

**LIVELIHOODS AND CLIMATE CHANGE IN HAMBURG:
ISSUES FOR FOOD SECURITY**

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Abstract

Climate change continues to present a major challenge to food security around the world. The potential impact of climate change on rural livelihoods is especially significant as rural communities often rely heavily on natural resources to sustain their livelihoods and, hence, food security. This is applicable to the rural town of Hamburg, on the Eastern Cape coast of South Africa. The Sustainable Rural Livelihoods framework analyses livelihoods in terms of the context, available capitals and institutional framework that determines the livelihood strategies and outcomes for rural households. In terms of livelihood outcomes for Hamburg, it was found that the households have a heavy reliance on state grants in their livelihood portfolios. Natural resources, in the form of agriculture and harvesting of marine organisms, played only a supplementary role in livelihood strategies. Thus, given that climate change would impact negatively on the estuarine resources and the impact on agriculture is unknown as the climate becomes wetter and hotter, the impact on livelihoods and food security would not be significant. However, the sustainability of current livelihood strategies is questionable as grants, by their very nature, are unsustainable and therefore can result in vulnerability and food insecurity in the long-run for households. It is recommended that grants should be issued within the community, instead of in the distant town of Peddie, to help develop the local economy and reduce leakages. This would allow for diversification of livelihood strategies in Hamburg. In addition, government support through extension officers should be extended to Hamburg to assist in developing the local agriculture sector.

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Chapter 1

Livelihoods and Climate Change in Hamburg: Issues for Food Security

1.1. Background to the Research

Climate change has emerged as one of the biggest global issues in recent times. The issues behind climate change are of global significance but may have severe impacts at the local level. This global event has the potential to affect even the smallest and most isolated communities in the world, and part of that fundamental impact is on the natural resources that provide food and hence food security.

For sub-Saharan Africa, food security remains a significant element of society: the Food and Agriculture Organization estimated in 2009 that approximately 265 million people of the 915 million undernourished people worldwide were located in sub-Saharan Africa (FAO, 2009). It is predicted that this region will surpass Asia in terms of food insecurity (Schmidhuber and Tubiello, 2007). Further studies indicate that southern Africa is likely to suffer negative impacts to some of its most important crops as a result of climate change, decreasing further the food security in an already fragile area (Lobell *et al*, 2008). This has major implications for South Africa, as per capita food production has been decreasing steadily since the 1980s, while population numbers have been on the rise (World Resources Institute, 2007).

Food security in the Eastern Cape province of South Africa, from an initial overview, is a good performer relative to the other eight provinces. In the Eastern Cape, 80 percent of households reported to have adequate access to food, which was higher than the national average of 78 percent and was the second highest by province behind the Western Cape. However, the Eastern Cape ranks fifth, at nine percent among the provinces for households with severe inadequate food access and is higher than the national average of eight percent (Stats SA, 2011). This indicates that, although most of the province has adequate food access, there remain parts of the province that suffer from severe food access problems.

In terms of agriculture in the Eastern Cape, 34 percent of individuals participate in agricultural production, compared to 22 percent for South Africa, which is the second highest rate of agricultural participation by province after Limpopo at 54 percent (Stats SA, 2011). The

Eastern Cape, relative to the other nine provinces and South Africa in general, has a high rate of agricultural participation. Of those that do participate in agricultural production, 91 percent do so through backyard gardens while 12 percent do so through farm land (there is overlap here where three percent participate in both forms) (Stats SA, 2011). This is higher than the national average of 86 percent and provincially is second only to Mpumalanga. This indicates that much of the agricultural participation in the Eastern Cape is dominated by small scale subsistence agriculture and thus may be an important source of food security for rural households.

For coastal rural communities, food security depends upon a combination of agriculture and marine harvesting, which are each strongly influenced by climate change, principally rainfall and temperature fluctuations. Marine ecosystems will be impacted by changes in water temperature, wave action and rising water levels, which can change fish and invertebrate populations, and subsequently affect those peoples whose livelihoods depend on the resources (Brander, 2010; Drinkwater *et al*, 2010; Blythe *et al*, 2014).

1.2. Purpose of the Research

For the community of Hamburg, located in the Eastern Cape Province of South Africa, these realities of food security/insecurity and livelihoods are faced on a daily basis. The most recent study, before this research project, was conducted by Eco Africa in 2010/11 (Eco Africa, 2011). The study concluded that Hamburg, being a rural coastal community, was “highly dependent on the natural resources through small-scale farming and fishing” (Eco Africa, 2011: 8). The study indicated that there were high rates of unemployment and limited livelihood opportunities outside of natural resource extraction for local residents.

The Eco Africa (2011) study, however, did not consider the extent to which the local community was reliant on natural resources as there was no indication of identifying income and goods generated from the natural resources of the area, nor was there consideration of the impact of social welfare on the livelihoods of the residents. Hamburg thus presented an opportunity to explore the impact that climate change would/could have on food security, taking into consideration the relevant financial and natural capitals that are present in the area.

The objective of this research is to contribute to the understanding of food security in the face of climate change at the household level in rural coastal areas of the Eastern Cape Province of South Africa. This is to answer the following questions:

- What is the current nature/status of the financial and natural resources available to the community?
- What is the relative reliance of households on the different resources?
- Should climate change have an impact on the natural resources of the area, to what extent would households be affected?
- What would the resultant implications be for food security for households given their relative reliance on different resources?

Through answering these questions, it was envisioned that the objectives of the research will be met.

1.3. Structure of the Research

This research thesis is constructed out of five Chapters and one Appendix.

Chapter One is a general introduction to the study. The chapter gives background information and shows the problem that led to the choice of subject matter. The chapter also states the aims and objectives of the research and sets out the structure of the research thesis.

Chapter Two is a review of the relevant literature surrounding the chosen sustainable rural livelihoods framework through which the research would be coordinated. The chapter also deals with literature surrounding food security and climate change.

Chapter Three introduces the study area in greater detail and the methodology followed. Maps showing the relative position of Hamburg in the Eastern Cape Province and South Africa are shown and a detailed history of the area and politics are developed to provide an understanding of the current context of Hamburg. The methodology section introduces the chosen survey and its relative coverage of the area as well the contributing research from other members of the Global Change System for Analysis, Research and Training (START) project team.

Chapter Four presents the results of the research. Summary statistics are presented to provide an overview of the community. Following which, the two primary capitals, namely financial and natural, are presented and unpacked. The implications of the results are then discussed.

Chapter Five is the conclusion of the research thesis. The Chapter provides a brief summary of each of the preceding Chapters and then proceeds to conclude the research.

The Appendix contains the questionnaire that forms the core of the data presented in this research.

Chapter 2

Unpacking the Sustainable Rural Livelihoods Framework and Food Security

2.1 Introduction

Development thinking in the post-World War II development institutions (World Bank, development agencies, national governments) were dominated by the overarching belief in the power of economics, resulting in the increasing influence of professional economists and side lining of development generalists and multi-disciplinary analysis (Scoones, 2009). The result was the domination of a mono-discipline, top down approach to development thinking and discourse through the mid-20th century. The root of the Sustainable Rural Livelihoods (SRL) approach to development research can be found in the shift away from the dominant structural theories of the 1970s and 1980s, which were characterised by top-down approaches to rural development, to a newer paradigm of bottom-up views of rural development. Focus thus shifted from the broad framework of development to the individual within the developmental framework (Chambers, 1986; Chambers, 1988; Scoones, 1998; Ellis and Biggs, 2001; de Haan and Zoomers, 2005).

The livelihoods approach to development theory still emphasised developmental issues as the result of distribution of assets and power, where groups with little or no access to assets experienced lower standards of living than those who had easy access to assets. However, the livelihoods approach placed the individuals at the centre of the analysis as opposed to mere products of the environment. This actor-orientated perspective identified individuals as having agency in their environment and focused on the lived experiences of these actors at a micro level in terms of family units, networks and communities (de Haan and Zoomers, 2005). The livelihoods approach was gradually adopted into the SRL framework in the 1990's (Chambers and Conway, 1991; Farrington *et al*, 1999; Scoones, 1998). Most notably was a paper by Chamber and Conway (1991) which developed a definition for sustainable livelihoods, which later became the starting point of the SRL approach (Scoones, 2009).

The SRL approach begins with the rural realities of individuals and centres the research on how these actors go about achieving better living conditions, mainly through grassroots initiatives as opposed to top-down policy initiatives (Jacobs and Makaudze, 2012). Thus, poverty and marginalisation is understood in terms of access or exclusion from livelihood assets, where formal and informal institutions play a role in favouring some groups over others (Timmermans, 2004). However, it was only after the neo-liberal Washington Consensus began to be broken down in the late 1990's and early 2000's that the SRL approach emerged as a mainstream approach to development thinking (Scoones, 2009).

2.2 Defining Livelihoods

Livelihoods, as defined by Chambers and Conway (1991: 6), are “the capabilities, assets (stores, resources, claims and access) and activities required for a means of living”. The concept of capabilities is drawn from the work of Sen (1993), where capabilities are the ability of an individual to achieve valuable functioning as part of the individuals lived experience. The capabilities concept identifies an individuals lived experiences as central to understanding the individuals' state of development. The individuals' situation is thus understood in terms of whether the individual has the ability to meet certain needs, thus removing the focus from income-related aspects of poverty towards a more holistic view. Hence, an individual who is unable to access sufficient healthcare may be sick because of a lack of infrastructure and not purely because of income constraints. Thus, poverty can be understood in terms of vulnerability and not only income (Hajdu, 2006).

The livelihood outcome is dependent on the assets individuals have in their possession. Bebbington (1999: 22) identified assets as having three fundamental uses, these being “vehicles for instrumental action (making a living), hermeneutic action (making living meaningful) and emancipatory action (challenging the structures under which one makes a living)”. These assets are both tangible and intangible and can be separated into five classes of capital, namely, physical, financial, natural, human and social (Scoones, 1998).

In addition to the five classes of capital discussed, psychological capital is emerging as a new form of capital. Psychological capital is a representation of the features of personality that contribute to an individuals' productivity, where these features impact on “self-perception, attitudes towards work, ethical orientation and general outlook on life” (Cole *et al*, 2009:

465). Hence, psychological capital differs from human capital ('what you know') and social capital ('who you know') by focusing on 'who you are' or, in the development sense, 'what you are becoming' (Cole *et al*, 2009). Judge and Bono (2001) identified four personality features that are strong predictors of an actor's productivity:

- self-esteem (an individuals' perception of their innate personal value and capability which influences feelings of adequacy, confidence and desire for achievement);
- self-efficacy (an individuals' perception of their ability to perform a task competently);
- locus of control (the extent to which an individual perceives they have control over situations in their life); and
- emotional stability (the tendency to display poor emotional adjustment and experience negative emotions such as fear, hostility and depression).

These four personality features contribute to the psychological capital of an individual, which influence the capability of an individual to achieve value in their lived experiences along with the other forms of capital already discussed. These capitals are combined together through a livelihood strategy, which then produces a livelihood outcome.

2.3 A Framework for Sustainable Rural Livelihoods

The framework presented in Figure 2.1 is drawn from the work of Scoones (1998) and provides a holistic picture of the integrated approach of the SRL framework. The framework developed by Scoones identifies five key elements in analysing rural livelihoods. These are context, livelihood resources, institutional processes and organisational structures, livelihood strategies, and outcomes. Thus, this framework seeks to understand livelihoods as a process whereby a certain contextual setting dictates the availability of certain resources to households while the institutional processes and organisational structures dictate access to these resources and thus shape the livelihood strategies of the households, resulting in positive or negative outcomes.

2.3.1 Context

The way in which rural households construct their livelihoods is determined largely by the context in which they find themselves. As is seen in Figure 2.1, these contexts include policy, history, politics, macro-economic conditions, terms of trade, climate, agro-ecology,

demography, and social differentiation. These elements all contribute to defining and limiting to some degree the scope of what households can engage in when pursuing their livelihoods, such as current government policies limiting their access to natural resources due to environmental concerns. Thus, current policy has restricted to some degree the ability of households to use such natural resources in pursuit of their livelihood outcomes.

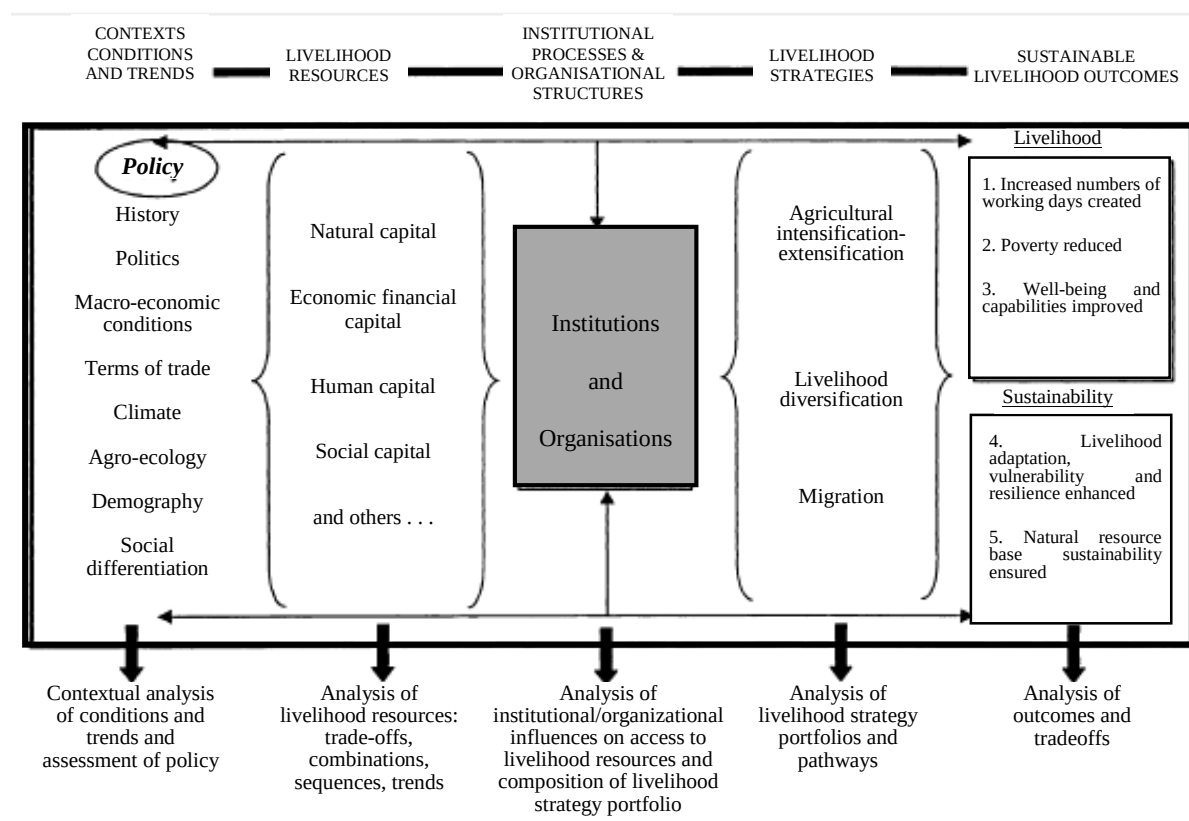


Figure 2-1: The SRL Framework (from Scoones 1998).

