane point yataurwa na mbuya G, ndaifarira yekuti tinogona kutaura nezvayo. Ndinoda kupa example yaana Mr G nemuzukuru wangu apo takaita meeting tikati machocho ngaabve asi endai pa block paana Mabika apo akazara. Izvezvi zvatiri kutaura ndakapfuurapo last week asi tiri kutaura kuti gonye racho ndomariri kugara asi hamudi kubisa ndobvisa ndirini here inini, ndapedza. 2. Eech nyaya yezvirwere zvevatimati kuti zvisapera ndeyekuti pane mumwe mufarmer handichatauri nezita akarima matomatoes ake tuta ndokubva apinda iye ndokubva aramwa yet, tinoti kana zvaramba chitema tema wounganidza wotungidza saka muri kuda kuti Mudhumeni auuye ateme here. Ini basa rangu nderekuti kana ndikakutaurira kuti pisa wopisa kana waregera waregerawo. Saka isusu tiri kuti izvo Madhumeni nevarimi zvatinenge takutauriraiwo moitawo saizvozvo nekuti chidhumeni chekare necha nhasi chasiyana. Chaiitwa kudhara naana Mudhara Mushiri change chiri chiDhumeni nekuti maimanikidzwa kuita. Ikozvino ndava kukunyengerera kuti wadiii kudai kuti zviite. Then tiri ipapo futi pagonye refall armyworm eech harisati ranantsa kuoneka mushonga waro. Tine mamwe Madhumeni vakatobva ku workshop last month vaChabvanga namai Chitambo kwamutare. Vanoti pane matrapa akaiswa ekuti vanoisa anditi, mukasvika paoffice pedu paya anditi makamboona zvevatins zve yellow zviya zviya saka mune katablet kakaiswa imomo kekuti kanenge kaine whema whekuti mukono wegonye racho re fall armyworm unenge uchifunga kuti mune mukadzi muchigaba icho chiya robva rapinda imomo rikanga rapinda imomo harichabuda muchigaba ichocho robva ratofa. Ndonzira yakatoonekwa kuti its 100% to control fall armyworms because hariberekani. Saka isusu, pane imwe article yakambobuda kuonini kuChipinga kuma fruit trees pane makonye anorumawo futi mamengo, maavocados nei nei. Participant E3: ... pane yamati, inyaya yemaresistance yema disease nema pests. Dambudziko riri kwese kwese tiri kutenga mishonga yatisingazivi, isina malabels. Whereas isusu pachiDhumeni tinoti tanga wabvunza Mudhumeni wako	Participant W6: Participant F13 Participant F13 Participant E3 Participant E3	

		kuti ndiri kuda kurima chakati ndeipi mishonga yacho then tokutaurira then moishandisa.... Saka isusu kuvarimi tinoti endayi kuma agrodealer mononatso tenga mishonga ine malabels inotaura Participant E3: Eeeh agrodealer uri mwaMutare umo munhu waano employer munhu ane degree, diploma, certificate in agriculture, muninina wangu Foggie uri apa haana zvaanoziva unongoti chauya ndichocho saka, munozovi mukamboenda kuVet distributors ndopaunozoziva kuti vakomana vanoziva nekuti unosvika uchiti huku yangu iri kurwara, okubvunza kuti iri kuita Seiko wotsanangudza obva ati haa uyu unoita wobva wamuti unoita marii obva akutaurira. Saka ma agrodealer emuruzeva umu ndiniwo ndangotorwa kuti nditengeserewo mushonga ende iye unongoti uyu unoita, uyu unoita which is very wrong. Saka tiri kuti isusu musati matenga mushonga uyu uyayi kuna Mudhumeni moti matomatoes angu adai ndouya ndoona ndoti endayi munotenga mushonga wakati kana mashaiwa tengai wakati. Zvino uyu unongoti uyu unoita neiyoyo yeku South Africa iyoyo yataurwa na Mr. C inini handiuzivi inini. Imwe yava kubva kuMozambique imwe kuZambia. Saka ndochallenge yataanayo yekuti tava kushandisa mishonga yakawanda. Participant F13: ... chinoti zve resistance iite ndechekuita overdose kana yakanzi 16ml muchigubhu isai 16ml. Imimi dambudziko redu nemi nderekuti ndinoda kuuraya wobva waisa 32ml saka gonye riya rinoramba kuzofa because watoriita overdose rinozotawo karesistance. Participant F10: ini question yangu iri pamaererano nema diseases nemapests. Ini neruziwo rwangu plus maworkshops andakamboenda etonje kuKadoma, zviya zvamambotaura Extension Officer X zvekuti pamunenge muchinotenga machemicals enyu make sure hamuende kunosprayer continuous machemicals enyu iwayo. Sometimes rimwe ndorinofanira kushanda let's say kana kuti zvanzi Lamuda ndiyo inofanira kushandiswa muNyanyadzi muno for 2 years then lamuda iyaya inobviswa muNyanyadzi munomu yonoiswawo kunana Bulawayo uko then mushonga waishandiswawo kunaana Bulawayo wounzwawo kuno so that madiseases atiri kusangana nawo anokwanisa kurapika. Toenda panyaya yezvipukanana zviri mukati umo sure zvipukanana zvacho hazvicha nzwisisiki nafarmer zvava kutoda maresearches anotoitwa muirrigation scheme medu for example mune ma horse flies mune ma aphids. Murima unongoti mumunda mangu mune maaphids, chanondokwanisa kuti ndaona nhata oenda kunotenga mushonga wenhata osvika onosprayer otenga another chemical futi ongoramba achitutirwa mishonga but tine vanhu vane ruzivo rwekuti kune mushonga unorapa zvese ichi neichi then farmer ochipirwa nemushonga. So we are lacking vanhu vanouya kutitaurira kuti zvirwere izvi vinorapika seiko nekuti zvirwere zviri umu zvawandisa. Plus 2. Zvavakuita kuti varima voita pfunga dzavo vonotenga mishonga ku South Africa yet mishonga yekuSouth Africa nezvirwere zviri munomu zvakasiyana. Munhu anoenda kunotenga mushonga wake ku SA, atenga kudaro haasi kuziva futi kuti unouraya chii nechii haasi kushandisa nemazvo futi unotoushandisa zvepfunga dzake. Ndosaka ndati dai chikumbiro change ndechekuti maExtension Officers dai mamboitawo block by block kudzidzisa vanhu angava ma workshops nekuti tunga haasisina kumira zvakanaka. Nekuti inini ndingati ndachinja mushonga here uyu ari panext pangu ari kungoshandisa same chemical saka ini ndikachinja hapana zvandiri kuita because uyu anongochengeta mbeu. Dai kwanga kuri kuti tabvumirana kuchinja mushonga tiine helicopter yaifamba ichisprayer minda yose gwenga rose. Tingangoti hongu matomatoes aisimwa evanhu vashoma gonje riya riya munhu ngaasaita zvefungwa dzake kuti ndoda kunotenga mushonga wakati saka ndozvandaida kuti tionesane naanaMudhumeni kuti dai maimbouyawo mukati medu umo muchitionerawo zvirwere zvatinaazo. Participant F16: Yaaah inin ndoda kubvunza kuti pacommunication nemaextension workers. Taita dambudziko rekuti havasi kucommmunicator nemalocal agrodealers edu vari kutengesa mishonga. Kufamba vachionawo kuti mushonga watuta ndiwo here uri kutengeswa imomo, paita communication breakdown ipapo. Because tuta uri kuti netsa ende zviri kuoneka unoona zvichinzi munhu wepa nextdoor wakaisa nextdoor yacho haina asi tuta wakapedza munda wose. But	Participant E3 Participant F13 Participant F10 Participant F16