2.3.2 Livelihood Resources

The livelihood resources can be conceptualised as the basic capitals from which rural households base their production on and thus form their livelihood outcomes. The five types of capital already mentioned are physical, financial, natural, human, and social.

- Physical capital consists of the basic infrastructure of a community, such as buildings, roads and machinery;
- financial capital refers to the stocks and flows of money, such as savings, income and remittances;

- natural capital is the available stock of natural resources from which resources and services flow;
- human capital encompasses the skills, knowledge and good health needed to pursue a livelihood outcome;
- social capital refers to the social resources, such as social relations, affiliation and associations, needed to pursue a livelihood outcome when coordination is needed (Scoones, 1998; Cherni and Hill, 2009).

These resources are used in different combinations to create livelihood outcomes.

2.3.2.1 Natural Capital

Natural capital in the SRL framework refers to the natural resource stocks, such as soil, water, air, and environmental services, such as the hydrological cycle and pollution sinks, from which resources flow and services used in livelihoods are derived (Scoones, 1998). Changes in climate can have significant impacts on the stocks and flows used in livelihoods that are derived from natural capital. The Intergovernmental Panel on Climate Change (IPPC, 2007) has predicted that there would be significant changes to the global climate, resulting in changes in temperature, rainfall and the increase in severity of natural phenomenon such as storms and droughts. Such changes will have a direct impact on rural communities that rely heavily on natural resources for their livelihoods.

Agricultural and marine systems in the Eastern Cape Province are an integral part of rural livelihoods and constitute the platform for food security through crop and livestock production and harvesting of marine resources. These systems are severely impacted by variability in climatic regime, such as prolonged drought and then flooding. With the frequency of droughts predicted to rise in southern Africa (Badjeck et al. 2010), this will inevitably lead to reduced production and quality of crops, and loss of grazing for livestock. Gbetibouo and Hassan (2005) found that the net revenue per hectare of cropland would drop by at least 2 percent, given a 2°C increase in temperature and a 5 percent decrease in rainfall in the Eastern Cape. Marine ecosystems will be impacted by changes in water temperature, wave action and rising water levels, which can change fish and invertebrate populations, and subsequently affect those peoples whose livelihoods depend on the resources (Brander 2010, Drinkwater et al. 2010).

However, a more recent study conducted by Masubelele *et al* (2014) found that climate change has not led to a decrease in rainfall as was previously predicted. Their study was based on an analysis of changes in the distribution of grasses and shrubland in the Eastern Cape. Shrubs were predicted to increase in distribution as they would outcompete grass. This is due to shrubs being better suited than grasses to drier and warmer conditions, which is synonymous with predicted changes in the climate. Past climate change projections for this and other areas of the Eastern Cape had predicted that the areas would become drier and hence shrubbier in response to increased temperatures and drought frequency as a result of climate change (Beaumont, *et al*, 2011; Midgley and Thuiller, 2011; Midgley *et al*, 2002). Masubelele *et al* (2014) found, however, that there had been a general increase in the distribution of native grass species between 1962 and 2009 and that this did not support the climate change predictions for the area. It was found that there had, in fact, been an increase in wet periods for the area and a shift in when the area experienced its highest and lowest rainfalls, with an increase in early season rainfall (Sep-Feb) and a decrease in late season rainfall (Mar-May) (Du Toit, 2010). The study thus concluded that climate change was not leading to a warmer-drier climate for the Eastern Cape but rather a warmer-wetter climate.

2.3.2.2 Human Capital

Human Capital in the SRL framework refers to the skills, knowledge, ability to labour, health and capability of individuals important in the successful pursuit of different livelihood strategies (Scoones, 1998). The development of the concept of human capital was pioneered by Schultz (1961) who postulated that increases in national output are large compared to the increases in land, man-hours and physical capital investments and that this can be explained by the investment in human capital. The direct expenditures on education, health and internal migration for better job opportunities are examples of investments in human capital. The forgone earnings by mature students attending additional education institutions, instead of entering the workforce, and workers acquiring on-the-job training are also examples of investment in human capital (Schultz, 1961). This investment in human capital entails an improvement in the quality of human effort and hence productivity and income and can account for regional differences in development and economic growth (Gennaioli *et al*, 2012).

2.3.2.3 Financial and Economic Capital

Scoones (1998) defines economic and financial capital as the cash, credit/debt, savings and other economic assets, including basic infrastructure, production equipment and technologies, which are essential for the pursuit of any livelihood strategy.

2.3.2.4 Social Capital

The Organisation for Economic Co-operation and Development (OECD) defines social capital as “networks together with values and understandings that facilitate cooperation within or among groups” (OECD, 2001:42). Putnam’s (1995: 66) definition of social capital follows similar lines but, in addition, emphasises that coordination and cooperation are “for mutual benefit”. Underlying the focus on social capital is the belief that a community with high levels of social capital are likely to have higher educational achievement, better performing public institutions, faster economic growth and hence a better state of well-being. This occurs because a positive cycle emerges where mutual caring and civic responsibility leads to health, wealth and happiness. In turn, people are more likely to invest in and care for each other (Eade, 2003). Measuring social capital is a challenge in itself, especially with notable economists such as Kenneth North and Robert Solow disagreeing with the term ‘capital’ being associated with ‘social’ within the discipline of economics (OECD, 2010). However, researchers at UC Berkley’s Nicholas C. Petrakis Centre for Health Care Markets and Consumer Welfare developed the Petrakis Social Capital Index (PSCI) as a supply side measure of social capital, which was argued would pass the definition of capital within the discipline of economics (OECD, 2010). The PSCI measures the number of employees in voluntary organisations within a community as a proxy for the stock of social capital within the community. This measure relates to aspects of social interaction such as bonding (social connections between individuals who are similar), bridging (social connections between individuals who are dissimilar), or linking (social connections between different levels of social status) (OECD, 2010). Thus, the more community members involved in voluntary organisations within a community, the more networks together with values and understandings that facilitate cooperation within or among groups, exists (OECD, 2001; OECD, 2010).

According to Putnam (1995), a community with a large stock of social capital has an easier life. This is due to the networks of civic engagement that foster norms of reciprocity and encourage the emergence of trust between community members. These networks then facilitate coordination and communication and thus allow for challenges facing communities to be resolved using collective action.

An OECD report on the relationship between social capital and health used the example of two communities in California to illustrate the effect of social capital on health statistics over time (OECD, 2010). Between 1999 and 2007, Community A's average annual household income increased by US \$7 797 while community B's increased by US \$4 401. Thus community A's financial capital increased more than community B's. However, community B's social capital grew more than community A's (measured by the number of employees in voluntary organisations per 10 000 people). Community A's social capital increased by 0.04 while community B's social capital increased by 0.10 (OECD, 2010: 14). When health statistics were analysed, community B fared better than community A in all categories observed between 1999 and 2007. Community B had a 12 percent increase in people obtaining flu shots, an 8 percent decline in smoking prevalence and a 10 percent decline in obesity compared to community A's 9 percent increase in flu shots, 4 percent decline in smoking and 7 percent decline in obesity (OECD, 2010: 14). The conclusions drawn from this data were that social capital contributed more to healthy behaviour than income. Community B had smaller income growth than community A but higher social capital growth coupled with better improvements in healthy behaviour than community A.

2.3.3 Institutional Processes and Organisational Structures

Institutions can be defined as "humanly created formal and informal mechanisms that shape social and individual expectations, interactions, and behaviour" (Agrawal and Perrin, 2008: 1). Power relations are thus embedded within the different institutional forms and are subject to multiple interpretations by different actors while being dynamic over time. Institutions are hence part of the social negotiation process, continuously being altered and shaped within the social fabric of society. Davies (1997: 24) provides a more SRL based definition of institutions, where "institutions are the social cement which link stakeholders to access to capital of different kinds to the means of exercising power and so define the gateways

through which they can pass en route to positive or negative [livelihood] adaption". Hence, institutions are not fixed objects but rather part of the social negotiation process. It is important to consider institutions, then, as they mediate access to livelihood resources and so affect the composition of portfolios for livelihood strategies.

Institutions form an integral part of the SRL framework. In the SRL framework, understanding institutional processes allows the identification of restrictions and opportunities to sustainable livelihoods (Scoones, 1998). The institutional context of the actors is identified as a key factor influencing developmental outcomes in the SRL framework (Scoones, 1998; Ashley and Carney, 1999; Saab, 2009). The institutional context of actors shapes access to livelihood assets and livelihood outcomes through mediating livelihood strategies and pathways (Scoones, 2009). Understanding the institutional process allows for the identification of opportunities for and restrictions to achieving sustainable livelihoods where interventions are more likely to be successful if carried out within an existing institutional pathway. The formal institutional context consists of laws and policies that are established by formal organisations or groupings. Government policies that control the distribution of funding and laws controlling the acquisition of land are some examples. These formal institutions are often a macro-level force that influences the micro level lived experiences of individuals.

2.3.4 Livelihood Strategies

Livelihood strategies are the combination and means through which an actor uses the available capital to produce a livelihood outcome (Scoones, 1998). Chambers and Conway (1991) argue that livelihood strategies have a number of influences. An individuals' livelihood strategy can be determined by accident of birth, where these livelihoods are ascriptive, such as being born into a caste with assigned roles as a herder, potter or fisherman or being born a certain gender with the norms associated with that gender determining livelihood strategies (Chambers and Conway, 1991). Some individuals are socialised and apprenticed into livelihood strategies. These individuals then in turn socialise and apprentice other individuals into the strategy. Livelihood strategies are also improvised by degrees of desperation, created by the social, economic and ecological environment in which actors find themselves. Rural livelihood strategies are typically identified as natural resource intensive, where subsistence

agriculture, livestock husbandry and wild resources contribute significantly to livelihoods (Shackelton *et al*, 2001), due to the social, economic and ecological environment associated with rural communities.

Livelihood strategies are thus influenced by the availability of, and access too, the different forms of capitals (Scoones, 1998). As can be seen in Figure 2-1, Scoones (1998) identifies three avenues of rural livelihood strategy, these being; agricultural intensification (increasing agricultural output per unit area) or extensification (increasing the area of land under cultivation); livelihood diversification (diversify income generating activities away from agriculture); or migration (leave the area permanently or temporarily to seek a livelihood in another area). Rural communities are seen to be abundant in natural capital but less abundant in other forms of capital, such as physical or financial capital, leading to livelihood strategies that are natural resource intensive. However, actors interlace various resources using livelihood strategies to overcome deprivation (Jacobs and Makaudze, 2012). The rural poor rarely specialise in one form of income generating activity but rather diversify their productive activities to encompass a number of actions to construct livelihood strategies (Hussein and Nelson, 1998).

Rural livelihood strategies are thus most often widely diversified, with different assets contributing to the overall livelihood of the actor, and each asset providing a unique benefit. A household diversifies when it sources new income streams or produces new products without ceasing to produce existing products (Fabusoro *et al*, 2010). Vetter (2013) argues that rural assets such as livestock and other natural resource assets provide actors with 'safety-nets' in times of hardship to prevent destitution. They form part of a diversified livelihood portfolio that includes other income-generating activities not focused on livestock, crop or fish production (Hussein and Nelson, 1998). These livelihood portfolios may be highly specialized, concentrating on one or a limited range of activities while others may be much more diverse with a large range of activities. Jacobs and Makaudze (2012) identified that the trend over the last 50 years in rural South Africa has seen a decline on the reliance of natural resources as a livelihood strategy. This is in line with developments in other underdeveloped countries in Asia and Latin America. The decline in the prominence of natural resources in livelihood strategies is linked to decreasing returns from farming in rural areas of low-income

countries, forcing actors to seek alternative means of income for survival (Fabusoro *et al*, 2010).

Mutenje *et al* (2010), however, contend that there are two sets of motives for diversification. The first is linked to that of Fabusoro *et al* (2010), where 'push factors' force actors to diversify in order to survive/maintain their standard of living. These include diminishing returns, risk reduction, shocks or liquidity constraints and high transaction costs. The second set of motives identified by Mutenje *et al* (2010) are those of 'pull factors', where actors identify activities that could complement current livelihood strategies, and thus realise strategic complementarities between activities, thereby creating a greater positive sum game in diversification.

2.3.5 Sustainable Livelihood Outcomes

The SRL framework in Figure 2.1 identifies five key outcomes of a sustainable rural livelihood. The first three outcomes relate to one's livelihood, focusing on poverty, security and capabilities (essentially the standard of living). The last two outcomes relate to the sustainability and resilience of the livelihoods, questioning the ability of the livelihood to be maintained in perpetuity and to recover from stresses and shocks (Scoones, 1998; Scoones, 2009).

The first outcome, the creation of working days, identifies if the livelihood strategy/strategies employed is able to create employment (working days) through increased income or production. The creation of working days can be achieved through on-farm or off-farm activities, through the wage labour system or subsistence production (Scoones, 1998). The concept of employment developed by Sen (1975) has three aspects, *viz.*

- income, through wages;
- production, through producing a consumable output; and
- recognition, through being engaged in an activity that can be seen to be worthwhile but may or may not provide a wage or consumable output.

The second outcome (poverty reduction) identifies whether the livelihood has resulted in a reduction in poverty, measured in both financial and non-financial terms. Measuring poverty is very important. This can be realised through developing an absolute poverty line through

income/consumption measurements or through determining relative poverty and inequality through the Gini coefficient (Scoones, 1998). These quantitative measurements of poverty can be combined with qualitative indicators to develop a more holistic picture (Schaffer, 1996).

The third element, capabilities and well-being, is concerned with whether actors are able to use their assets to reduce their own poverty levels, where an increase in financial income may not necessarily translate into reduced poverty due to a lack of access to services (Scoones, 1998). Capabilities are directly linked to the work of Sen (1984; 1987), where the provision of income or consumables is not directly translated into improved well-being but rather whether actors are able to make use of these to improve their well-being. The well-being approach also allows the actors to define what is important in defining their well-being, allowing for a range of qualitative sustainable livelihood criteria (Chambers, 1997).