		mateachers emafarmers tinawo havasi kuti sanganisa ba kuti tikwanise kurwa nechinhw one saka communication yedu ipapo haisi kutombonatsa kuvalue zvakanaka. Senge ipapo dai vatibatsirawo sevarimisi nekuti ndivo ziso redu, vakaona kuti uyo wawinner vanofanira kunzwisisa kuti wawinner sei nekunotengeswa mishonga ngavaone kuti mishonga watuta is it available kwauri kutengeswa uko nekuti tiri kushandisa Cabrah ne Ascite saka ndiri kunopinda imomo muri kutengeswa mushonga Ascite iya hamuna ndiri kunosangana ne Cabrah ne lamuda iya neimwe mishonga isinga urayi tuta uya ndinongotenga and at the end of the day I am the looser saka tinodawo kuti varimi vedu vange vachipindawo munotengeswa mishonga voona kuti mishonga chaiyo chaiyo ndiyo here irimo tobatsirana takadaro ndinofunga tino kunda hondo yatinayo yema diseases and pests iwayo. Participant F9: Sure zvamuri kumbai discusser tiri kunatse kumbaizvinzwa maererano ndituta. Zvino taida kuti tibatsirwe maererano nemushonga watuta anoti rimisa aya echinyambopindemo muma stores achinobvunza kuti munewo mushonga here inouraya tuta wemustore unogona kuti uri muno iwo vanogona kumarker avo, zvosiyana neni mbuya G, ndopindemo zvonzi mushonga iZ\$75 ini ndine Z\$50 ndava kutosiya ndava kutotore usingaite. Inini ndinofunga kuti mataurire atiri kuita aya dai katori kameeting kakazara vanhu yekudzidzisa vanhu kurima ka zvaitoda kuti mbuya G, musarima musina mari yekutenga mushonga yakati. Nekuti tinokuvadzana maningi muirrigation umu nekuti kana imimi Madhumeni mukanangisa mukaiona irimo handi kuishaya ngekuti mishonga yavakudhura. Ndinofunga papaper redu iro tambonyora kuti hatichakwanisi ba zvinhu zvodhura. Isusu varimi tiri kubve muno tabva kunodzidza ngatiende kunofundisana zve kumamisha uko tasvikeko kuti ndapota tisarima tisina zvakakwana ba. Rino gore harisi rekuchamuke mublanket kwava kuti ndava kuenda kuno nursery matomatoes hazvichaiti ba ndoriri kutiunzira zvirwere kana kuti gwere racho izvezvi tatengesa beans ndofunga kuti mukomana uyo wanatsa (researcher) dai kwanga kuri kunzi kwauya vanhu vakawanda kupokana kwatiri kuita kunoku tiri kutotaurirana. Kana gwere racho gore rino tichakorera kuridya ngema konye, makonye asiyiwa Maningi mukati umo nematimati ne beans. Saka zvatiri kureketa munomu Madhumeni haatipi chiro baa wo anondoreketa okusiya wakadaro havatitengere mishonga ba avo. Ngatichengete mari isusu varimi yekotenga mishonga ngatichengete mari yokunotenga mbue kumainputs. Ndaona kuti handina ngandirime ½ Acre kumwe ndo rentesa kuti zvirwere zvisawanda hapana zvaanoita ba Madhumeni aya. 01:06:38: 3. Farmers are not adhering to cropping calendar. Tiri kungorima tisina zvatina, tichingoita zvatirikuda nenguva yatinoda tisinga teereri ma extension officers edu. Sokuti tinogona kunonoka kurima beans zvozo konzeresa kuti pamwe nhata dzozoti affecter nekuti tinenge tisina kuteerera maextension officers edu. Asi kana tikateerera maextension officers kuti musi wakati, musi wa 15 March ngatirime panenge pasinawo zvirwere zvinokwanisa kuzotibata tava kumberi. Saka vazhinji vedu tinozongoona beans dziri green dzava nenhata saka dzichadawo mushonga ndemamwe macosts achazoti waster mari. Participant E3: ... pane point yataurwa na mbuya G, ndaifarira yekuti tinogona kutaura nezvayo. Ndinoda kupa example yaana Mr G nemuzukuru wangu apo takaita meeting tikati machocho ngaabve asi endai pa block paana Mabika apo akazara. Izvezvi zvatiri kutaura ndakapfuurapo last week asi tiri kutaura kuti gonye racho ndomariri kugara asi hamudi kubisa ndobvisa ndirini here inini, ndapedza. 2. Eech nyaya yezvirwere zvevatimati kuti zvisapera ndeyekuti pane mumwe mufarmer handichatauri nezita akarima matomatoes ake tuta ndokubva apinda iye ndokubva aramwa yet, tinoti kana zvaramba chitema tema wounganidza wotungidza saka muri kuda kuti Mudhumeni auuye ateme here. Ini basa rangu nderekuti kana ndikakutaurira kuti pisa wopisa kana waregera waregerawo. Saka isusu tiri kuti izvo Madhumeni nevarimi zvatininge takutauriraiwo moitawo saizvozvo nekuti chidhumeni chekare necha nhasi chasiyana. Chaitwa kudhara naana Mudhara Mushiri change chiri	Participant F9
		Participant W6: ... pane point yataurwa na mbuya G, ndaifarira yekuti tinogona kutaura nezvayo. Ndinoda kupa example yaana Mr G nemuzukuru wangu apo takaita meeting tikati machocho ngaabve asi endai pa block paana Mabika apo akazara. Izvezvi zvatiri kutaura ndakapfuurapo last week asi tiri kutaura kuti gonye racho ndomariri kugara asi hamudi kubisa ndobvisa ndirini here inini, ndapedza. 2. Eech nyaya yezvirwere zvevatimati kuti zvisapera ndeyekuti pane mumwe mufarmer handichatauri nezita akarima matomatoes ake tuta ndokubva apinda iye ndokubva aramwa yet, tinoti kana zvaramba chitema tema wounganidza wotungidza saka muri kuda kuti Mudhumeni auuye ateme here. Ini basa rangu nderekuti kana ndikakutaurira kuti pisa wopisa kana waregera waregerawo. Saka isusu tiri kuti izvo Madhumeni nevarimi zvatininge takutauriraiwo moitawo saizvozvo nekuti chidhumeni chekare necha nhasi chasiyana. Chaitwa kudhara naana Mudhara Mushiri change chiri	Participant W6:
		Participant E3: ... pane point yataurwa na mbuya G, ndaifarira yekuti tinogona kutaura nezvayo. Ndinoda kupa example yaana Mr G nemuzukuru wangu apo takaita meeting tikati machocho ngaabve asi endai pa block paana Mabika apo akazara. Izvezvi zvatiri kutaura ndakapfuurapo last week asi tiri kutaura kuti gonye racho ndomariri kugara asi hamudi kubisa ndobvisa ndirini here inini, ndapedza. 2. Eech nyaya yezvirwere zvevatimati kuti zvisapera ndeyekuti pane mumwe mufarmer handichatauri nezita akarima matomatoes ake tuta ndokubva apinda iye ndokubva aramwa yet, tinoti kana zvaramba chitema tema wounganidza wotungidza saka muri kuda kuti Mudhumeni auuye ateme here. Ini basa rangu nderekuti kana ndikakutaurira kuti pisa wopisa kana waregera waregerawo. Saka isusu tiri kuti izvo Madhumeni nevarimi zvatininge takutauriraiwo moitawo saizvozvo nekuti chidhumeni chekare necha nhasi chasiyana. Chaitwa kudhara naana Mudhara Mushiri change chiri	Participant E3

		chiDhumeni nekuti maimanikidzwa kuita. Ikozvino ndava kukunyengerera kuti wadiii kudai kuti zviite. Then tiri ipapo futi pagonye refall armyworm eeh harisati ranantsa kuoneka mushonga waro. Tine mamwe Madhumeni vakatobva ku workshop last month vaChabvanga namai Chitambo kwamutare. Vanoti pane matrapa akaiswa ekuti vanoisa anditi, mukasvika paoffice pedu paya anditi makamboona zvevatins zve yellow zviya zviya saka mune katablet kakaiswa imomo kekuti kanenge kaine whema whekuti mukono wegonye racho re fall armyworm unenge uchifunga kuti mune mukadzi muchigaba icho chiya robva rapinda imomo rikanga rapinda imomo harichabuda muchigaba ichocho robva ratofa. Ndonzira yakatoonekwa kuti its 100% to control fall armyworms because hariberekani. Saka isusu, pane imwe article yakambobuda kuonini kuChipinge kuma fruit trees pane makonye anorumawo futi mamengo, maavocados nei nei. Saka ivo vanouraya male yacho mai vava vava vakashaya mukono havachabereki mazai acho. Saka ndiyo imwe nzira yakaonekwa kuti iri effective iri kushandiswa mazvita henyu. Participant F16: Inini ndinoda kuwedzera panyaya yataurwa na extension officer yekuti vanhu vanoenda kumaworkshops that problem ndoimwewo isina kumbotaurwa, vanhu vaenda kuma workshops asi iwo mafarmers acho zvavabva nazvo kuma workshops havasi kuzvisvitsa ba kune mamwe mafarmers. Zviri kundogumira mumusoro mawo zvobva zvapera zvakadaro izvezvi kuti kwakabviwa kumaworkshops kuma farmers hakusi kusvikiwa ikozvino tinofa kuti ngati dai tida asi kuma farmers hakusi kusvikiwa ba. Ndopamwe panonetsa futi ipapo ndopatinodanidzira lack of communication. Participant F16: Diseases and pests yaana Tuta absoluta. Researcher: Diseases and pests zvanzi ndochallenge yatinayo. Varimi iyi ichallenge here? Extension officer iyi ichallenge here? Participant E3: Haaaah haisi its one of the manifestations ingori nyaya ye poor management chete. Participant E3: Aiwa nyaya iripo haisi pakucitisa kuti pakudzidziswa woziva how to control. Participant F16: Aiwa ini ndinorambirana nazvo. Participant W6: Ini ndinoda kutsigirawo kuti kana munhu akadzidza anenge ane ruzivo. Diseases and pests zvinobva muruzivo. Pane pamwe pamati tine AGRITEX iri kuenda yakadai then tine NVTC iri kuenda yakadai, ndopane nyaya nekuti munhu akadzidza anonatso ziva kuti kana muDhumeni akati mbeu yako iri kusangana nezvakati nezvakati manje vamweni vari kuti muDhumeni akauya pamunda pake otoenda akananga so. Inyaya yekusada kufunda muchidimbu. Participant F16: haa inini ndiri kuramba ini. Ndoda kumboburitsa point yangu. Zvese izvi handisi kuti handizvoba but inini ndiri kutaura kuti tuta it's a problem because chinhu ichi chinonzi was first identified in north America anditi muri kuzviona. Participant F10: Ndoinonzi farmer education, ndeava manje veAGRITEX ne NVTC kana vasipo manje tuta unotinetsa ndokwairi kuenda nyaya yacho. Participant F16: Eho asi kuti uzotinetsa tiri kutangira pakuti Participant F9: Eeh regai nditi ndiri kundoramba ndichiedza kutaura iri imwe nyaya yekuti pamanagement pakudzidziswa apo ndinoona senge iri nyaya yekuti kubva kare kuma 1931 kwambotaurwa uku kwaingotaurwa nenyaya yenguva yekusimwa kwezvinhu kuti nguva yekusimwa kwechinhu ngei nguva yekusimwa kwechinhu ichi ngeiyi. Ngekuti pane paper randinaro panapa nekuti ndere AGRITEX yanga iri number three yavo yekuti mafarmers havasi kuteedzera macalender ekusimwa kwezvinhu. Right ehe zvinhu izvozvo zvinouya futi kunoti affecter mumaminda medu. Kutu ngatiti ndosima domasi, ndobvise domasi riya randiitire mari ndava kuuya futi kusime domasi muya mandakabvise domasi rimwe riya. Izvozvo zvimwe zvinhu zvatiri kuita zvinoite kuti kurima kusaite zvakanaka. Asi tozozvitarisa futi zvoite sezvinonzi	Participant F16 Participant F16 Researcher Participant E3 Participant E3 Participant F16 Participant W6 Participant F16 Participant F10 Participant F16 Participant F9

		hatisi kudzidziswa asi tinenge tichidzidziswa. MaDhumeni anotidzidzisa nenyaya dze crop rotation but kana tichinge tisiri kunatse kuteedzera nemazvo pane zvinenge zvichitaurwa tinopedzisira tava kupe dambudziko kuenchirwere chinenge chisinga faniri kunge chiripo. Asi chinochizoisira zhirwere ichocho ipapo tisuru tinenge tava kuchiisa ipapo. Participant F14: Kuwedzera zvakare pataurwa nemutauri, kuti hatisi kutevera maplanting calendars icho ichokwadi. Ndoda kuuya pana tuta, its now making the year all round yangova madomasi hapasisina nguva yekuti tuta uya uya uchambosvika nguva yaachamborwadziwa wava kungoramba achirarama nekuti chinhu chaanoda matomatoes nema veggies kunyanya. Ndozvaari kuramba achidii achiteerera saka tikangozvi chengetawo kwemwaka yakati wandei tuta munomuziva unoti bare saka kungoramba tichindomurera unotorambawo uchikura tozototi ndiyo yaa problem yedu yezvirwere asi chii tiri kutizana ne AGRITEX kuti muDhumeni akauya pamunda tototi aiwa. Akauya akati wakatema here mishanga kana kuti wakandosira akadaro ongoti aiwa kune vatinoti muchidimbu ma autocratic vasingadi kuteerera zvinenge zvichitaurwa nemaDhumeni kwachizoitika dambudziko ndopaunochizooona kukosha kwemaDhumeni. Theme1: not following cropping calendar Participant E3: Maybe comment yataurwa navaMuzulu yakanaka maningi nekuti unoona kuti pakaita outbreak yaana tuta ne fall armyworm pane nguva dzatinototi chimbomirai kuitira kuti ti breaker cycle yacho kana ari mazai acho angobva afa. Munguva yambotaurwa iya yekare yeFirst generation neSecond generations ndofunga kuti imimi munotozviziva yaitonzi winter plough. Mwaitomboti mabvisa beans motomborima then zvotombooma nezuva kusvika munana October mavakusima chii magwere but this time cropping calendar haisi kuteedzwa even nyaya yemvura manje ndopamunoona mavakuzoti pump iri kudhura because pane vanhu five vane madherere umu zvonzi Water Baillif ngaavhure mvura, kuvhura mvura zvodhura manje. Muri kuzviona saka tikateedza macrop farming calendar senge zvinoita veku Birchneough vanotoziva kuti September vanovhara mvura kwaDewure uko vocleaner mugero wawo. Kana mwanga muine matomatoes ndezvekwamai vako zvinotsva. Then kwavakutoti 15 September simai vanhu vosima, manje munomu icrurer. Participant F16: Eeh ndinoda kuwedzera pataurwa ipapo. Kudhura kwakamboita dambudziko rechainzi chibvungwa kwaiite magwere aisimwa munana June-july aini mawinter aitengeswa ari mafresh akarambidzwa kunzi ngaasasimwa nenyaya yezvirwere nekuti aitaudzira magwere emunana December zvirwere saka akarambidzwa. Saka hameno panezvinhu zvinofanirwa kuti zviitwe hameno pane ka gap ipapa. Theme 2. Farmers lack interest to learn Participant E3: Mirai MrX ndikubatsireyi, Mr Magarine ndipupurirei naMr Musiya, gore rapera paseri takaita field day ye Seedco Mr. MJ vachiri vice chairman. Pafield day ndopanoni vanhu uyayi mudzidze munhu anokwanisa kubhadhara mari yechikafu \$1 but pafield day pachokwadi. Apa tanga tiine pamunda pavaMujazi paine trial one, paMutama nepani futi yanga iri miviri vanhu vakanodzidza ipapo zvese zvamuri kutaura zvakatotaurwa ipapo nevanhu veSeedco vakanzwa vakanzwa. Asi attendance yainge iripo nanhasi tiri kunetsana na Supervisor kuti varimi vemuNyanyadzi havadi kudzidza. Gore rapera kuBlock B north chikafu change chiripo vana Togi vakafa nenyama pa Gudyanga asi attendance yakanga iripo panga pasina saka munoda kudzidza sei. Because tinenge tiine nyanzvi dzinenge dziripo dzinenge dzichitaura nyaya dzemakonye, mbeu dzinofanirwa kunge dzichisimwa but hamuyi. Muma field day tinotoiti iLearning tool yekudzidza. Participant F16: Inini ndiri kuda kuuya hangu papoint, ndoda kuuya appoint yekuti muNyanyadzi mane dambudziko rekuti hazvisi kudaidzirwa ba kudhura tainzwa kuti kune musangano kune musangano but ikozvino misangano yava kundoizwa isina kufambirwa vanhu kuti kune misangano saka ndopane problem ipapo nekuti vanhu havasi kutaurirwa ba kuti kune musangano. Communication haisi kuchasvika kuvanhu vanhu vashoma varipedo ndivo varikuenda kuno attender.	Participant F14 Participant E3 Participant F16 Participant E3 Participant F16

	Participant F9: Eeeh ngatidai kana even kukaita outbreak yecholera tinoona tichideedzwa tichitaurirwa zvekuita right saka even tikaita outbreak ye mapests iwawo ana tuta nezvi nezvii maDumeni tinomaona achititaurira zvimwe zvacho vanonoka pane patakaviti taurei nezuro. Kuti vanokwanisa kuzouya zvavo nenguva inenge yati oooh asi pane pavanouya vachitidzidzisa. Asi tombotarisa fall armyworm iya iya chinhu chakanetsa nyika yese zvekuti vanhu Havana kukasika kuchinzwisisa kuti chii pavakachizochinzwisisa nekuuya kuvanhu change chaparadza saka inini ndiri kuda kuedza kurambirana nezvirikutaurwa nemukomana uyu. Eeeh ndichiti chinhu chese kana chichinge chaita outbreak chinofanirwa kuva nechidzidziso runofanirwa kunge ruripo. Ndokuti chinhu icho cho chione kuparadzwa or chione kurwiswa chisasara chiripo. Participant F16: Hatiri pamwepo, inini handisi kuramba kuti kudzidziswa hatisi kudzidziswa ba but ndiri kuti patoite problem dambudziko guru chairo Participant F4: Regai ndimbokubatsirai inini kana ndakatarisa tuta abusoluta haaa wanetsa nekuti hapana chirirmwa chacharimwa chikanatsa kuibva nekuti angava madomasi rinagava gwere tuta urikuparadza. Asi dambudziko randiri kuona ehe tingariisa kumaDhumeni kuti maDhumeni edu haasi kuti dzidzisa asi isusuwo wacho varimi takange kujekerwa kuti pane point tinga enzanisa nemazhonje aitaurwa na Extension officer wedu. Mazhonje iwawo muri kungoramba muchimaunganidza makonye andorimo. Izvezvi zvizvi mune minda yatakabvisa beans ukaenda muminda yakabva beans mukafambamo mune makonye asi vanhu hatisati tadeestroyer ba mabve chiii beans tangosiya zvakadaro. Kudzidza kunoda kkuti tikadzidza toenda kunoita tikango dzidza badzi kwava kuzviisa mubag kwavakunoturika mumba hazviseveni. Isusu wacho tiri muno tafunda muno ngatichibudawo nekunoita vavhangeri ekuparidze gonye wekuti tikaonawo anemachochu mumunda tomuti pisa. Kune minda yandakafamba pakati apo zhona riye hapana ba chakaitwapo asi muridze wemunda newakarima domasi wariramwa uri kundosiya wakadaro munda wacho urikuti ridii? Ribare ka richienda muDhumeni akasvikapo unobvita here, ini ndirikungoona problem iri kwatiri. maDhumeni ane problem but isusu wacho tisu tine problem huru. Participant F22: Eeeh ndimbokuti dzosei kumashure. Pane pataurwa na Extension officer vati kuma field days ndokunofundwa zvese. Pakaitwa field day kwedu ku block B gonye riye (fall armyworm) ranetsa asi takafunda zvakambaindowanda kwakauya maexperts akabva kuHarare nawo maDhumeni aya achitifundisa. Tikambaindofuniswa tikabva tava kuziva kuti gwere rinofanirwa kusimwa musi wakati robuditsa musi wakati. Zvino isu tofanira kuto attender manje mukanzwa kuti kune field day musi wakati munofanira kutoenda kunofundiwa. Theme 3: Failure to observe constitution Participant F22: Chimweni chinoita kuti zvinhu zvitetse izvi inyaya yekuti constitution yedu haisi kuteedzerwa zvakanaka nekuti constitution iyi tikaitevedzera zvakanaka inoti controller kuti kana murimi akarima chirimwa chake chika affector ingava nedisease or pest anotarisirwa kuti abvise odestroyer zvachose. Asi constitution hatisi kuteedza munhu anokwanisa kungosiya zvakadaro otoenda. Chirwere chopararira or pest yopararira saka constitution yedu haisi kuteedzerwa ba. Participant E3: On top of that imimi vanhu vemuNyanyadzi misoro yenyu haidhonzi mushe pamwe pachu. Why because tirikuti, mirai ndikutaurirei tiri kuti munhu anofanira kupinda muIMC anofanira kunge ari plot holder. Asi unotoona munhu asina neplot ari kurima pamunda pasekuru kuti ngaapinde mucommittee zvine musoro here? Zvinoshanda here izvozvo, torai vanhu maplot holders moisa mucommittee motevedza zviri mubumbiro remutemo. Researcher: Iyoyo ngatimboisiya, toda kumbonzwa yeconstitution. Old constitution yenyu ndeya riini? The old one ndeyariini? Iripo here constitution yacho in the first place?	Participant F9 Participant F16 Participant F4 Participant F22 Participant F22 Participant E3 Researcher