The fourth outcome, livelihood adaptation, vulnerability and resilience, questions the ability of a livelihood to recover from stresses and shocks. Those actors who are unable to cope, through temporary adjustments, or adapt, through longer term changes in livelihood strategies, are ultimately vulnerable and may not achieve a sustainable livelihood outcome (Scoones, 1998; Scoones, 2009). Measuring livelihood adaption, vulnerability and resilience requires a historical analysis of past stresses and shocks experienced by actors and their responses to them, while different stresses and shocks may result in different responses, such as avoidance, resistance or tolerance (Payne and Lipton, 1994).

The fifth outcome, natural resource base sustainability ensured, considers the ability of the natural resource base to maintain/enhance its supply of goods and services given the livelihood strategies employed (Scoones, 1998; Scoones, 2009). Most rural livelihoods are based on natural resources, so the ability of these natural resources to maintain the supply of goods and services in the face of different stresses and shocks determines their sustainability. It is essential to ensure that the stock of natural resources is conserved in order to maintain the supply of goods and services (Scoones, 1998). In order to measure the natural resource sustainability, it is necessary to develop key indicators of resource depletion or accumulation and key livelihood needs to determine if the natural resources are able to meet the requirements of livelihood strategies employed in a sustainable manner.

2.4 Food Security

The World Food Summit of 1996 defined food security as existing “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” (WHO, 2014). Furthermore, food security is seen as being built on three pillars, namely food availability, food access and food utilisation. Each of these three pillars can be broken down further, where food availability comprises production, distribution, and exchange; food access comprises affordability, allocation, and preference; and food utilisation comprises nutritional value, social value, and food safety (GECAFS, 2011). These three pillars have been conceptualised as forming part of a food security system that either succeeds or fails in providing food security (Pereira and Ruysenaar, 2012). The food security system is characterised as interacting human and natural systems and can be further conceptualised as a socio-ecological system where food security or insecurity is the result of sets of interactions in multiple domains, across different types of scales and levels and with multiple feedbacks and thresholds, creating a highly complex system (Pereira and Ruysenaar, 2012). Due to this complexity and the existence of thresholds of prosperity, many households seemingly become trapped in a cycle of poverty and food insecurity.

Stephens *et al* (2012) associate this poverty cycle as being the result of poor initial asset endowments and market failures that prevent the accumulation of income and investment. Rather, natural capital endowments are depleted in order to sustain human capital. The result of this is an increase in degraded agricultural land, most of which is in the poorest areas of central America and sub-Saharan Africa (World Bank, 2000; WRI, 2000). Stephens *et al* (2012) therefore contend that there is a natural resource based poverty trap where a threshold of both biophysical and economic assets exists and which results in divergent dynamics for households on either side of this threshold. In Kenya, where Stephens *et al* (2012) based their research, they found that the natural resource base had a strong influence on poverty while economic phenomena, such as transaction costs, affect biophysical phenomenon. Policies to address poverty and food insecurity in Kenya also had a positive effect in reducing the impact of natural resource shocks and assisted improving on-farm yields and accumulation of cash reserves. However, they observed low levels of investment in soil quality and high fertility rates, which would likely result in continued food security issues, as soil degradation would erode the natural capital stock while the reduction in farm sizes would reduce the initial

allocation of natural capital to households. This carries the risk of pushing households below the threshold of the poverty/food insecurity trap.

2.4.1 The Three Pillars of Food Security: Availability, Access and Utilisation

The pillar of food availability stems from the pre 1970's conceptualisation of food security that dominated the discourse. This was that food security was a matter of national level supply and where food security was attained as long as a country was able to avoid shortfalls in national food supply (Sijm, 1997). This understanding was based on the perception of the food situation during the early 1970s, particularly in several Asian and African countries. Africa, at large, was faced with food crises mainly due to drought problems. The situation was characterised by shortfalls in food supply, low reserves of cereals, and high and rapidly rising prices on world food markets. Indicators were then developed based on a food supply deficit model and the crisis was measured at the national level by shortfalls in supply of basic foodstuffs in relation to aggregate population requirements (Sijm, 1997).

In the mid-1970s however, the national food availability picture changed dramatically as increases in aid and investment in agriculture in Africa resulted in a dramatic increase in the availability of food and a removal of the national level shortfalls that many countries had been experiencing. Despite this, many people remained food insecure (Sijm, 1997). At this point, the analysis and understanding of food security progressed beyond mere food availability and national level supply-demand analysis to questioning the extent of food access at the household and individual level. It was learned that the problem of food security was not a lack of food supply, but rather a lack of access to enough food at the household and individual level due to a lack of purchasing power. This was captured by Sen's (1981) concept of food entitlement, or in the case of the food insecure, a lack of entitlement. Thus, food security thinking shifted from inadequate supply of food to inadequate access to food.

Sen's (1981) entitlement approach to the study of food security argued that food insecurity results from a failure in entitlements. The model explained why food insecurity can exist without any decline in the general supply of food, and showed that food security comprises more than availability of supplies. This means that even though food may be available, some may be food secure while others are food insecure. Thus, according to Sen (1981), food security at the household level was based on four different sets of entitlements, *viz.*

- production-based entitlements, based on the rights a household has to the food it produces through its own capabilities;
- Trade-based entitlements, where a household has the rights to food it has acquired through trade of one good the household own or produced for food or money to buy food;
- Own-labour entitlement, where a household sells its labour for money to purchase food; and
- transfer entitlements, where a household has the right to own what is given to it by others (i.e. social grants, remittances) and use this to acquire food.

Finally, food utilization emerged as the nutrition of food became a reason for concern. The mere provision of food was not enough to ensure food security. Malnutrition emerged as a consequence of poor food utilization. Thus, food utilization was conceptualized to determine the safety and quality of the food, how much a person eats and how well a person converts the food into energy and vital nutrients (USAID, 2007). Adequate food utilization, thus entailed ensuring a proper diet that provided sufficient energy, nutrients and potable water

2.4.2 The South African Experience of Food Security

At a national level, South Africa is a food secure nation as aggregate food availability is greater than aggregate food demand. However, below the national level of food security, South Africa has pockets of food insecurity as accessibility to food is left wanting (Drimie and McLachlan, 2013). The 2005 National Food Consumption Survey found that one out of two households experienced hunger, one out of three was at risk of hunger and one out of five appeared to be food secure, while the highest prevalence of households experiencing hunger was in the provinces of the Eastern Cape, Northern Cape and Limpopo (Labadarios *et al*, 2008). The risk of hunger was also negatively correlated with socio-economic factors such as household income, weekly food expenditure and employment status. Households in rural areas were net deficit food producers and their access to food was reliant on household income. Thus, food security was linked to access to cash to purchase food (Chopra *et al*, 2009).

Baiphethi and Jacobs (2009) found that while rural households have historically produced their own food, their dependence on market purchases has increased substantially in recent times, reaching 90 percent of food supplies in some cases. Rural households were found to

have a high dependency on state grants for cash income. De Cock *et al* (2013) found that 75 percent of respondents indicated they received social grants while 31 percent received some form of formal salary. However, social grants were the most prevalent source of household income while farming income (15 percent) and remittances (13 percent) only made up a small portion of households income. Thus, rural households were found to access the majority of their food through the market and supplement this bought food with own production. A study conducted in the rural villages of Koloni and Guquka in the Middledrift and Victoria East Districts of the Eastern Cape, respectively, found that state grants, made up from old age pensions and disability grants, accounted for as much as 53 percent of total household income with agriculture only accounting for 7.2 percent in Guquka and 33.9 percent and 18.3 percent in Koloni (Monde, 2003). The study concluded that there was a high dependency on state grants for food security. Food security in South Africa also has a seasonal dimension. De Cock *et al* (2013) found that of the households that reported hunger, 25.9 percent experienced hunger in January, 17.2 percent in June, 16.2 percent in February, 15.5 percent in July and 15.2 percent in December. This can be attributed to high spending during the festive season and shifting of funds to items such as school uniforms (Rule *et al*, 2005).

In South Africa, recent reviews have documented the failure of existing strategies to deal adequately with the complex challenges facing food security (Altman *et al*, 2009; Chopra *et al*, 2009; McLachlan and Thorne, 2009). This has been attributed to the rapidly changing context of food security where both long-term stresses, such as climate change, and short-term shocks, such as food price volatility, have rendered traditional strategies for dealing with food insecurity inappropriate (Drimie and McLachlan, 2013). The reasons for food insecurity are interconnected and thus require a holistic, integrated, response. Drimie and McLachlan (2013: 219) capture this interconnectedness and complexity in the following quote:

“This complexity means that causal processes remain unclear, running along different spatial, temporal and social scales – from local to global, from current events to long-term consequences, from action in everyday contexts to the policies of worldwide regimes and multinational organisations. A stunted child in the Zululand district is linked through a complex chain to Canadian seed companies and British aid agencies, with multiple players and structures engaged in complex relationships and feedback loops throughout the system.”

2.4.3 The Need for a Multi-Disciplinary Approach

According to Drimie and McLachlan (2013: 219), “the complex food system challenges... cannot be understood and addressed using mono-disciplinary approaches only”. No single discipline can truly capture and understand the entire picture that is food security. Rather, a multi-disciplinary approach is advocated. This multi-disciplinary approach forms a hybrid means of understanding food security, combining learning, research and applications, from multiple disciplines. This approach identifies that scientific knowledge is not the only knowledge that is relevant to finding resolutions to societal problems but that social and experiential knowledge are also relevant. This forces researchers to move between the boundaries of natural and human sciences to generate holistic results that could not be attained through following a mono-disciplinary approach (Regeer and Bunders, 2009).

2.5 Conclusion

The review of this literature has set out to, firstly, unpack the SRL framework as the basis of the research to be conducted in the thesis. As has been explored, the SRL framework has been constantly developed and expanded since the 1970’s into a grassroots multi-disciplinary approach to addressing societal based research. The framework seeks to understand the complexity of sustainable livelihoods by breaking up the concept into the context, resources, institutions, and strategies faced and employed by households. This approach thus lends itself to a multi-disciplinary understanding of sustainable livelihoods, and in this thesis, specifically issues of food security.

Further, this literature review has analysed the concept of food security both through a theoretical understanding and at the South African lived experience. The complex nature of the South African situation further promotes the need for a multi-disciplinary approach to understanding food security and the use of the SRL framework to achieve this.

Having laid out the theoretical framework and the accompanying literature for this research, the next chapter will describe the study area in both geographical and historical terms. In addition, the chapter will describe the method used in the research, focusing primarily on the socio-economic household survey which constitutes the primary source of data, and the method of analysis that will be used in analysing the data in the ensuing chapter.

Chapter 3

Study Area and Research Method

3.1. Introduction

The following chapter seeks to introduce the study area through a description of Hamburg's location, its system of local government, the history of the political context of the area, a description of the biophysical environment and a broad overview of the socio-economic realities of the town. Following which, the methods of data collection and analysis will be unpacked

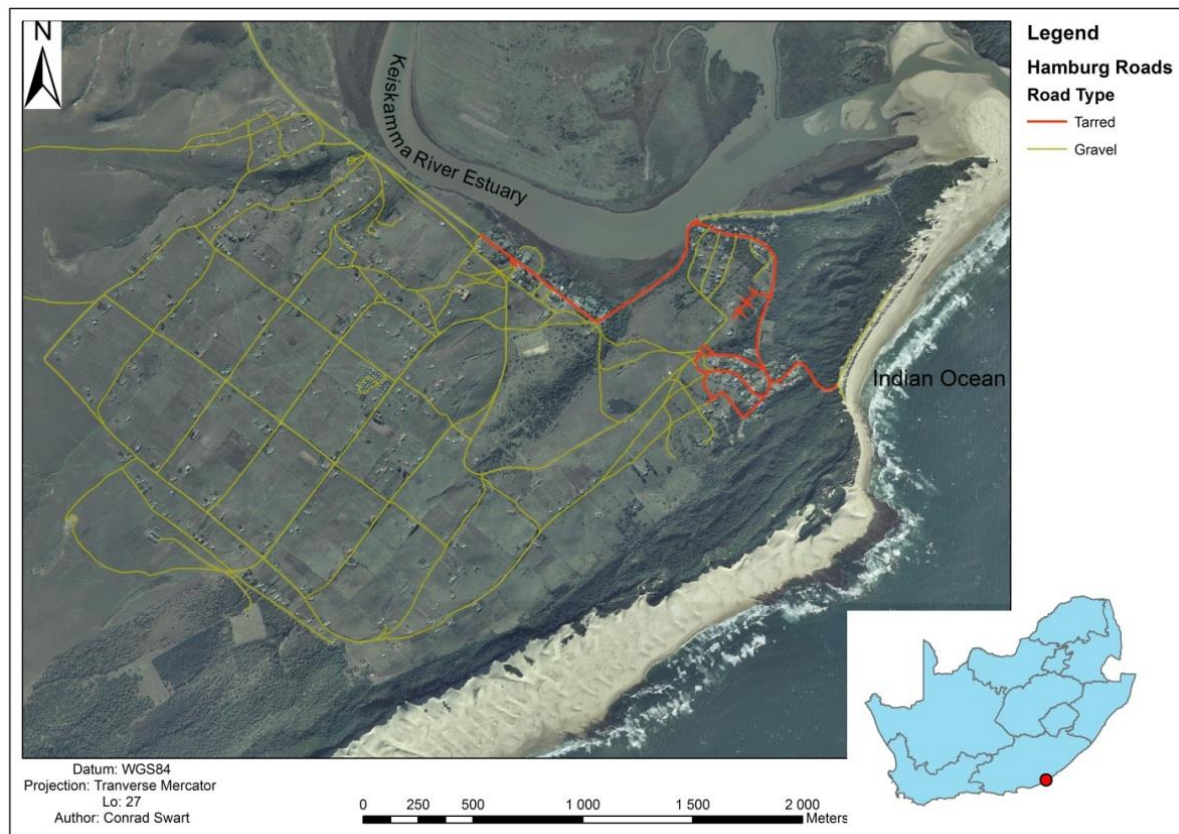
3.2. Study Area

Hamburg is located on the south-eastern coast of South Africa in what was formerly the Ciskei homeland but now forms part of the province of the Eastern Cape (See Map 3-1, below). The town is situated alongside the Keiskamma Estuary where the Keiskamma River flows into the Indian Ocean ($33^{\circ} 17' 26.88''$ S, $27^{\circ} 28' 30''$ E) and is comprised of a mix of communal, state and private land. Hamburg is connected to the R72 by a 14km long gravel road while the nearest small urban area is that of the town of Peddie, also the seat of the local municipality, which is 40km away. The nearest large urban area is that of the city of East London which is 90km away.