		Participant F16: Hapana constitution, Participant F18: Iripo, iripo Participant E3: Mirai ndikutaurireyi Mr. Researcher, mirai ndikubatsirei ka varimi, takanga tisina constitution tiishandisa maBylaws (Chimanimani) all along so constitution yakazotogadzirwa pa Committee yaana Majarine anditi. but haisati yanatsa kuperera kwasara masterms mamwe. Participant F9: Mr Extension officer yakanaga iripo iyaya yakagadzirwa aana Mr. Gwitira (Chamatowo) iyaiya kwanga kwava kungoita review basi kwatanga tava kuita. Researcher: Saka constitution yamunayo ndeya riini? Participant F16: Haaa kwange kusina, hameno... Participant F9: kubva kumasure kwese ino kwanga kusina. Researcher: Yaana Mr. Gwitira yacho ndeyariini? Participant F4: yaka passiswa here? Participant F9: Eya yanga yava kushanda. Participant F16: muna 2013 Participant F19: zuro handiyo yavakabvira kuPolice here Participant F9: Aaah aaah pamusoroi, eeh panguva yaana Chamatowo ndopagadzirwa bumbiro remitemo itsva iri rikapasser then panguva yatanga tavapo isusu yakauya kuitwa review, ehe. Kuda kutapudza imwe nekuwedzera imwe. Participant F4: oooho ndiyo iri kuda susigner? Participant F16: ehe ndiyo yainzi vanhu munofanira kusigner Participant F9: ehe asi parizvino manje hausati wava kushanda. Saka pane mubvunzo wa Researcher manje ndepekusi yekare constitution iripo here? Ndiyo yatiri kuti iripo yenguva yaana Chamatowo, ehe. 01:07:28: 4. Lack of crop diversity. Zvakangofanana nezvatatsanangura pamusoro. Participant E3: Mirai tivabatsire kana tichiti crop diversity tinorevei, tinoreva kuti, muNyanyadzi muno tine dambudziko rekuti vanhu Munyanyadzi muno vanongorima chirimwa one, for example munorima beans nematomatoes but tikada kuzozviongorora pamberi pachu zvinhu zvamuri kuona zvacho zvisihoma. Ndongopa zvangu example ya Mr Y, murimi akati ngwarire kupfukurawo inini nekuti vanorima garlic vakatoona mukoto wavo kuti chii zvine mari, ndozvandiri kuedza kutsanangudza ipapo.	Participant F16 Participant F18 Participant E3 Participant F9 Researcher Participant F16 Participant F9 Researcher Participant F4 Participant F9 Participant F16 Participant F19 Participant F9 Participant F4 Participant F16 Participant F9 Participant W6 Participant E3
	Other	01:44:20: High cost of inputs- parizvino paita dambudziko hombe rekuti mainputs adhura. Fertilizer yadhura, seed yadhura. Murimi anenge asvina asvina zve homwe asinga kwanisi kuita break through zvakanaka. 01:47:48: Settling of people along the canals causing siltation- ukatarisa ikozvino kune dzimba dzavakwa, dziri kuvakwa ammitters mashoma shoma kubva mumugero zvokonzeresa kuti ivhu ripinde mumugero. Migero yedu yovharika mafarmers oramba achiburitsa mari kuti ivhu riya riburitswe mumugero. 01:49:29: Lack of communication with the local authorities- local leaders e.g masabhuku edu. Pakati pevarimi naana Mutape pakuti nei apa munhu stand iri pamusoro pemugero zvinozo tiaffecter mangwana. Hongu uyo wapihwa stand wabenifiter and iye wa benefiter wo semunhu anogara muNyanyadzi asi ivhu rinozopinda mumugero rino affecter irrigation scheme yose nekuda kwe benefit yemunhu one abenifitor stand yaapihwa.	Participant F13 Participant F13 Participant F13

Appendix W: Summary of the ELP on Leadership and Management contradiction activity

ELP principles	Action/Activity	Response
<i>Introduction and Recap (Figure 6.1)</i>	1. Researcher led the plenary by introducing the participants to the plan of the day, objectives to be met and the ELP cycle. 2. Farmers and other stakeholders prioritised and reformulate the contradictions they want to work on 03:00:41 Leadership management.	So, what we want to do now is to ask you the farmers and other stakeholders to work together, prioritize the challenges/contradictions which you feel are urgent and you need to deal with them immediately. Participant F16: Leadership and management. Researcher: Let me write them down number 1: Leadership and management. Participant F8: Marketing Participant F10: Farmer education. These three contradictions were further discussed and reformulated as Poor Leadership and Management, Poor Farmer Education, and Poor Marketing
- The first Double Stimulant (Figure 6.2) - Critical questioning phase: What is the real challenge on leadership and management of our Irrigation?	03:00:41 Leadership management- the Researcher used the previous days' charts as double stimuli one (see figure 6.2 below). Farmers and the other stakeholders decided to work first on Leadership and management contradiction. They pin pointed the major manifestations.	Participant F16; "I would say our biggest challenge (manifestation) is (a) failure to differentiator politics from development." Participant F10; (b) "its poor financial management," Participant, F4, "there is also the issue of (c) high political interference," Participant F22, (d) "non adherence to the Irrigation constitution" and Participant F18, "another major issue we talked about is the issue of (e) illegal leasing then the issue of democracy which is highly linked to the issue of political interference." Participant E3, "linked to democracy we were more concerned with the selection of the committee members (selection vs appointment) and also political affiliation as a prerequisite/ticket for selection into the committee.
- Second Double stimulant (Figure 6.3) - Critical reflections emerged: Where did we go wrong in the past?	Farmers and other stakeholders engaged in critical reflections on past experiences and practices. Working out of stimulant 2 they collectively formulated a Work Forward and Plan	Participant F10: "<i>First and foremost there are some qualities we should expect as farmers on the type of committee members we want and we elect. And even at block level, we should have a frame of qualities we expect our nominees to possess and as farmers justify if the block's nominee(s) is/are suitable and meet all the expectations. 1. He./she must be a plot holder, a capable farmer and committed to irrigation farming. 2. A person who is reachable/accessible, accommodative, and considerate to our old aged farmers. Not a person who is unrespectful and inconsiderate to the elders. 3. A church goer not a drunkard... because much of the challenges we have are engineered in the beerhalls.</i>"

		Participant F16: <i>“I want to add on the way we select the committee members. People are elected from the block level then into the committee. I want to propose that there are some positions at committee level which should be reserved for practitioners serving in important government departments (AGRITEX & NVTC). We want to elect educated personal on the Chairman/chairperson positions, the person must be knowledgeable, authoritative and that way I see our irrigation scheme moving forward.</i> Participant F18: I personally feel that we went wrong in the selection of the nominees for the six blocks because from those nominees it’s where the chairman was elected by the committee members. But, we as farmers must nominate the chairman of the IMC.
• <i>Historical analysis of the activity</i>	Questioning the IMC member selection process. How did you end up electing representatives without desired qualities into the committee? Because by nominating your candidates at Block level you would have created a pool where the relevant authorities elect the IMC from, so whom to blame here?	Participant F18: I personally feel that we went wrong in the selection of the nominees for the six blocks because from those nominees it’s where the chairman was elected by the committee members. But, we as farmers must nominate the chairman of the IMC. <i>Participant F16 ...farmers are asked to choose representatives from their blocks to the IMC, we just elect but we don’t know the positions they are going to be given in the IMC and this is where the problem is.</i> <i>Participant E3: Mr Researcher let me explain ... We invite the farmers to select their representatives block by block. So, every Block nominates 2 candidates to the IMC then after that it’s a secret ballot. Those nominated are invited to nominate eight names they wish for IMC chairperson position. The names of the eight nominated are printed on the paper and all the farmers (IMC nominees) together with the Extension Officers are asked to nominate the candidate of their choice by printing the name on a small piece of paper. Afterwards the votes are recorded and based on the nominees, who get majority votes/nominations becomes the chairperson and is asked to go out then we move to the next positions until all positions have been filled up.</i> <i>Participant F22: “mostly the people voted into IMC its either they are vocal... they don’t have the rightful qualities... So maybe the constitution should explicitly relate the qualities a chairman must have...</i> <i>Participant F15: I have realized that we are always complaining committee after committee, I suggest that what if we invite the Extension Officers to be part of the IMC. They can even supervise and advise us on the candidates to select into the IMC as well starting at Block level</i> <i>Participant F22: the issue of framework on qualities is helpful but has to be backed up by the constitution</i> Participant F8: yes, but what are you saying is good but when we get there no one will do it. Participant F12: <i>the farmers are not understanding the irrigation’s constitution”</i>

Actual-empirical analysis of the activity	Lack of framework on expected qualities Emergent : non -adherence to the constitution	Participant F22: Some farmers don't even know the constitution we are referring to, whether it's a national or irrigation? and when was it enacted? Participant F16: the constitution they know but they turn a blind eye for personal gains. Participant F22: I suggest the use of suggestion boxes can be helpful and the suggestions be read in the meetings as an additional agenda...
Modelling the new solution	Reflexivity on Leadership and management activity	Participant F16: I think especially on leadership lets go back to where we said we want the AGRITEX & NVTC practitioners in the IMC. Otherwise, the AGRITEX Supervisor must be the Chairman of the IMC. Because he is in overall charge of the whole irrigation scheme. So, he has the qualities to be the Chairman of the IMC and vice by one of the farmers. So that he can be overseeing our financial management with the help of the farmers... so what we want is to agree that on leadership and management, the Chairman position is not contested but reserved and obvious the chairman is the seating Supervisor of AGRITEX. This way I see the system of the irrigation moving forward.
Actual-empirical analysis	Questioning Extension Officers role and possibility of holding Chairperson position in the IMC	Participant E3: suggested that, "the National labour law doesn't allow Extension Officers (government employees) to handle community". Participant F8: Right Mr. E please allow me to question you, you said you are not allowed, how different are you from the government school setups because in schools there is a Chairman, Secretary and their vices then other committee members including the headmaster and the deputy in the committee members. So how different are you from these other setups? Participant E3: Its different in that at AGRITEX we are not allowed to handle communal funds, it is a punishable offense you can be arrested or expelled. Researcher: But they have not requested or invited you to hold their finances, chairman does not handle any finances. Participant E3: you see what, when the IMC sit ZINWA or ZESA meetings concerning their debts of financial plans and even when they do their end of year celebrations, they don't invite us. Participant E3 "I agree with you the Researcher, but things has changed. Let me give you an example I guess you know that in the past you are referring to the AEO and the vice, the Supervisor was the Irrigation Manager just after independence (1980). They replaced the Whites' positions with AGRITEX Supervisors as the Irrigation Managers. Yet, by the law the AGRITEX Supervisor should help the IMC to manage the irrigation scheme but the problem now is that the IMC act independent. We are in constant

1. A small recap of the actual manifestation and an opening question Questioning phase	<i>03:56:14: Financial management</i> <i>First double stimulation : So what can we do?</i> Way forward Questioning	Researcher: we agreed that one of our biggest challenge is a lack of financial management structures. So, what can we do? Participant F10: Audit must be regularly conducted. Participant F8: Quarterly Participant E3: In the irrigation constitution it is written internal and external audits. And we suggested the Extension Officers can help with the internal audits then Mr. C a Commercial teacher at Nyanyadzi high school can help out with the external audits. ... let me tell you something Mr. Researcher if the farmers want the financial reports... they just boycott paying their monthly payments in their blocks until the IMC present the financial reports. I think what has been come out Mr. Researcher its clear, the Supervisor is the chairperson of the IMC, financial reports must be ready by the 30 of August for example, the treasure by the 30th must be done and feedback to the farmers... the Supervisor must overly see all is in place and its good because the Supervisor doesn't hold any money... he just supervises..." Participant F15 asked a critical question the money that we pay and collected do they really have to sleep over in the individuals house or they are supposed to be surrendered elsewhere? Participant F6 enlightened the issue at hand then she explained that "the issue is that farmers are not aware that there is now a new merchant code called Nyanyadzi Irrigation Scheme on which you can pay straight into the irrigation scheme's merchant account. To pay in ecocash to the treasure you can but it's no longer advised so send to the merchant code which is traceable and for accountability hence, no one has to sleep in hold of you cash.

Appendix X: Summary of the Expansive Learning Process (ELP) on Farmer Education and Training

ELP principles	Action/Activity	Response
1. Introduction and Recap (Figure 6.1)	3. Researcher led the plenary by introducing the participants to the second activity of the day.	<i>no. 7. 01:46:14: “Lack of communication between farmers and the extension officers, ZINWA & ZESA- there is no longer transparency, there are times when the farmers are faced with diseases and pests in their fields and report to the Extension Officers. It doesn’t really matter what time of the day you report, they don’t come to ground truth... we have a challenge there.”</i>
2. Questioning	This activity emerged from critical analysis of data in the CLW. The mirror data provided and generated in the CLW became important double stimulation mediation tools in the development of this contradiction up to modelling of the solutions. The farmers and other stakeholders expected to learn from the Insider informative Interventionist Researcher as well. I then used my role as an insider interventionist and knowledge of the theory to manipulate much of the mirror data and personal experiences from working with the community for more than 25 years to critically question and envision the model of	Interviewee FGI 3: <i>No.16. 01:51:24: “Disease & pest resistance- over use of pesticides – most of the farmers are buying own pesticides, but seems as if they are over using it and have made the pests resistant. Now if you look at our farming records the pests and diseases have become persistent, year in year out its those same pests and diseases...”</i> Researcher: ...but during that time as farmers were you learning? Interviewee: Yes, we were learning in groups... we were taught in groups on how to farm... it was sort of an attachment learning ... Interviewee: Yes, there are changes now, it’s like nowadays there is no systematic cropping... there is no proper guidance... we only know that in order for us to succeed there is need of proper farmer guidance and effective policies. If you see maize in one plot and groundnuts in the next it’s a sign that there is a problem... Researcher: What can be done? Interviewee: I’m glad you have took, up this challenge and we look forward to you because you are the young farmers and you are still at school. These are the challenges we are faced with and we look forward to you... Interview with Participant FGI 4 went as follows: Researcher: From what I hear, it seems as if most of the farmers in Nyanyadzi irrigation scheme came from different places, so in terms of learning were you getting any form of farmer education? Interviewee: Learning yes... there were some learned Extension Officers from Domboshava who came to teach us... Researcher: Are there any farmers who were also send to farming vocational training centres? Interviewee: No, were just encouraged to send our children to be trained in the training centres. Researcher: So how did you learn? Interviewee: Through demonstrations at the Training Centre (now called Nyanyadzi Vocational and Training Centre), that’s where the Extension Officers from Domboshava would come... Researcher: What should be done?

	solutions that can be applicable to the context at hand. 4. Mirror data from the ethnographic data (15 interviews with 3 generations of farmers.	Interviewee: Yes, I think if it was that we have found a person in the irrigation who can lead us... the government should make its Extension Officers move around in the plots... but nowadays the Extension Officers are just looking and leave as it is. I think the Extension Officers were too quick to abandon us and the reason is that the people were given power and some individual farmers abuse and sometimes assault the Extension Officers. Researcher: So from your experiences are farmers still learning? Interviewee: No, learning at all it's now individualistic farming... Interviewee: Yes, it's like some of the youth farmers (third generation farmers) some never went to school and they don't have any respect. Researcher: So what are the challenges working with people of such calibre? Interviewee: Yes, there are many challenges associated, the young generation are very troublesome when watering. I don't want to lie, there is a need for a real and effective management team to surpass these challenges... remember when the government is sending its Extension Officers it's not because they are being paid but it's because they understand that the majority of the farmers came here to Nyanyadzi uneducated and unknowledgeable of farming.
5. The first Double Stimulant (Figure 6.5)	6. Critical questioning phase:	<i>Researcher: On this one we said the critical challenge we have been faced with we said it is the deposition of the AGRITEX and NVTC. We have ignored the roles played by the AGRITEX and NVTC and in the process we have disposition them leading to lack of communication, lack of commitment and lastly, we as farmers we are no longer observing the planting, disease and pest control calendars. So, what can we do on the issue of farmer education?</i> <i>Participant F8: There should be farmer training courses</i> Researcher: But by that time were farmers learning? Interviewee: Yes, the farmers were taught by the Extension Officers. There was a time when the Extension Officers would move around the irrigation educating the farmers on how to grow, let's say beans... it was very educative. Compared to now, it's now here and there, it doesn't have the real respect and impact it used to have. The workshop maybe attended by only $\frac{3}{4}$ the farmers and the rest don't even know anything... farmers have to make ends meet, but now with the new young farmers (third generation) in the irrigation scheme its difficult. They lack farming knowledge and most of the times they go wrong and at the end the irrigation is dying a slow death especially with this new generation we are moving forward with... Researcher: In terms of education are there any or changes in the kind of farmer education help you got before independence and now after independence 1980 onwards? Interviewee: ... yes, the main difference is that our parents were well organized and were much attached to Extension Officers in their farming activity unlike now the Extension officer are on themselves and the farmers on themselves and where it is going is a slow death there is no improvement to talk about. And there is also a sign of laziness from the new coming generation. Our parents taught us farming but this generation is not interested in farming. But, during our young age we took farming seriously and again there is no improvement we can talk about here. Researcher: I heard you emphasize a lot on issue of attachment and generational gaps ... My question will be, from your own generation moving to the third generation and forward do you see possible challenges on attachment to the plot and commitment to farming?