Hamburg falls under the Ngqushwa Local Municipality in Ward 11. The municipality serves the towns of Hamburg, Peddie and Bhira and is one of eight municipalities that fall under the Amatole District Municipality which is seated in East London. The town was formerly part of the Ciskei homeland (founded in 1972) before being reintegrated into the Eastern Cape Province following the scrapping of the homelands in 1994.

Hamburg has a population of 1 344 individuals according to the 2011 National Census (STATS SA, 2013) and is made up of a core tourist centre, which contains about 30 holiday homes, a caravan park, a hardware store, a general dealer that doubles as the post office, a coffee shop, the Keiskamma Art Project, and essential services, such as a police station, clinic and school. The holiday homes in the tourist centre are empty for most of the year except when used by holiday makers who either rent or own the houses. Beyond this touristic suburban-like core

remains Hamburg's truly rural periphery. This part of Hamburg is made up of a number of different areas and is considerably different from the tourist centre. There are no large houses in these areas; most are of traditional construction and others form the government RDP houses built for local residents. Many households are typically found either on half- or two-hectare plots of land, sizes entrenched by the colonial history of Hamburg.



Map 3-1: Study Area in Relation to South Africa

3.2.1. History

Human activity in the area of Hamburg dates back to around 1000BC when the area was inhabited seasonally by Early Stone Age hunter gatherers. Khoi pastoralists then entered the area around the Keiskamma River around 100AD but were later pushed out or assimilated into the Bantu (ancestral people of the Xhosa) around 500AD. The area was then occupied by the Bantu/Xhosa who grew crops and kept Nguni cattle until the arrival of the European settlers in the 18th century (Derricourt, 1977). Early European explorers and hunters identified the area as abundant in game, from antelope to elephants, and natural predators and began to encroach on the territories of the Xhosa (Geddes-Bain, 1960; Bullock, 1960).

In 1819, the governor of the British Cape Colony, Lord Somerset, reached an agreement with the Xhosa chiefs at Gwanga that the area between the Fish and Keiskamma rivers would be cleared of all European and Xhosa inhabitants in an effort to reduce hostilities between the two groups (Bullock, 1960). However, in 1847, after the seventh frontier war, the British Cape Colony was extended to the Keiskamma River and the new province of British Kaffraria was established by Sir Harry Smith. It was further extended to the Great Kei River in 1857 after the Xhosa cattle-killings and subsequent Xhosa famine in 1856/57 (Pape, 1985).

It was in 1856/57 that the British Cape Colony government established the settlements of Hamburg, Bodiam and Bell on the frontier of then British Kaffraria. German soldiers of the British German Legion, who had been en-route to fight in the Crimean war, were diverted to British Kaffraria when the war ended to live in these new settlements. They would later be joined by their families and other German settlers and establish the towns layouts which persist to this day (Pape, 1985).

Hamburg persisted as a rural coastal town throughout the remainder of the 19th century while British settlers joined the Germans and some Mfengu (Xhosa who had fought on the side of the British in the Frontier Wars (Britannica, 2013)) also moved into the town to work on the farms as labourers. Through the 20th Century, Hamburg became a popular holiday destination due to the good fishing and sandy beaches and, while Apartheid did not allow non-whites to live inside the town, forcing the Mfengu out, the town still grew as hotels were established.

In 1961 a separate administrative region called the Ciskei, which Hamburg fell into, was formed. This was part of the South African governments attempt to create independent homelands for blacks within South Africa. In 1972, the Ciskei was declared a self-governing region and finally was declared an independent state in 1981 with all residents losing their South African citizenship. The result was the white inhabitants of Hamburg selling their land to the South African government which was then donated to the new Ciskei government who settled their non-white citizens in the town. Hamburg ceased to be a popular holiday destination due to fear amongst whites of entering the new homelands. As a result, the town suffered economically (Hofmeyr, 2012).

Following the scrapping of the homelands, Hamburg was reintegrated into the Eastern Cape Province in 1994. Some whites returned to Hamburg, bringing much needed money into the

town, but it remained a poor area as the fear of the former homeland areas persisted and Hamburg did not benefit from the economic growth that was being experienced in South Africa in the Post-Apartheid era (Hofmeyr, 2012). Reintegration into the Eastern Cape Province was also turbulent as Hamburg lost the support of the Ciskei government and basic services suffered considerably as the Eastern Cape government was slow to take over services, such as healthcare and education, in the former Ciskei areas. A result of this was a proliferation of HIV/AIDS and TB as a lack of education and inadequate health services left the community unable to deal with the outbreak (Hofmeyr, 2012). Up to 2005, there were no HIV/AIDS treatment facilities in the Peddie district until the establishment of the Keiskamma Health Program (a private initiative) by the Keiskamma Trust. The Keiskamma Trust also established an arts project to boost local employment, as well as an educational support program (Keiskamma Trust, 2013). The Keiskamma Trust now has a significant presence in Hamburg and is involved in the lives of many of its inhabitants.

3.2.2. Livelihoods

Livelihoods in Hamburg consist predominantly of low value activities based on their natural endowments which provide a supplement to state grants. A study conducted by EcoAfrica (2011) identified the Hamburg economy as being mainly based on cattle herding and small-scale agriculture. There is, however, a culture of males emigrating to nearby urban areas to seek employment. The natural resources are also used to gather food and for sale to tourists; women are often seen harvesting muscles on the rocky shore and local fishermen are a common sight while illegal abalone harvesting has also been reported. Apart from the artisanal use of the marine resources, there is also a commercial oyster farm which is funded by government. There is also a large influx of tourists into Hamburg during the long school holidays who are attracted by the fishing. These visitors stay in privately owned holiday homes, in some of the few guest houses, or in the single caravan park on the shore of the estuary. Tourists and locals alike often travel outside of Hamburg to purchase goods where prices are cheaper. The result is a very poorly developed retail sector in Hamburg consisting of only a few shops and hence very little local economic growth as much of the money that does come into Hamburg very quickly leaks out.

3.3. Method

This research formed part of a broader inter-disciplinary research project under the auspices of the Global Change System for Analysis, Research and Training (START). The researcher was involved in the design and administering of the household questionnaire along with researchers from other disciplines while additional research was conducted by the various other researchers that contributed to the final research output.

3.3.1. Socio-Economic Household Survey

The socio-economic household survey involved the development and administration of a questionnaire where the unit of analysis was targeted at the household level. In 2011, a draft questionnaire was designed from a number of separate contributions from each of the participating research groups who specialize in different science disciplines. The Nelson Mandela Metropolitan University (NMMU) and Sustainable Seas Trust (SST) provided estuarine and marine expertise, the University of Fort Hare (UFH) provided agricultural science expertise and Rhodes University (RU) provided economic, educational and anthropological expertise. The draft questionnaire was refined and translated into the local vernacular of isiXhosa in order to reduce variability when translation was necessary. The draft questionnaire was administered to a small area of Hamburg in a pilot survey to test the questionnaire. The pilot site was selected knowing that it would have to be excluded from the final sample and as such the site chosen was part of a larger similar site, thus ensuring no significant data would be excluded from the final survey. Following the pilot survey in late 2011, the questionnaire was further refined and the final questionnaire (Appendix 1) was accepted for the full survey to be conducted in late January 2012.

At the time it was unknown how many households there were in Hamburg; thus a target of 120 household surveys was set in order to ensure a representative sample and to allow for the exclusion of some surveys should they be found to be inconsistent. It was decided that the different areas of Hamburg would be surveyed to determine whether distances from different natural resources affected resource use. The survey was administered by five teams, each consisting of three people: two researchers and a local community member who had been trained and familiarized with the questionnaire during the pilot study. The community

member did not administer the questionnaire, but provided support through local knowledge and translation where the researcher was not isiXhosa speaking.

The questionnaires were administered over a period of two weeks, excluding weekends due to community and cultural events that may have biased the data. The questionnaires were completed by household heads, where available, or where not, by a household member familiar with the necessary information required in the questionnaire. Each research team also captured the GPS coordinates of the household using a hand-held GPS navigator. Every day, the questionnaires that had been completed were checked for inconsistencies; if found, they were discarded or were followed up at a later stage to ensure the data set remained reliable. A possible inconsistency that may have influenced the data set was the changing of the research group during the weekend break, when some researchers were replaced and the new researchers had to become familiar with the questionnaire and hence may have approached the data collection differently from those whom they replaced. However, this is not deemed to have resulted in so much bias as to invalidate the data captured.

At the end of the data collection process, 134 questionnaires were accepted. This was above the original target of 120 and, more significantly, there was considerable research overlap because, towards the end of the data collection period, many households indicated that they had already completed the questionnaire when approached by researchers. This suggests that a very significant proportion of the households in Hamburg had been surveyed and hence the data set collected would provide a representative sample of the Hamburg community. Table 3-1 displays the names of the different areas of Hamburg and the number of households surveyed in each. Unknown refers to household surveys whose area was not captured by researchers.

Table 3-1: Distribution of Sample among Hamburg Sections

Section	No. Of Households Surveyed
Gogweni	29
Ndlovini	17
Pola Park	17
Qolweni	16
Elaleni	12
Ntilini	16
Unknown	27
Total	134

The questionnaire schedule, which can be found in Appendix 1, covered the following areas:

- Personal information about household members (age, gender, marital status);
- Household data (history of settlement, household composition, education, employment status);
- Access to, and use of, land (residential plots, gardens, fields);
- Livestock ownership (quantities, problems);
- Cash income (remittances, welfare payments, salary, trade);
- Expenditure;
- Local food sources (crops, livestock, marine);
- Food consumption (purchased, own production, collected);
- Water accessibility;
- Environment and climate perceptions.

3.3.2. Additional Research

While the household socio-economic survey forms the core of this thesis, additional research conducted as part of the START project by other researchers has also been included:

- The geographical study used Geographical Information Systems (GIS) techniques to map land use and so produce land use maps of the area from 1956, 1973, 1990 and 2009. The socio-economic household surveys were used to corroborate findings in the study
- The anthropological study was conducted over two periods of four weeks and then 10 days. In this time the researchers conducted participant observation research and open-ended interviews with the aim of understanding the wider social and spiritual contexts within which people see livelihoods and resource issues, and about the need for a more inclusive approach to the understanding of 'the environment'.

- The water science study made use of historical desktop research and sampling in order to establish the current health of the estuary and to determine the potential effects of climate change on the estuarine habitats, resources, and goods and services of the Keiskamma Estuary.
- An analysis of conflict in the line fishing industry was conducted through desktop research and in-depth interviews. The aim was to capture the nature of the conflict and identify conflict points between all stakeholders (i.e. government, recreational fishers and subsistence fishers).

3.4. Method of Analysis

The method of analysis used in this research primarily takes the form of descriptive statistics drawn from the socio-economic household survey. Some statistical analysis in the form of correlation analysis was also conducted to determine correlations between income and various livelihood activities. These were grouped under Scoone's (1998) four primary capitals, namely, natural, human, economic and social. The unit of analysis is primarily the household, but some analysis of income and expenditure is conducted using the Adult Equivalent Unit (AEU) where appropriate. The AEU allows for the impact of household size and composition to be taken into consideration when meeting basic needs.

The number of Adult Equivalent Units was determined using the following equation:
 $(A+0.5K)^{0.9}$

- Where 'A' equals the number of adults in the household.
- 'K' equals the number of children in the household younger than 15.
- The coefficient 0.9 is used to account for economies of scale.
- Adult equivalent cash income is then calculated as total household cash income divided by household AEU.

In addition to descriptive statistics, the use of Geographical Information Systems (GIS) mapping was used in order to determine current land-use and track land-use change over time. The GIS data was then corroborated with descriptive statistics from the socio-economic household survey.

3.5. Conclusion

Chapter Three has provided an introduction to the study area in both geographical placement and historical foundation. An overview of the current state of livelihoods was provided in order to set the scene for the data analysis. The method of data collection was also discussed and the quality of the data collected was determined to be adequate. The unit of analysis was shown to be the household, with conversions to AEU where appropriate. The method of analysis to be used in the ensuing chapter is made up of primarily descriptive statistics with some statistical analysis and GIS mapping.

The following Chapter (Chapter Four) will take the reader through the analysis of the data collected from the socio-economic survey, coupled with data drawn from GIS mapping and input from other researchers involved in the START project.

Chapter 4

Financial and Natural Capitals in Hamburg:

Results from the Research

4.1. Introduction

The following chapter will seek to present the results of the research conducted. Results will be broken up into, firstly, presenting a general overview of the sample through summary statistics. Following this, results are split into an analysis of the financial and natural capitals respectively. The implications and outcomes for livelihood strategies and food security is then discussed. The chapter is then concluded.

4.2. General Overview of Socio-Demographic Dynamics of the Hamburg Community

From the 134 households surveyed a total of 739 people were accounted for. From the survey results the following summary statistics were constructed:

4.2.1. Age profile of the Hamburg Community

The average age in Hamburg is 34 years (Table 4.1). This includes all permanent residents, non-resident household members and students being educated from pre-primary to tertiary. If students are excluded from the sample then the average age rises to 45. This captures household members who are either receiving pensions or are potentially economically active. When non-residents are also excluded from the sample the average age rises further to 48. Non-residents are those people who are identified as part of the household but do not live in Hamburg due to work commitments but rather return to Hamburg regularly and/or send money or goods home for the household. These are mostly individuals who venture beyond Hamburg to look for work and due to the distance are not able to commute every day between Hamburg and their place of employment. The rising average age indicates that older household members remain in Hamburg while the younger members of the household venture outside Hamburg to look for employment.

Table 4.1: Average Age Comparisons

	Average Age (Years)
Entire Sample	34
Sample Excluding Students	45
Sample Excluding Students and Non-Residents	48

4.2.2. Gender Distribution of Hamburg Community

The gender distribution, summarised in Table 4.2, revealed that females make up the majority of those surveyed in Hamburg and half of all households surveyed are headed by females. There appeared to be no gender discrepancy when considering which gender was non-resident. However, when considered in relation to the given overall gender distribution the percentage of male non-residents was higher than female non-residents suggesting that males are more likely to move outside of Hamburg than females.