		Interviewee: Yes, there are so many challenges we face that are related to farmer-plot attachment... our generation going backwards we had better attachment to the plots, the government should at least teach the other subsequent generations and at least gazette a policy that clearly spells that a plot holder must know or have acquired certain farmer education trainings so that our production can improve...
7. Second Double stimulant (Ethnographic data from 15 interviewees from three generations of farmers)	8. Mirror data from the day one-first plenary sessions with farmers and other stakeholders in the CLW. 9. <i>The mirror data was then used as double stimulation and mediation tool to focus, envision the future. The researcher then build on the available mirror data to reformulate solutions to improve farmer education.</i> 10. <i>Together with the farmers and other relevant stakeholders we managed to critically historicise and do an actual - empirical analysis of the contradiction using the first</i>	Participant F13 reporting for the farmers said, no. 7. 01:46:14: “Lack of communication between farmers and the Extension Officers, ZINWA & ZESA- there is no longer transparency, there are times when the farmers are faced with diseases and pests in their fields and report to the Extension Officers. It doesn’t really matter what time of the day you report, they don’t come to ground truth... we have a challenge there.” No.16. 01:51:24: “Disease & pest resistance- over use of pesticides – most of the farmers are buying own pesticides, but seems as if they are over using it and have made the pests resistant. Now if you look at our farming records the pests and diseases have become persistent, year in year out its those same pests and diseases...” Participant E3: Yes point taken, but maybe I didn’t understand you quiet well. Our point as Extension Officers is that, in our extension work if a farmer wants to start a new crop, you are supposed to come first to AGRITEX and discuss with your Extension Officer about your intention to begin a new crop. But current farmers start by experimenting and when faced with challenges that’s when they will come to consult, and this is the challenge we face... Then number 2. resistance of disease and pests- this we have to blame everyone; farmers are buying pesticides without labels... what cause the diseases and pests to resistance is overdose of the pesticide let’s say you are supposed to use 16ml you end up doubling to 32ml so the pest build resistance... Participant F10 observations and critique on Nyanyadzi pesticide application system as a whole. He said, my question is on persistent diseases and pests. From my experience and knowledge through Kadoma Cotton I once attended, I would agree with what Extension Officer X said on chemical application... let’s say Lamuda must be used for not more than 2 years in Nyanyadzi then exchanged to another pesticide that was being used in Bulawayo... that’s what makes diseases and pests easy to control. Going to some of the new pests we now have in the irrigation, they are difficult for us farmers to understand them there is need for proper researches in the whole irrigation scheme... So we are lacking practitioners who come to explain these diseases and pests for us. Number 2. this has end up most farmers purchasing pesticides from South Africa yet, the pesticides and the diseases and pests here in Zimbabwe might be different from those ones in South Africa. Farmers go to purchase their pesticides from South Africa and they don’t even know what diseases or pests does it control and how is it applied, resultant its guess work. this is the reason why I pleaded with you Extension Officers if we could have block by block learning process and could be through workshops because things are extremely bad. Because would that be effective if I change a pesticide yet my

	<i>double stimulant provided Figure 6.5.</i>	neighbour farmer continues with the old on, it's pointless. Only if we could agree as an irrigation scheme on one pesticide and if we can hire a helicopter to spray all the fields and the whole valley... Participant F16. He posit that, I also want to ask on the issue of communication between the farmers and the extension workers. We have a challenge that they are not communicating with our local Agro-dealers who sell us the chemicals... Because tuta abosulluta has troubled us and its visible... But we have farmer educators in our midst and they are not uniting us to collectively fight these diseases and pests. Please they should help us since they are out Extension Officers and our eye...
11. <i>Historical analysis of the activity</i>	First Double stimulant (Figure 6.5) Historical and actual-empirical analysis of the contradiction? Researchers' Reflexivity	<i>Researcher's Reflections: On all you have said its purely lack of farmer education. Where does our major issue lie? It lies in the disposition of the AGRITEX and NVTC roles in the irrigation scheme</i> <i>Of much interest is that; ... We have ignored the roles played by the AGRITEX and NVTC and in the process we have disposition them leading to lack of communication, lack of commitment and lastly, we as farmers we are no longer observing the planting, disease and pest control calendars</i>
12. <i>Modelling the new solution</i>	Working out from the deep engagement of historical and actual-empirical analysis of the contradiction using the Double stimulant Figure 6.5 the Researcher feedback to the farmers and other stakeholders as part of modelling the new solutions. Researcher' Reflexivity	Participant F8: There should be farmer training courses. <i>Researcher: Yes, someone says we should have farmer training courses. One think that I have seen that trouble most people is donor syndrome. we have our own local resources including internal resources such as AGRITEX and NVTC practitioners who have experience in the subject content. We have our own Vocational & Training Centre already which has horticulture department</i> <i>...in my opinion the idea said before that we should start with farmer training courses, I also see it as a noble idea. These farmer training courses could be organized training courses. Some could even be one-day workshops and some cold be 2-daysworkshops and there is a small demo-plot here at the NVTC which you can as well utilise for training purposes and demonstrations. We can also start to envision long courses up to diploma level through our NVTC. And if you begin from that and maybe in the near future when you are more organized you can as well decide on training in other agriculture courses like apiculture.</i> <i>we can also develop farmer training courses together (farmers) whether horticulture or apiculture and we can also borrow some training materials from similar resource packs. We can also seek training assistance in developing our own training course materials and modules from the Environmental Learning Research Center (ELRC) -Rhodes University where I learn I am sure they can help us in this area because they have been working with farmers and designing some training courses for farmers and communities</i>

		<i>Another way to motivate learning will be running certificate courses maybe partnering the NVTC with other relevant associations like ELRC (Rhodes University) ... So, we can also start to think on approaching them (ELRC-RU) and other important stakeholders (like SAFIRE, Tsuro dzeChimanimni) to collaborate with NVTC to write farmer training modules. I am sure we can also build on the expertise and experience in modules and training manual designing and publishing.</i> <i>We can also dive into water harvesting and drip irrigation systems to especially curb our so-called water shortage issues... we can also start look and learn approach, whereby few farmers can be supported to visit another neighbouring irrigation scheme or farm to learn how they practice and principles to their success...</i> <i>We can as well meet later own as NVTC, AGRITEX and myself to discuss on the training courses that might benefit the farmers.</i>

Appendix Y: Summary of Expansive Learning Process on Crop marketing contradiction activity

ELP principles	Action/Activity	Response

• <i>Introduction and Recap (Figure 6.7)</i> • Questioning	• Researcher led the plenary by introducing the participants to the third activity of the day. This activity emerged from critical analysis of data in the CLW. The mirror data provided and generated in the CLW became important double stimulation mediation tools in the development of this contradiction up to modelling of the solutions. The farmers and other stakeholders expected the Insider informative Interventionist Researcher to lead and help them with practical solutions whilst, the researcher was eager to learn from the process as well. I then used my role as an insider interventionist and knowledge of the theory to manipulate much of the mirror data and personal experiences from working with the community for more than 25 years to	FGI 1 <i>there was no cash crop that could generate income... it was just maize you could sale and some other crops like beans and tomatoes no one would buy them. But with time around 1960 to 1970s that's when we saw contractors coming with seeds they wanted to be grown. We started growing sugar beans and tomatoes for Cains company around 1960s... things started to normalise the year (1962) we started to grow seeds provided by Lipsee Sunroil in the irrigation scheme. That's when we started to realise better profits because they would buy the green beans and the paw paws they would have provided us with the seed. These two crops had a better market, every week we would make money after delivering the paw paws and green beans we were getting paid...</i> FGI 1 <i>... but the marketing we had to our own and we had new crops like cotton, and tomatoes.</i> Researcher: <i>So was there a better market after independence?</i> FGI 1: <i>The market was now open after independence, but in the past (prior to independence) it was more closed but after independence it was too open but very difficult and it was because, as we were about to get independence we were under the British sanctions (1965-1970s)</i> FGI 5 <i>"... yes, marketing is one of the biggest challenge the farmers are faced with. Marketing has tossed us, like I previously said we would sell the beans way before harvesting but now there nothing like that, no market at all.</i> Researcher: <i>What went wrong?</i> Interviewee FGI 5: <i>There is nowhere to sell them, the companies have closed or downsized. That is the biggest challenge to the farmers. We are now supposed to do own market research, and the farmers who grow perishables like tomatoes have to transport them to Mutare 100kms to sell their products... yet when we started farming we used to sell to Cains company. No one would transport boxes of tomatoes they would come to buy and transport on themselves. This has just started recently, because no canning companies are still operating they all closed</i> FG2 6 <i>... during the precolonial era most of the farming activities were systematically organised unlike what we are now doing</i> Researcher: <i>Who was responsible for marketing your crops?</i> Interviewee FG2 6: <i>Marketing was done, we didn't know the prices but we were just told to grow for example beans.</i> Researcher: <i>Who?</i> Interviewee FG2 6: <i>Our Extension officers, would encourage us to grow beans because they are in demand... Unlike, now we are just growing without knowledge of where we are going to sell them.</i> Interviewee FG3 13 <i>"... marketing of the produce its affected because of the economic hardships currently prevailing in our country... what it means now is that there is open informal market. The informal buyers come all the way from Bulawayo and Harare buying small quantities for resale in the local markets. So, they offer very little prices and out of desperation the farmers</i>

• Questioning phase- Double stimulation process • Historical and Actual-empirical analysis of the contradictions	critically question and envision the model of solutions that can be applicable to the context at hand. • The mirror data from the ethnographic data (15 interviews with 3 generations of farmers provided became a double stimulant and mediation tool to the researcher. After the introduction and presentation to the activity of the day, the farmers and other stakeholders were put in relevant planetary groups and discussed, listed the challenges they were faced with. The farmers had to engage in historical and actual-empirical analysis of the contradictions by highlighting and discussing the manifestations they were experiencing.	<i>accept to cover some necessities like paying fees for the school children and replenishing drying up household food stocks resultantly they don't break even.</i> Participant W6. 01:06:15: 2. Informal Market- <i>informal traders are the ones coming to buy our produce. So they buy for very low prices but only if we can find some interested formal traders whom we can engage in contract farming with we may profit better.</i> Participant F13: 01:07:28: 4. Lack of crop diversity. Participant E3: ... by crop diversity we mean, in Nyanyadzi irrigation scheme you grow one crop (monocropping) for example, you only grow beans and tomatoes as main cash crops but if we closely look you are not making huge profit margins. Let me give you another example Mr. Mukome... he grows garlic and is profiting a lot because he diversified from what is grown here. 4. 01:44:44: Participant F13: Marketing of crops- <i>tomatoes, beans and other crops. There is informal trading, we don't have a market to sell our crops timely. Let's say I grow beans where to sell the beans is the challenge. There are no formal buyers and not even marketing support from the government hence, we are clueless...</i> Participant E3: ... then there is another issue I want to comment on that was raised earlier on. <i>It's the issue of informal market, I think few years ago we used to see companies like Midlands Buyers, Gloria, Victoria Foods, Blue Ribbon coming to buy beans... there was no informal market and you were paid cash... I think we had forgot this point, that there is no liquid cash in the market system hence being a rural irrigation scheme transacting electronic money is a big challenge... Selling on own its still a loss because you still want to 1. hire people to harvest the tomatoes for you, 2. buy packing</i>

	It is safe to say this whole process was a double stimulation process where mediation tools like the historical experiences, stories, actual examples were used to articulate a contradiction/challenge or to describe a manifestation. Critical questioning was used as also another form of double stimulation. So after presentation by a plenary group all the participants engaged in a critical questioning moment to seek clarity, understanding and envision the type of contradiction.	cardboard boxes 3. hire transport to ferry your produce from the fields to the bus stop 4. hire a truck to ferry your produce to Mutare, Sakubva market place... Grant and company still become your Sales Representative charging you as minimum as Z\$2:00 per box to sell the box of tomatoes for you... sometimes Z\$5:00 for every box sold... for around 20 boxes x \$5 = \$100 for free... I call for the government to call upon the local companies to support local communal irrigation schemes like Nyanyadzi.
Third Double stimulant (Wallace & Grant story)	- Wallace & Grant's story as a double stimulant to crop marketing issues. <i>The Wallace and Grant's story</i>	<i>Participant E3: Selling on own its still a loss because you still want to 1. hire people to harvest the tomatoes for you, 2. buy packing cardboard boxes 3. hire transport to ferry your produce from the fields to the bus stop 4. hire a truck to ferry your produce to Mutare, Sakubva market place... Grant and company still become your Sales Representative charging you as minimum as Z\$2:00 per box to sell the box of tomatoes for you... sometimes Z\$5:00 for every box sold... for around 20 boxes x \$5 = \$100 for free... I call for the government to call upon the local companies to support local communal irrigation schemes like Nyanyadzi.</i> <i>Researcher: okay in the situation that the government did not support through marketing the farmers' produce, as farmers what are you doing to support your own market? What I am trying to mean is that, do you realise how Wallace and Grant protect</i>

Questioning	stimulated further reasoning and visioning of the future activity. In addition, the double stimulation opened up the participants' horizons of understanding and engaged the participants in critical questioning phases where they analysed the now and the past. The farmers and other stakeholders engaged in positive critic of the actual-empirical analysis. New ways if understanding were realised.	their market in Mutare. Instead of letting you do business they do all in their power to protect and even become your Sales Representatives because you have come with your produce to their workplace and that's where their livelihoods depend on. So as a farmer what are you also doing to protect your market and become just the farmer and not both the farmer and the trader. This is because in the field that's where the farmers knows best am I lying Mr. MK. You grow your crops and send to Cains company and get paid and you return to the field... whatever they do next it's none of your business. So as a farmer what are you doing? That's my question to you all. Participant F16: ... as farmers we started a Marketing Committee. The Marketing Committee represents us in meetings. The Marketing Committee is only said to be seen representing us in meetings, but what I am not sure is whether have managed to source out formal traders/buyers. There were some Mozambiquean traders reported to have visited Nyanyadzi recently, but they failed to negotiate with the buyers to buy their lots from Nyanyadzi... The Marketing Committee was formed recently. Researcher: As farmers what stopped you from exporting your produce to Mozambique? Participant F16: To export to Mozambique? The communication would be the greatest limiting factor unless if we had a committee that would go and negotiate, I think what is only needed is proper communications. Researcher: So do you see where our problem lies? Participant F16: It's on all of us farmers we are not taking any initiatives. But we must mostly look towards a functioning committee because if you are said to be a committee it means you are representing the whole community. So they are not putting any effort or doing any initiative, they are just a committee by name. Participant F13: The problem I have noticed is that, of course crop marketing could be a problem, but the challenge starts with the farmer. A farmer grows his crops let's say tomatoes and after harvesting he ferry his produce to Mutare for marketing and the IMC and the Marketing Committee are not involved for whatsoever reason in the process. Now if he/she arrives at Mutare marketplace looks for market of the tomatoes from the buses and resident buyers. The buyers respond "we are interested in buying the tomatoes but not the Rio Grande type" yet, that's the ones you have Researcher: Right, you are coming back to the Extension Officer's point.... Participant F13: Yes, because I was born here doing the same and we knew once a crop is grown goes to market at once than, what is currently being done, that each farmer grows his own or unique plants.

		<i>Researcher: The other thing is you don't involve the IMC in planning your crop calendar.</i> <i>Participant F13: The problem is that in the past we were told what plant to grow...</i>
	Third Double stimulant (OK Supermarket example). Working out of the second double stimulation the researcher introduced the third double stimulation to widen marketing knowledge and horizon. Researchers' Reflexivity	<i>Researcher: In short, we are coming back to the point of the Extension officers that you are now doing your own things... and the issues is on competition to be the first to harvest and avoid market competition. Yet, group marketing is easy. I was discussing with one farmer here and I said do you know that if you come together as farmers and approach OK Supermarket there is infinite market, yet you still complain that there is no market. If you approach OK Supermarket, they will tell you that they accept farm supply tenders from registered farmers. So, what can deny you to just produce 3 tonnes of tomatoes and approach OK Supermarket with your registration documents and you are allowed to supply...</i> <i>Participant F13: The standards of our products could be a challenge. The reason being that we can't produce the same quality and same levels... what is happening is that some farmers invest more ... what was nice about Cains is that it took from everyone whether you have 2 boxes, or 4 boxes.</i>
Examining the contradiction	Fourth double stimulation in form of Figure 6.7 was used as a recap and as a tool to reframe the activity towards examining the contradiction. The process encompass moving between historical analysis of the manifestations as well as the actual-empirical analysis of the practices. Researcher's Reflexivity was also an important mediation tool in the process. The researcher provided a synthesised and more	<i>2. 00:40:09: Informal Market- lets frame it as poor crop marketing, so as we looked at it through the historical analysis yesterday. Can we relate where our real contradiction is? All these other issues we are raising like informal marketing for example, are all manifestations of poor crop marketing.</i> <i>Participant F16: I would say poor advertisement of the produce and the irrigation scheme.</i> <i>Participant F4: On marketing the real problem is on that we used to have Cains, National foods, Victoria foods who used to buy our produce and these companies are no longer coming so we are only left with informal traders... and its mostly because of the economic situation most companies have closed down.</i> <i>Researcher: So, there is no longer contract farming plus difficult economic and political environment.</i> <i>Participant F14: On marketing again, we no longer have external buyers and we no longer exporting our produce.</i> <i>Participant F6: ... we once referred to farmers are not honest...</i>

	reframed feedback to the farmers and other stakeholders in an effort to enhance their understanding, challenge their understanding, experiences and frames of reasoning	<i>Participant E3: Yes true, there was one buyer who wanted to promote contract farming of beans... but he said Nyanyadzi no. because if you give Nyanyadzi farmers inputs you are on loss instead of owning the agreements they sale the produce to other buyers. So Nyanyadzi are untrustworthy, not only Nyanyadzi but, most of the irrigation farms.</i> <i>Participant F14: Researcher lets refer back to the historicity, how was the market in the period of the first generation of farmers...</i> <i>Researcher: In the first period there was poor marketing they only had surplus maize for sell.</i> <i>Participant F14: let's move to the next period, how was the market? Was it supported by the Cains, National foods.</i> <i>Researcher: Yes, this period market was very good.</i> <i>Participant F14: Market so the period was good and the dealers/traders could also contract farmers through provisions of inputs right?</i> <i>Researcher: Plus, there was Nyanyadzi Cooperative which gave farmers credits and loans inform of inputs. The market was through contract farming on Paw paw and green beans.</i> <i>Participant F14: So, what made contract farming to collapse and give in to informal market?</i> <i>Researcher: There are two issues Poor political environment -there was the UDI declarations which brought in the Smith's sanctions and then came the liberation wars (Chimurenga 1 and 2.</i> <i>Participant F14: ... but I am informal market is not the beginning in itself, let's say Mr. Majoni approaches me with beans seed and we agree to sale him at \$5 per kg at that time and Mr. Mukwambo come during the harvest time and offers the same beans \$8 per kg. Mr. Majoni who gave me the beans seed and offers that \$5 agreed long then, as a farmer what am I going to get as a farmer, that's where I end up looking for a better market offer despite previous contract. The budget won't allow because the prevailing circumstances at the time of agreement and by the time of harvest would have totally changed hence as a farmer, I would prefer a win and win situation than owning the first contract at a loss.</i> <i>Researcher: What exactly do you mean?</i>