Table 4.2: Gender Distribution of Individuals Surveyed

	Percent of Total Surveyed	Percent of Gender
Female	56	
Male	44	
Female Headed Household	51	
Non-Resident Female	9	16
Non-Resident Male	9	22

4.2.3. State of Education

Table 4.3 summarises the findings of respondents' education levels as they were asked to indicate their highest level of education completed ranging from Grade 1 to Grade 7 for Primary, Grade 8 to Grade 12 for Secondary and any post-secondary education was listed as Tertiary. This stratification allowed for the capturing of the number of people currently in the schooling and tertiary schooling system as well as those that had completed their schooling and studies and are no longer participants of the formal schooling systems. Only 6 percent of people had no formal schooling. This small percentage suggests access to and participation in formal educational institutions is not highly problematic, a suggestion which is further emphasised by the fact that these 33 individuals were all over the age of 55 and the majority of whom are over 70. Hence all children over the age of 6 years accounted for in the survey

in Hamburg currently attend or did attend some form of schooling. This high rate of school attendance can possibly be attributed to the presence of a combined primary and secondary school in Hamburg.

Table 4.3: Distribution of Education among Sample

Education	Sample	Percent of Sample
None	33	6
Primary	179	30
Secondary	333	56
Tertiary	46	8
Total	591	100

4.3. Financial and Economic Capital

Cash income for households in Hamburg is primarily divided into welfare payments, remittances, self-employment through trade, formal employment and casual employment. Welfare payments are made up of state pensions, disability grants, child support grants and foster grants. Remittances constitute cash transfers by household members who work and reside for most of their time outside of the area and usually send money back home for use by the household. Self-employment through trade includes the sale of agricultural products such as livestock and/or crops, business ownership such as a tavern and/or Spaza¹ shop, sale of harvested natural resources and informal sale of consumables such as cigarettes or sweets. Formal employment refers to those households that identified that one or more household members held a permanent job with a regular salary such as teachers, police officers, nurses etc. Finally, casual employment is made up of individuals who identified that they worked on a part-time basis or without formal employment contracts. Most of the work in this section is constituted by seasonal domestic work and irregular work on government sponsored building projects. Many of these income sources, such as self-employment, remittances and casual employment are irregular while welfare payments and formal employment provided are the more regular source of cash income for households. In some instances, remittances were regular, depending on the commitment of remitters to sending money home or engaging in stable employment with regular income.

¹ A form of local grocer or convenience store typically operated out of the owner's residence.

The most common source of cash income is by far welfare payments (88 percent of households surveyed were receiving them, as illustrated in Table 4.4). The total income sources with the highest value per month for all households captured by the survey were welfare payments (R164 680 per month) followed by formal employment (R129 289 per month). The individual value of welfare payments at the time of the survey in 2012 were made up of pensions at R1 140 per pensioner per month, disability grants at R1 140 per individual per month, foster care grants at R790 per child per month and child support grants at R270 per child per month. Marginally, over one quarter of respondents (26 percent) identified that they receive cash income from formal employment. Remittances, self-employment and casual employment contribute only R56 890 per month combined.

Table 4.4: Total Hamburg Cash Income and Source

Source of Income	Percentage	Rands (Per Month)
Welfare Payments	88	164 680
Formal Employment	26	129 289
Remittances	15	8 339
Self-Employment	28	27 449
Casual Employment	31	21 102

What emerges from these results is that welfare payments have a considerable presence in the community with a high rate of penetration, evident by the high number of households that receive state welfare grants. The disaggregation of welfare grants among the community can be seen in Table 4.5. As can be seen, Child Support and Pensions make up the majority of state grants, with 64 percent and 51 percent of households respectively receiving these types of grants. Among all households surveyed 12 percent reported not receiving any grant, 11 percent reported receiving one type of grant, 51 percent reported receiving two types of grant, 14 percent reported receiving three types of grant and two percent reported receiving four types of grant.

Table 4.5: Disaggregation of Welfare Grants among Community by Household

Type of Grant	Percent of Households
Pension	51
Child Support	64
Disability	14
Foster Support	2

Together, welfare payments and formal employment constitute over 84 percent of the R350 859 total monthly cash income among those surveyed in Hamburg. However, because formal employment is so low a significant proportion of this income is held by only a few (26 percent).

Additionally, the low level of self-employment through trade points to a situation where most of the cash income flowing into Hamburg in the form of welfare payments and state formal employment does not circulate within the Hamburg community/economy but is rather lost to other areas, most notably Peddie. Significantly, the welfare payments are paid out to recipients in Peddie and not in Hamburg. This implies that Hamburg recipients must travel to Peddie every month to collect their welfare payments, forcing recipients to pay for transport to receive their grants. Once they have received their welfare payments they purchase goods to be transported back to Hamburg. Reasons for this, as indicated by the respondents, was that the major retail outlets were present in Peddie and they could thus get goods at a cheaper price as well as have a wider variety of goods to choose from.

In addition, those in the community that have bank accounts, mostly the formally employed, and have their salary deposited into their bank accounts must also travel to Peddie in order to access the cash as there are no banking services in Hamburg. The result is the same situation as with the welfare payments where most goods are then purchased in Peddie and brought back to Hamburg. The multiplier effect of cash injections into Hamburg is thus low, with large leakages out of the local economy. This has a significant economic influence on Hamburg as a large proportion of the cash income leaves the local economy, restricting the growth of local trade and local agricultural production, thus preventing farmers from earning acceptable returns and hence investing in local food production and improving food security.

When cash income is disaggregated to a household level what emerges is the majority of households surveyed earn a cash income of less than R3 000 per month with a small number (10 households) earning in excess of R6 000. These results are summarised in Figure 4.1. The lowest cash income per month reported by a household was R120 while the highest cash income per month reported by a household was R34 041.

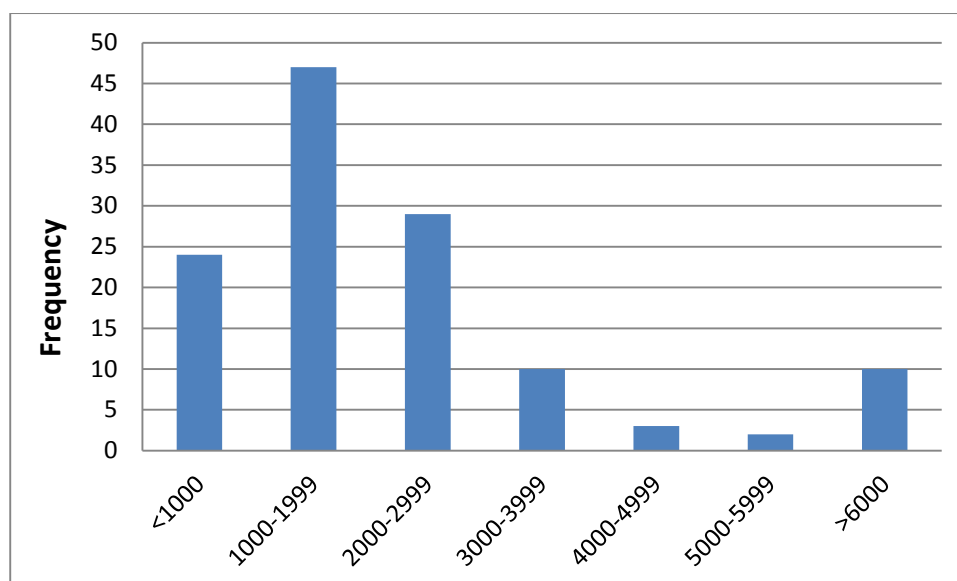


Figure 4.1: Household Income per Month

When considering the total income in each category, what emerges is a wide income inequality (Table 4-5). From the top income category, 10 surveyed households which makes up 8 percent of the sample receives 36 percent of the entire monthly cash income of all households in Hamburg while the bottom 82 percent of surveyed households receive 55 percent of the monthly cash income. This wide income inequality could be attributed to the small number of formal employment opportunities available in Hamburg with those few who are able to find formal employment, particularly in the public sector, benefit from a higher wage rate compared to those without formal employment who rely on state welfare payments, casual labour, remittances and small scale trading to earn cash income for the household.

Table 4.6: Total Household Cash Income per Income Group per Month

Rands Per Household Per Month	Total Cash Income for Household Category (Rands)	Percentage of Total
<1000	15 942	5
1000-1999	68 482	20
2000-2999	72 650	20
3000-3999	34 934	10
4000-4999	17 561	5
5000-5999	15 360	4
>6000	125 930	36
Total	350 859	100

However, these outcomes do not take into consideration household sizes, where larger households may earn more cash income per month due to having a larger number of individuals within the household that receive welfare payments or are formally employed. Adult equivalent units (AEU)² is used to determine household sizes, where AEU takes into consideration that children cost less to support than adults and are not as productive as adults while also recognising that certain economies of scale operate as households increase in size (Deaton, 1997). As is shown in Figure 4-2, most households per AEU earn less than R800 but what emerges again are a small number of households (12) earning R2 000 or more per month per AEU.

As Table 4.7 shows, even when taking household sizes into account, 36 percent of total household cash income per month per AEU goes to the highest bracket representing only 10 percent of the sample while 46 percent of total household cash income per month per AEU goes to 74 percent of the sample. Thus wide income inequality still persists when household sizes are taken into consideration.

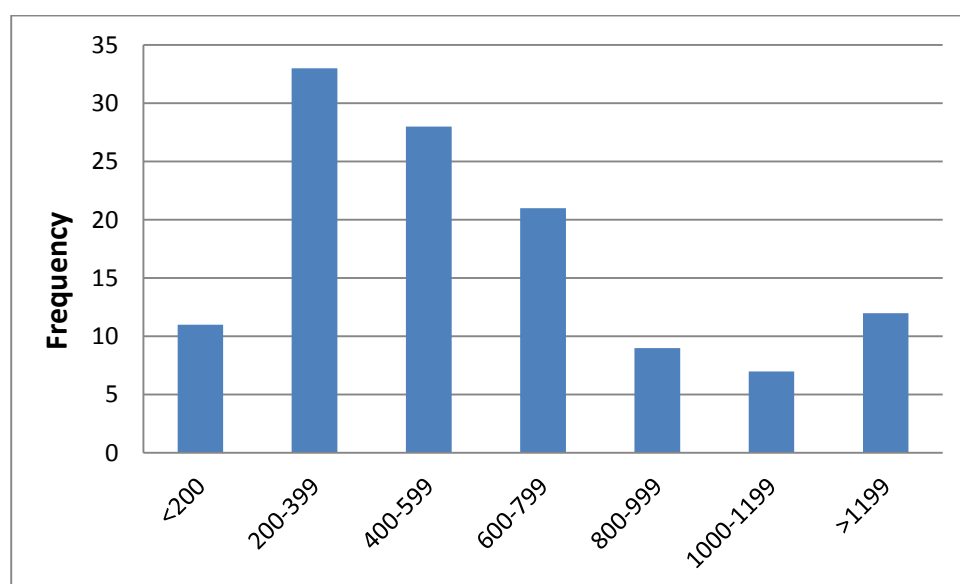


Figure 4.2: Cash Income per AEU per Month

² AEU is calculated as $(A+0.5K)^{0.9}$, where 'A' equals the number of adults in the household, 'K' equals the number of children in the household younger than 15. The coefficient 0.9 is used to account for economies of scale. Adult equivalent cash income is then calculated as total household cash income divided by household AEU.

Table 4.7: Total AEU Cash Income per Income Group per Month

Rands per AEU per Month	Total AEU Cash Income (Rands)	Percentage of Total
<200	1 305	2
200-399	9 938	12
400-599	13503	16
600-799	13920	16
800-999	8136	9
1000-1199	7687	9
>1199	31311	36
Total	85800	100

4.4. Natural Capital

When considering the possible impact of climate change on food security in Hamburg, it is necessary to first determine the relative reliance the community has on its natural resources for food security, be this from food production via agriculture or food collection from the river, sea or forest. If climate change was to improve or reduce the ability of these natural resources to provide food it is necessary to understand to what extent the community would be harmed or benefit from such an occurrence. If the community is heavily reliant on natural resources for food security and climate change negatively or positively affected these resources then climate change would have a large negative or positive impact on food security in Hamburg. However, if the community has a low reliance on natural resources for food security and climate change affected these resources in a positive or negative manner climate change would have a very low negative or positive impact on food security in Hamburg. The following section attempts to establish the extent to which the Hamburg community is reliant on natural resources for food security. Specifically, this section will focus on the river and sea resources as well as agricultural resources.

4.4.1. River and Sea Resources in Food Security

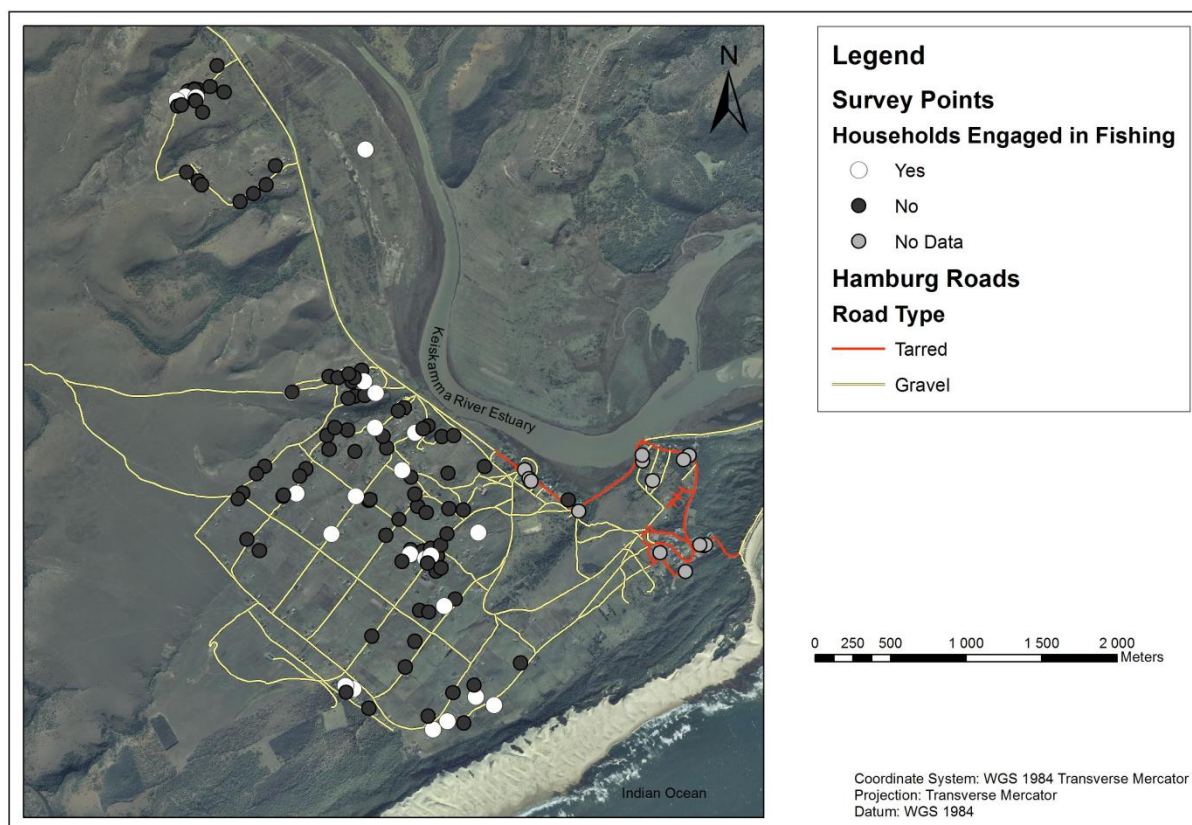
Hamburg is situated along the banks of the Keskamma River and the shore of the Indian Ocean. The two meet at the Keskamma estuary, one of a relatively small number of permanently open estuaries in South Africa (Ridden *et al*, 2012). The river and sea combine to form a highly valuable natural resource for fish and crustaceans while the coastline, with

its rocky features, provide breeding grounds for numerous shell-fish (Ridden *et al*, 2012). The river and sea are thus sources of food for the local community to exploit through fishing or gathering.

In order to determine the relative reliance of the community on the river and sea resource with the given data from the survey, it was first necessary to determine the percentage of the community that accessed the resource through fishing or gathering. Following this, it was necessary to identify which of those who accessed the resource relied on the food gathered from it as their main source of protein. If a household's main source of protein was derived from food gathered from the river or sea, it can be reasonably assumed that that household is relatively reliant on the river or sea directly for food. This, therefore, forms an important part of food security for that household and is thus an important part of that household's livelihood strategy.

Of the households surveyed, one quarter reported that they made use of the river or sea for catching or gathering riverine or marine resources. This number in itself is not particularly high given that Hamburg is very close to the resource. However, this number includes households who reported that they only occasionally accessed the resource but did not access the resource as a main food source or as a main protein source. If those households are excluded, then the number of households that are reliant on the sea resources as a major source of food as protein almost halves.

When considering the spatial distribution of households that make use of the river or sea for catching or gathering riverine or marine resources, Map 4.1 indicates is that households that are further away from the resource continue to access the resource. However, there is some clustering of households that access the resource that are closer to the sea or river, suggesting, to some extent, that distance from the resource does play a role in determining whether a household will access the resource or not. Given that there are households further away that do still access the resource, it is then possible to deduce that distance is not so great an obstacle to completely deter some households from accessing river and sea resources.



Map 4.1: Spatial Distribution of Fishing

A correlation analysis was run on the relationship between households AEU incomes per month and households accessing marine and river resources. Households that earned cash income from fishing were omitted in order to determine if there was a relationship between the AEU cash income per month of a household and whether this impacted on a household accessing the marine and/or river resources. The intuitive assumption was that poorer households would access the marine and/or river resources more than higher income earning households. These higher income households could simply purchase food while poorer households would need to gather it. The results of the correlation analysis³ are presented in Table 4.8. As can be seen, accessing marine and/or river resources (fishing) is positively correlated with income and, while the result is closer to zero than one, it is still a significant outcome. This indicates that, as household income increases, so do the number of households that access the marine and/or river resources. This runs contrary to the intuitive assumption.

³ The correlation analysis shows if variables are correlated in any way. The outcomes range between -1 to 1 with -1 showing a perfectly non-linear relationship and 1 showing a perfectly linear relationship. A result of 0 indicates no relationship.

This finding could potentially be explained if the cost of equipment to fish is taken into consideration, where only higher income earning households could afford such equipment. However, gathering of shellfish was a significant form of accessing the marine resources and this does not require expensive equipment. In addition, while permits for fishing and gathering are needed and non-residents are required to purchase permits, free subsistence permits are given to residents in Hamburg. This trend needs further exploration to explain why such a result was found.

Table 4.8: Correlation Matrix

	INCOME	FISHING
INCOME	1	0.2298159
FISHING	0.2298159	1

What emerges from the data is that a low number of households surveyed actually access the river and/or sea resources present in Hamburg as part of their livelihood strategy. Hamburg is, therefore, not very reliant on the river and sea resources for food consumption and nutrition, indicating that this resource is not very important, at this time, for food security directly.

4.4.2. Agricultural Resources in Food Security

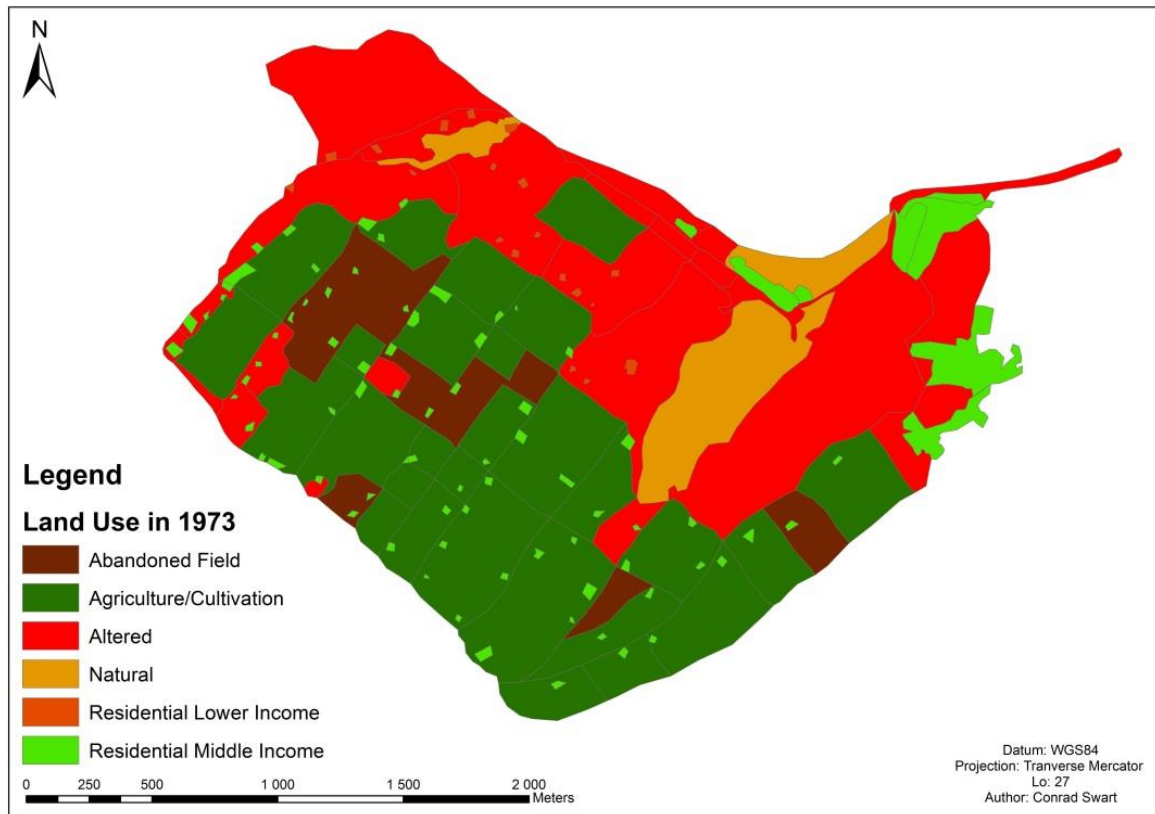
The use of land for agricultural purposes in Hamburg has deep historical roots. The original planning of the settlement with regards to plot sizes and positioning was overseen by the then Governor of the Cape Colony and High Commissioner of British Kaffraria, Sir George Grey in 1858 (Schnell, 1958). A hundred men of the British German Foreign Legion 1st Regiment, along with their families, settled on 1 and 5 acre plots in the newly formed settlement of Hamburg in around 1857/8 (Schnell, 1958: 10, 26). Over time, due to the failure of the settlement scheme and political events from the time of the first settlers through to the post-Apartheid South Africa, all of the original settlers and their decedents had left Hamburg. However, the original plots survive to this day and still form the core of the layout of Hamburg.

4.4.2.1. Land-Use Change Over Time

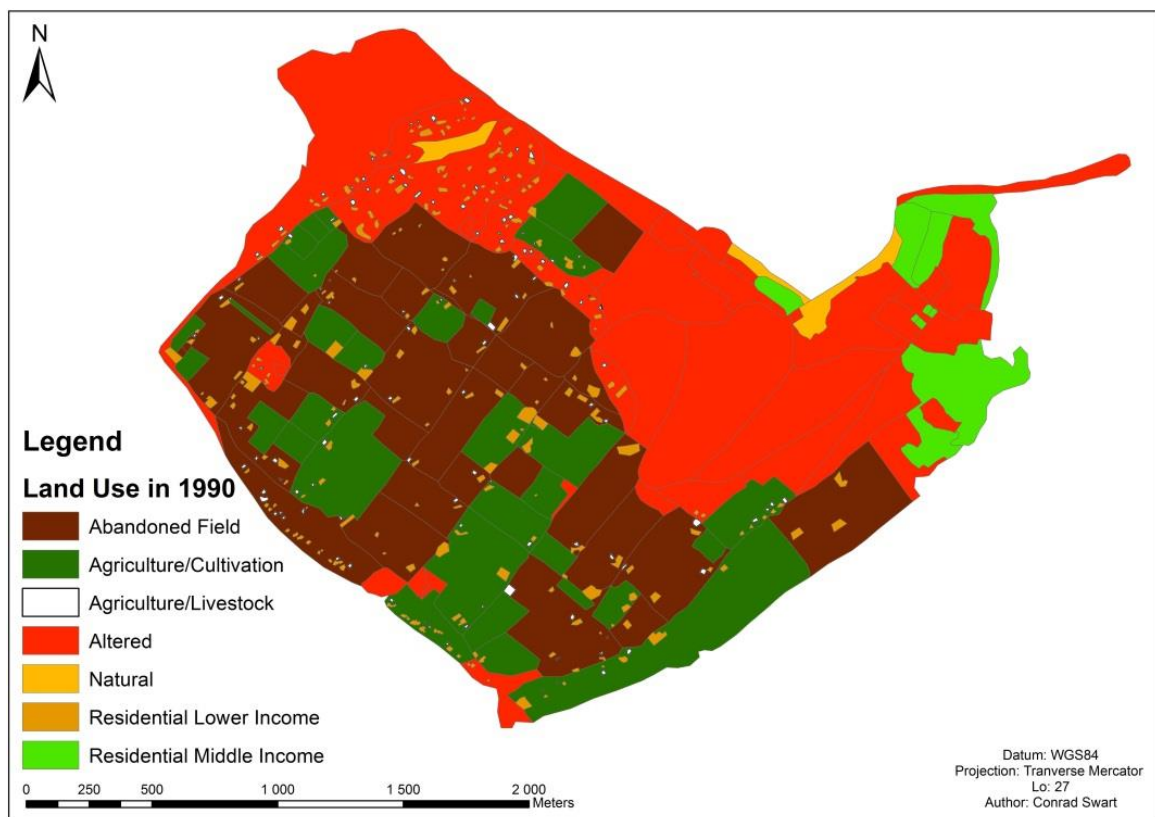
Through the use of GIS mapping and analysis of historical aerial photography, it was possible to track the historical change of land-use in Hamburg from 1956 through to 2009. This can be seen in Maps 4.2 through to 4.5:



Map 4.2: Land Use for Hamburg in 1956



Map 4.3: Land Use for Hamburg in 1973



Map 4.4: Land Use for Hamburg in 1990



Map 4.5: Land Use for Hamburg in 2009

Land use has undergone significant change in the 53 year period under analysis, although the town itself has not extended beyond its limits. It has stayed in an area of around 520 ha. One can see that in 1956, the predominant land use was cultivation of land (54.76 percent). This was also the case in 1973, although 11 percent lower (42.38 percent). In 1990, the area of abandoned fields was larger than that of cultivated land. Analysis of the 2009 aerial photography determined that only 3.51 percent of the land area examined was used for cultivation. The greatest change occurred between 1990 and 2009. According to this analysis, livestock farming emerged in 1990 to 2009. Altered land showed relatively consistent patterns and stayed between 32.36 and 37.67 percent of the area. Land in its natural state showed a decline from 7.44 to 1.67 percent of the total area. Lower income residential areas emerged in 1973 and grew to 2.93 percent of the total area in 2009. Middle-income residential areas were present throughout the 53 year period but grew in 2009 to 5.99 percent.

Figure 4.3 provides an illustration of the land use change in the area from 1956. One can clearly see that while cultivation has decreased, the number of abandoned fields has increased. These fields could potentially be used for grazing, but the very small increase in livestock agriculture, as seen in Figure 4.3, suggests that these fields are under-utilised. A greater increase in livestock agriculture would have been observed had these fields been converted to grazing lands.

When one compares Maps 4.2 through to 4.5, the middle-income areas change position from 1956 to 2009. Initially, they were located inside Hamburg in the farming area, but the location has changed to adjacent the coast and river.