		<i>Participant F10: If we look careful, for the market to be viable the economy has to be stable. So, even these other companies we name them, National foods and others they would love to come here and buy the produce but there is no liquid cash to do so. So much of our poor market is caused by the unstable economy.</i> <i>Participant NV 11: Still on marketing I have also realized that most of the farmers just copy when they are growing their crops. We can't do market research ... Last time it was pathetic when farmers would batter trade tomatoes with a bundle of firewood... So, a real farmer must know that during the preparation stage he has to do a market research then grow the best crop with ready market. Most of the farmers we just follow and realize on the last minute that there is no market for that crop.</i> <i>Participant F10: What I have heard of market maybe in the second-generation farming era is that time for beans Nyanyadzi would be asked to produce so much tonnage not like now. I don't know where the Extension Officers would do their meetings and will come up with the proposals for Nyanyadzi and would advise us plant so many hacters of beans and same applies with cotton. That is what was happening in the second generation of farming phase but now a farmer just grows what he wants and of his understanding... (from collective object to fragmented objects). But long back we had people who represented us and would advise us even during the peak season of farming they would come and advise if there are any farmers who want to grow a certain crop, we want so many tonnes. Farmers would grow the plant knowing that there is a ready market, so, the market was searched not because it's an individual who wants it but because it was their duty to conduct market research for us...</i>
• <i>Modelling the new solutions</i>	Modelling the new solutions (Researchers' critical reflections) The researcher critically reflect on the proceedings of the questioning and examining process as the mirror data to critically model the new solutions. The modelling phase was a collective process although the researcher as an insider informative interventionist also used his work and academic experiences to envision reasonable and workable solutions. Likewise, as an interventionist my	<i>Researcher: ...what I have noted in Nyanyadzi irrigation scheme is that, there is an issue of lack of representation and lack of value addition. So issue number 1. Lack of representatives: the real challenge is on poor marketing strategies, ...we don't have a Marketing strategist... this is person responsible for market research and this is the person we don't have, and another duty is to manage our value chain including value addition initiatives. Value chain management shows that the farmer is the primary producer and other respective eutrophic levels follow. But now we are now found in the field producing the crops and we are now partaking in the selling of the produce... So the market strategist is our main challenge. Instead of focusing on local market economy we should be exploiting export market or international market. You said "in the past they would come and say 200 tonnes of beans is needed" it is the same person we are lacking. ... someone was managing your value chain....</i> <i>The other challenge is on trust... after the contractor gives you seed, fertilizers and wait for you for 3 months and when he come to buy you change your mind. Yet he entrusted you with his investment and wait for that long 3 months and that trust erodes because of a \$0.50. you had agreed if he/she gives all the inputs he/she will buy at \$2.00 and because someone who didn't even give you anything offers you \$2.50 and you breach the contract but if you sit down and calculate the value of seed, value of fertilizer. This is one challenge I realized, and it can be all linked to the lack of the Market strategist we talked about.</i> <i>And failure to get the Market strategist we end up on another manifestation of poor crop choice. We end up confused and we don't know what to grow hence individual farming which leads to fragmented object because we don't have the personnel who go ahead of us doing market research and advising us accordingly. The Market strategist has to work hand in hand with the Extension officers and be advisory to both the Extension Officers and the farmers... so you will find that most of the farmers will grow the crop on demand and with a ready market. So, the market will be there already no need for individual market search</i>

	role was to intervene not to decide and order, hence I suggested and it was an open process where the farmers could carefully resonate towards a collective action.	<i>and this Market strategist shall negotiate prices for the produce since, he/she will be managing your chain value as well so it will be easy to determine right prices.</i> <i>Then another way to deal with unstable economy would be to use US\$, so all the agreements will be converted to US\$ because it's one of the stable currencies. So, in essence, that's the task we have to look for that person so that most of our marketing troubles could be resolved.</i>
• <i>Fifth double stimulation: value addition initiatives- (Tsuru dzeChimanimani - honey and cream of tartar & Chapanduka community's project on honey which is being supported by the SAFIRE)</i>	Examining phase - critique of own practice. Search of resonance a compatible solution to the crop marketing challenge.	<i>Participant F10: So, this is the person we must look for... but to take you back were the prices also different with contract farming.</i> <i>Researcher: Yes they were different for instance some could be buying at \$1.50 others at \$1.75 and another could be at \$1.65 plus packing bags.</i> <i>Participant F6: Difference of \$0.10.</i> <i>Participant F9: So one thing I picked it seems as if the farmers are not much interested in contract farming.</i> <i>Researcher: No, they don't understand it.</i> <i>Participant F9: They don't know? Why I am saying this its because more than 5 years ago there was a Whiteman who wanted to engage Nyanyadzi farmers on paprika farming. The farmers only became aware after realising how Birchneough irrigation scheme was prospering from paprika production.</i> <i>Researcher: Yes, a careful analysis will show that its also about poor farmer education. And it's because of the fragmentation that current exists between the farmers, Extension workers and the NVTC... resultantly, there is no unit of purpose, and at the end of the day we cry of the market and we don't even put value addition. Value addition simply means adding some importance to the product. As farmers we never thought one day we could start our own small industry canning beans putting our label of the Nyanyadzi irrigation scheme and sale. If they are tomatoes we can process and tin them with a beautiful label written Nyanyadzi... but because we rarely think of it, you may realise that we have some NGOs like Tsuru dze Chimanimani they are based here and they do have offices here in Nyanyadzi but I doubt if we are benefiting from their value addition processing.</i> <i>Participant F16: They are no longer doing, we are not so sure why they stopped.</i>

	Fifth double stimulation	<i>Participant E3: You have talked about issue of value chain management and value addition at Tsuru dzeChimanimani they are now much concentrating on apiculture (honey) and cream of tartar... There is another project supported by the SAFIRE in Chapanduka area in Buhera they build an office for the locals to pack, label their honey and sale to supermarkets.</i> <i>Participant F10: So, this is the person we must look for... but to take you back were the prices also different with contract farming.</i> <i>Researcher: Yes they were different for instance some could be buying at \$1.50 others at \$1.75 and another could be at \$1.65 plus packing bags.</i> <i>Participant F6: Difference of \$0.10.</i> <i>Participant F9: So one thing I picked it seems as if the farmers are not much interested in contract farming.</i> <i>Researcher: No, they don't understand it.</i> <i>Participant F9: They don't know? Why I am saying this its because more than 5 years ago there was a Whiteman who wanted to engage Nyanyadzi farmers on paprika farming. The farmers only became aware after realising how Birchneough irrigation scheme was prospering from paprika production.</i> <i>Researcher: Yes, a careful analysis will show that its also about poor farmer education. And it's because of the fragmentation that current exists between the farmers, Extension workers and the NVTC... resultantly, there is no unit of purpose, and at the end of the day we cry of the market and we don't even put value addition. Value addition simply means adding some importance to the product. As farmers we never thought one day we could start our own small industry canning beans putting our label of the Nyanyadzi irrigation scheme and sale. If they are tomatoes we can process and tin them with a beautiful label written Nyanyadzi... but because we rarely think of it, you may realise that we have some NGOs like Tsuru dze Chimanimani they are based here and they do have offices here in Nyanyadzi but I doubt if we are benefiting from their value addition processing.</i> <i>Participant F16: They are no longer doing, we are not so sure why they stopped.</i> <i>Participant E3: You have talked about issue of value chain management and value addition at Tsuru dzeChimanimani they are now much concentrating on apiculture (honey) and cream of tartar... There is another project supported by the SAFIRE in Chapanduka area in Buhera they build an office for the locals to pack, label their honey and sale to supermarkets.</i>

• <i>Solution Modelling – (Sixth Double stimulation chart -Figure 6.8)</i>	Solution modelling process Figure 6.8 -Double stimulation and mediation tool.	<i>04:15:03 Poor Marketing: The other issue is poor marketing. I think issues like marketing can also be constituted as some of the topics covered in the farmer training modules. So, if we start to think of farmer trainings this way we can suffice on this issue. A farmer who has been trained on marketing principles and an untrained farmer are totally two different farmers when it comes to professional farming. They are totally different and most of our worries on crop marketing can disappear with proper farmer education. So, I think farmer education is the best solution to our marketing crisis. The moment we will be able to successfully integrate with the AGRITEX and NVTC we will be able to easily tackle all these other problems... One more thing we should know as farmers is that we have the right to benefit from the services of the AGRITEX and as an irrigation scheme we must also benefit from the training center (NVTC). It's our right they were established because of our existence.</i> <i>So, we need to utilize the local human resources available to us instead despising NVTC we should work together and closely with them. We need to utilize their expertise and experiences that's why we were thinking of reserving them positions in the IMC or even to just be a committee member then give them a position in the Marketing committee. In the meetings we can benefit one or two issues from them. I also heard the NVTC also complaining of non-local enrolments and I think it's a good idea to encourage and support our children to enroll agriculture courses at NVTC. At least the courses can prepare us to be different farmers ... Because in the courses critical areas are covered on problematic areas like disease and pest control, marketing and issues around marketing research. Once we manage that then we can as well start to visualize farming in Nyanyadzi irrigation scheme as commercial farming not the current subsistence farming that is going on.</i> <i>Because of time we wanted to do much modelling in this session, but I will leave you part of the solution modelling on this issue of marketing. Will leave you the task to find that missing person in the marketing puzzle we talked about the previous day (Marketing Committee). If we already have that person then we might need to do some wake up. So, I would expect you the farmers to sit down with the AGRITEX and NVTC to help you set a working Marketing Committee that is functional and that can deliver the desired results. So, I will make follow ups to find out if you have implemented the solutions, we discussed in this CLW.</i>