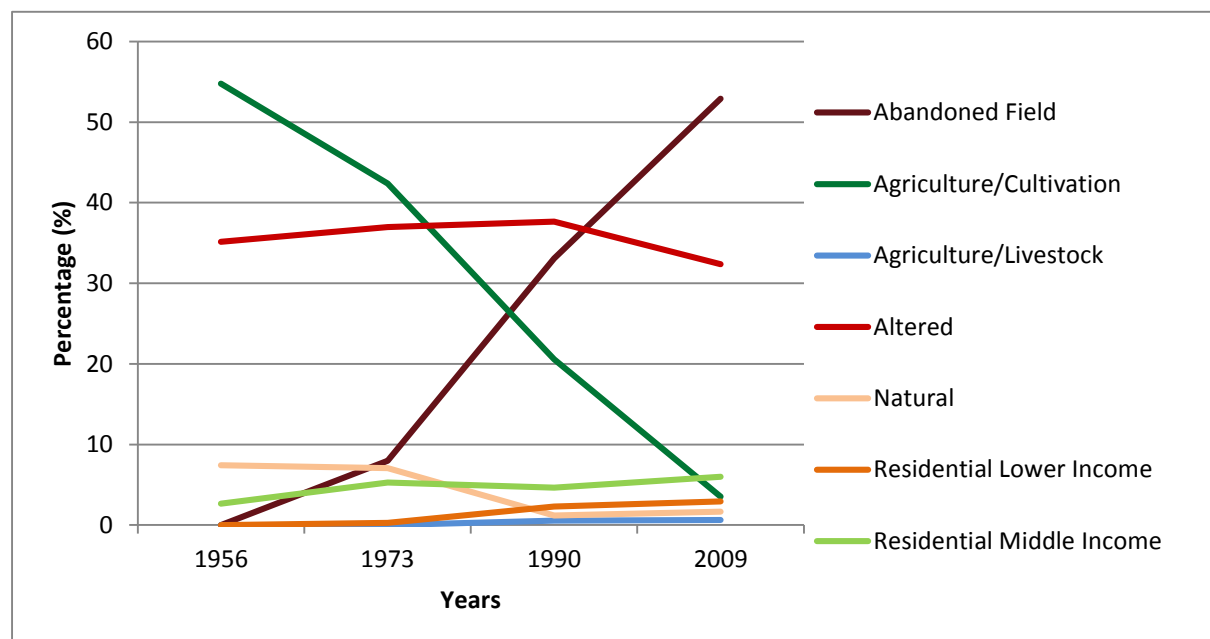


Figure 4.3: Land Use Trends in Hamburg from 1956 to 2009

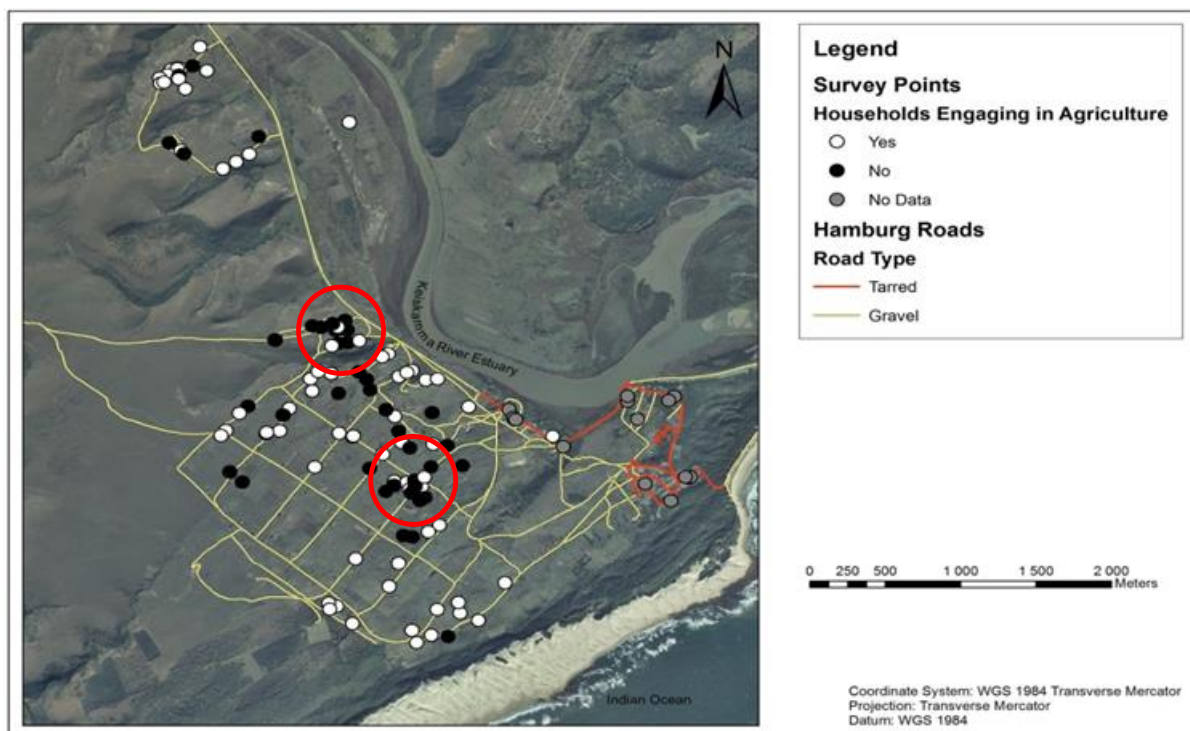
4.4.2.2. Current Status of Agricultural Land-Use

Sixty-one percent of households reported that they used their land to grow crops. This includes growing crops in fields and home gardens, where fields are generally located away from the residential site and/or constitute a large area of single crop growing whereas gardens are smaller and found on the residential site and usually have a number of different crops growing in the garden. Many of the households surveyed had large plots given that the residents had maintained the original layout of Hamburg from the days of the first settlers.

Interestingly, 24 percent of households surveyed had fields or gardens but had not planted in the last year or had only planted on part of the field or garden. This is a significant number and points to the possibility that the growing of crops is declining in Hamburg. This is substantiated by the decline in areas under cultivation found in the historical analysis of land-use change, which has very real consequences for livelihoods and food security.

However, 61 percent of households surveyed still identified that they engaged in crop growing which is still a significant number. This indicates that a significant proportion of households surveyed use crop growing as an important part of their livelihood strategy and thus forms an important part of their food security needs. Only 26 percent of households that engaged in agriculture used a field, with the rest making use of very small scale home gardens for food production.

The spatial distribution of crop growing can be seen in Map 4.6. What is evident is that crop growing activities are distributed across the research area. Areas where no activity was reported are mostly clustered. The two significant clusters are highlighted by the red circles on Map 4.6. These 'clusters' of no activity correlate to households that live in the government built RDP houses in the area known as Pola Park and in the considerably hilly area known as Elaleni.



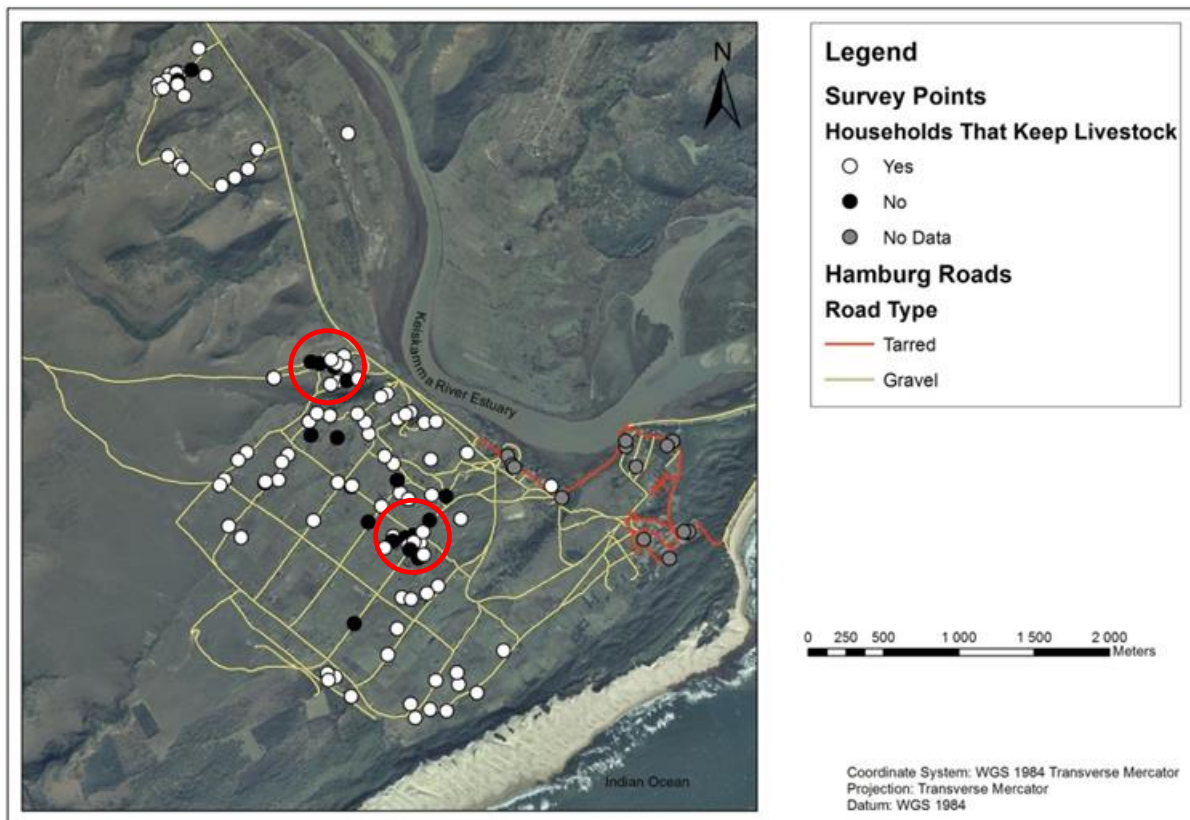
Map 4.6: Spatial Distribution of Crop Agriculture

The lack of activity in the area of Pola Park was not explored in the data collection but intuitively it can be explained by the small size of the sites on which the houses were built, thus not leaving enough room for home gardens. As for Elaleni, the hilly area may make the practising of crop growing more challenging and/or soil quality may be poor.

Of the entire survey sample, only 16 percent of households made use of fields for large-scale crop production. This could provide a significant proportion of their food security needs. However, 45 percent made use of small-scale home gardens that would act as a supplementary source of food. This further validates the small area of land under cultivation as identified in the land-use analysis. What also emerged from the survey is that many of the crops and vegetables that were produced in households' gardens and fields were also purchased from local stores⁴. Households are therefore not producing enough to meet their monthly needs. In addition, households also purchase many other refined foods such as maize meal, flour, rice and samp. This clearly points to the fact that much of the household's own production is not the main source of food but rather a supplement to store bought food. Thus while over 60 percent of surveyed households identified that they made use of land resources for growing crops, the extent to which this crop growing makes up an important part of their livelihood strategy is very limited. It is clear that, while contributing to food security, it does not form an important part of the food security bundle.

Another potential source of food production is the use of land as grazing for livestock production. Land for grazing in Hamburg appears to work on a communal property rights regime. There are very few fenced off grazing fields and many livestock simply roam freely in the fields and among the houses. It is very difficult to identify areas that are used for grazing only. However, a significant number of the households surveyed (80 percent) identified that they keep livestock (cattle, pigs, goats and chickens). Livestock production thus has the potential to form a very important part of livelihood strategies and food security in Hamburg. The spatial distribution of households engaged in livestock farming can be seen in Map 4.7.

⁴ It was not explored whether this produce was sourced locally or brought in from outside Hamburg by the local stores. This represents a failing in the research design.



Map 4.7: Spatial Distribution of Livestock Agriculture

The spatial distribution of livestock agriculture follows a similar distribution pattern to that of crop agriculture. Households that engaged in livestock agriculture appear to be distributed across the entire research area. However, households that do not engage in livestock agriculture seem to again be clustered in the areas of Pola Park and Elaleni (circled in red on Map 4.7). Given that access to grazing land follows a communal property rights regime, the size of the households housing site or location in a hilly area should not affect these households ability to keep livestock. Other variables may be responsible for these households not engaging in livestock agriculture and should be explored in future research.

In terms of food security, the cultural context of animal husbandry must be taken into consideration. Cattle and goats have important cultural connotations in Hamburg (De Wet, 2012). The number of cattle owned is viewed as a status symbol while cattle are rarely slaughtered for food outside of an important event such as a wedding, funeral or ritual. The result is that cattle do not form a significant part of livelihood strategies in terms of food

security as a source of meat. Cows, however, do provide milk for making of *maas*⁵ but this was not identified as a major source of food by households. Goats are also used in rituals and slaughtered for special occasions, but also do not provide a routinely used food source for households. In essence, cattle and goats do not form an important part of livelihood strategies in terms of food security but are only consumed as a last resort outside of cultural events.

As Table 4.10 shows, when cattle and goats are omitted as livestock for food, leaving chickens and pigs as the livestock considered, the number of households that engage in livestock production falls to 72 percent. This is still a very significant portion of the households that keep chicken and pigs. However, when households were asked to identify what they consume on average in a month and of that what they produce themselves, only 15 percent said that they consumed meat that they had produced. This is surprisingly low given the large number of households that keep chickens and/or pigs but again it can be seen that the chickens and pigs provide only a complement to meat that is purchased. So while a very high number of households keep livestock, only about half of these households consume meat on a regular basis. In the meantime, 15 percent consume their own meat that they produce and 42 percent identified that they purchased meat (this includes some who identified that they consumed meat that they produced themselves). Thus, only 7 percent of households only consume meat that they produced themselves each month.

Table 4.9: Livestock and Livestock Consumption in Hamburg

	Percentage of Households Surveyed
Keep Livestock	80
Keep Chickens/Pigs	72
Consume Meat	49
Purchase Meat	42
Consume Own Meat	15
Consume Own Meat Only	7

From this it can be deduced that livestock form only a small part of the livelihood strategy in terms of food security on a monthly basis. However, livestock (especially cattle) also play a role as a form of savings for households (De Wet *et al*, 2012). Hence, in times of financial

⁵ A form of sour milk commonly consumed in the rural areas of South Africa.

stress, households will resort to selling or slaughtering their livestock. Thus, livestock form only a small part of food consumption during 'normal' times but do provide a security net in times of stress. It is this role that contributes to food security in Hamburg but on a month to month basis, livestock is a small contributor to food security.

At a broader agricultural level the, crops and livestock generally play a supplementary role in the livelihood strategies of households for food security. Livestock can play an important role as a form of savings to be used in times of stress, but the community is generally not reliant on agriculture as a critical part of their livelihood strategies for food security.

4.4.2.3. Climate Change Impacts on Natural Capital

Broad conclusions on the impact of climate change in the study area on the natural environment are drawn from a recent study conducted by Masubelele *et al* (2014). The study focused on the region of the Eastern Cape. Given that Hamburg falls within this region and is located on one of the main water courses (the Keiskamma River) with a catchment stretching over 2 745 km² (Vorwerk, 2000) within the Eastern Cape, it is possible to draw inferences that the general results from the Masubelele *et al* (2014) study are true for the Hamburg study area.

Masubelele *et al* (2014) found that climate change has not led to a decrease in rainfall as was previously predicted. Their study was based on an analysis of changes in the distribution of grasses and shrubland in the Eastern Cape. Shrubs were predicted to increase in distribution as they would outcompete grass. This is due to shrubs being better suited to drier and warmer conditions than grasses. This is synonymous with predicted changes in the climate, than grasses. Past climate change projections for this and other areas of the Eastern Cape had predicted that the areas would become drier and hence shrubbier in response to increased temperatures and drought frequency in response to climate change (Beaumont, *et al*, 2011; Midgley and Thuiller, 2011; Midgley *et al*, 2002). Masubelele *et al* (2014) found, however, that there had been a general increase in the distribution of native grass species between 1962 and 2009 and that this did not support the climate change predictions for the area. It was found that there had been an increase in wet periods for the area and a shift in when the area experienced its highest and lowest rainfalls, with an increase in early season rainfall (Sep-Feb) and a decrease in late season rainfall (Mar-May) (Du Toit, 2010). The study thus

concluded that climate change was not leading to a warmer-drier climate for the Eastern Cape but rather a warmer-wetter climate.

As part of the START project, marine biologists conducted extensive sampling and analysis of the Keiskamma estuary and its catchment. Based on their analysis, the impact of climate change on the marine resources in the study area was developed. Three scenarios were postulated:

1. Climate change would have no impact on temperature or precipitation
2. Climate change would lead to a hotter-drier environment
3. Climate change would lead to a hotter-wetter environment

These three scenarios and their ensuing impact on marine resources are captured in Figure 4.4.

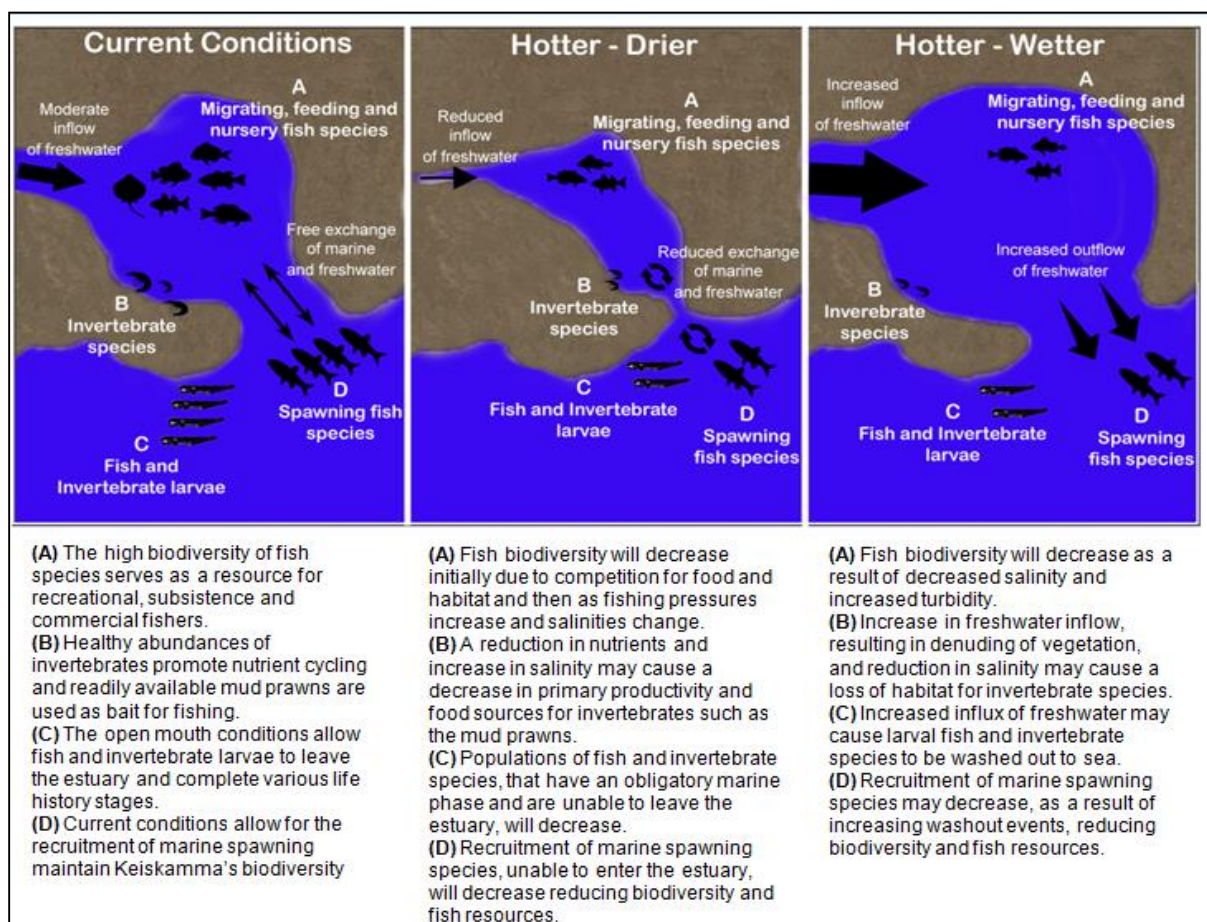


Figure 4.4: Scenarios for the Impact of Climate Change on the Keiskamma Estuary. (Ridden *et al*, 2012)

Drawing from the study conducted by Masubelele *et al* (2014), it can be concluded that the third scenario, where a hotter-wetter climate is described, is most likely for Hamburg. The result of this scenario is a general reduction in biodiversity of marine resources and marine organism in number and size (Ridden *et al*, 2012). As such, the availability of food that can be extracted from the estuary will be diminished. Households that use the marine resources as a source of food will experience diminished catches in quantity and weight and may harm their food security status.

4.5. Implications for Livelihoods and Food Security

Having presented the data collected from the socio-economic household survey, coupled with spatial data collected and input from other researcher's results, it is pertinent to consider the institutional aspects of Hamburg and its implications for livelihoods and food security. This is in keeping with the SRL framework presented earlier (Scoones, 1998; 2009)

4.5.1. Financial and Economic Capital

In Hamburg, the role of state transfers in the form of welfare payments play a leading role in the livelihood strategies of households. The high rate of individuals without formal employment is an indication of a limited local economy providing employment opportunities. Additionally, most formal employment is from government institutions, a further indication of the inability of the local economy to generate formal employment opportunities. Low formal employment thus increases the incidence of state welfare grants as individuals are not able to provide themselves with a private pension, provide the necessary nutrition and healthcare to their children or access private disability cover and life insurance.

Government institutions thus play an important role in providing access to important livelihood resources in the form of state welfare payments (primarily) and formal employment (secondary). The role of state institutions in determining access to livelihood resources, in this instance for financial and economic resources, is central in Hamburg. However, the institutional process for accessing these resources also has a reduced positive impact on the local economy.

By having to travel to the nearest administrative area of Peddie to receive welfare payments, their impact on the Hamburg economy is reduced. Some of the welfare payment has to be spent on travel expenses and, additionally, most of the welfare income is spent in the Peddie local economy instead of in the local Hamburg economy. This represents a substantial loss of purchasing power in the local Hamburg economy and a loss of potential additional income for households that could generate supplementary income through the sale of surplus goods. The potential to supply produce to a local market may also stimulate a revival in local crop production, promoting livelihood diversification and increasing sustainability through reducing direct reliance on state welfare for those households.

4.5.2. Natural Capital

Hamburg is characterised as having an abundance of natural capital due to the close proximity of the Keiskamma Estuary and the typical larger plots of land that households have access too due to the persisting colonial layout of the area. However, households in Hamburg do not access the natural resources as a primary source of livelihoods. Agriculture, both rearing of livestock and cultivation of crops, play a supplementary role in local livelihood strategies.

The reduced role of crop-based agriculture is evident by the decline in the use of fields for crop agriculture over time and the increase in the number of abandoned fields. Crop farming has been abandoned in favour of small home-gardening for producing a supplementary supply of vegetables. The use of livestock as a continuous supply of food is also limited, with cattle primarily used as a traditional form of savings and in traditional cultural practices, such as *lobola*⁶.

Institutionally, there were no significant indications of institutional restrictions on agricultural activity in Hamburg. Much of the agricultural land used for grazing seemed to follow an open access property rights regime while land used for crops was in abundance. However, institutional support was lacking. Many respondents indicated the lack of visibility and visits from government extension officers. This restricts the skills and knowledge base of local farmers.

⁶ A form of traditional dowry

In relation to the local estuarine resources, a similar trend in agricultural resources was seen. Households' extraction of resources from the estuary was limited to a supplementary role as opposed to a primary source of livelihood. Households with high incomes were more likely to access the resource, indicating that poorer households were not as likely to access the resource.

Institutional limitations on access to the marine resources do exist. Government limits extraction from the estuary and sea through the use of permits that limit the number of fish that can be caught (bag limit). Three types of permits exist, these being subsistence, recreational and commercial permits.

➤ Subsistence Permits

The subsistence sector comprises fishers who fish on a small scale to meet their basic needs. In order to fish, subsistence fishers must obtain a permit. Subsistence fishers are subject to daily bag limits along with other restrictions. In order to obtain a subsistence permit, the person must meet certain criteria and submit an application for the following year. In the Eastern Cape, all applicants who meet these criteria will receive a subsistence permit since there are no caps on the number of permits that are given out in a given area (DuBois, 2012).

In practice no subsistence permit exists *per se*; rather, fishers can apply to receive an exemption to fish for subsistence purposes. To obtain an exemption, fishers must register their request during a meeting, which is held in September or October, and permits are generally awarded in December. In order to qualify for an exemption, individuals must meet the criteria for a subsistence permit as well as:

- I. have a historic reliance and total dependence on the resources (DEAT, 2012), and
- II. not have a permanent form of employment (DEAT, 2012).

➤ Recreational Sector

Recreational fishers gain access to marine resources by applying for and purchasing a recreational permit. This sector is controlled through daily bag limit restrictions and/or catch-and-release policies (Weyl *et al.* 2007). This sector is fairly prominent in Hamburg, with the area popular among recreational fishers from as far off as Johannesburg (Du Bois, 2012).

➤ Commercial Sector

The provincial government grants commercial fishers access to a pre-determined quantity of marine resources. The sector includes both highly-industrialized offshore fisheries as well as near shore fisheries which are permitted to use gear such as gill-nets, long-lines and beach seine nets (Weyl *et al.* 2007). There were no commercial fishers operating out of Hamburg in 2011/12 (Du Bois, 2012).

The institutional restriction on access to the marine resources may account for the relatively low number of households that actually access the estuarine and marine resources as a source of livelihoods and hence offer only a small contribution to overall food security in Hamburg. This represents a restriction on the opportunities for a sustainable rural livelihood, but forms part of the institutional agenda to preserve and sustain resource flows into the future. The result should ultimately lead to actually increasing/maintaining opportunities for sustainable rural livelihoods for future generations. This promotes dynamic sustainability of livelihood opportunities as opposed to static livelihood opportunities. The effectiveness of this should be analysed, but is beyond the scope of the current research project.

4.5.3. Livelihood and Food Security Outcomes

What emerges quite strongly from the data is the large reliance on welfare payments as a main source of cash income by households in Hamburg. While formal employment is also an important contributor to the total amount of cash income for Hamburg residents, this income only passed to a small number of those surveyed and, as such, only a small part of the Hamburg community is not heavily reliant on welfare payments for cash income. The small contribution made to cash incomes through remittances, self-employment through trade and casual employment indicates a very weak diversity of livelihood strategies.

What was also shown through the data is that natural resources, while seemingly plentiful, play a smaller role in livelihoods than expected. Marine and river resources were accessed by only some of the households, and even fewer were reliant on resources gathered from the sea or river. From subsistence agriculture, growing of crops and vegetables in gardens and fields is a supplement to everyday food consumption rather than forming a major part of it.

Livestock are plentiful in Hamburg, but again form only a supplement to everyday food consumption, and few households were reliant on livestock as their only source of meat.

The picture that emerges is one of heavy reliance on welfare payments, which are used to purchase food, mostly outside of Hamburg, which is supplemented with food gathered from the river/sea resource or self-produced through growing crops and keeping livestock. Thus, the most common livelihood strategy in Hamburg is dependence on welfare income, with a small portion of the community deriving livelihoods based on employment.

In terms of climate change and its impact on food security in Hamburg, the outcomes are modest. On one side, if climate change were to lead to a dramatic decline in the ability of the natural resources to provide food in Hamburg the community would be adversely affected; there would not be a dramatic threat to food security but it could threaten the natural resources as a safety net. The community's heavy reliance on welfare payments would shield them from the fall in resource flows from natural resources. Consequently, much of the community would not have their food security threatened. On the other hand, if climate change were to lead to a dramatic improvement in the ability of the natural resources to provide food in Hamburg, the community would be positively affected. The outcome, similarly, would not be a dramatic improvement to food security due to the heavy reliance on welfare payments that has become the norm in this community.

From the research presented, it is clear that resource flows from the estuary are expected to decline due to climate change as the temperature increases and water flow increases. However, it is unknown what impact the wetter/warmer climate will have on agriculture. But given the low level of crop farming identified, it is not expected to have a significant impact on livelihoods as welfare payments remain the greatest source of income and the primary livelihood strategy for households in Hamburg.

However, welfare payments by their very nature are unsustainable, especially old-age pensions. Thus, while individual Hamburg households may not currently be heavily reliant on their natural resources, and their food security might not be heavily impacted by climate change, they could in future face such a situation should welfare payments cease to flow to households.

4.6. Conclusion

This chapter has provided a presentation of the results from the socio-economic household survey that makes up the core of this research project. This was presented with additional research drawn from the START project as a complimentary component to add value and depth to the primary data source. The implications and livelihood outcomes were then considered within the SRL framework. The next chapter will conclude the research and provide recommendations.

Chapter 5

Conclusions and Recommendations

5.1. Introduction

The following chapter represents the conclusion of the research. Each chapter will be briefly summarised, following which, recommendations based on the research will be provided.

5.2. Summation of Research

The root of the Sustainable Rural Livelihoods (SRL) approach to developmental research can be found in the shift away from the dominant structural theories of the 1970s and 1980s, which were characterised by top-down approaches to rural development, to a newer paradigm of bottom-up, actor orientated, views of rural development. The SRL approach begins with the rural realities of actors and centres the research on how these actors go about achieving better living conditions, mainly through grassroots initiatives as opposed to top-down policy initiatives.

The way in which rural households construct their livelihoods is determined largely by the context in which they find themselves. These contexts include policy, history, politics, macro-economic conditions, terms of trade, climate, agro-ecology, demography, and social differentiation. These elements all contribute to defining and limiting to some degree the scope of what households can engage in when pursuing their livelihoods.

The livelihood resources can be conceptualised as the basic capitals from which rural households base their production on and thus form their livelihood outcomes. The five types of capital conceptualised in the SRL framework are physical, financial, natural, human, and social, where physical capital consists of the basic infrastructure of a community, such as buildings, roads and machinery; financial capital refers to the stocks and flows of money, such as savings, income and remittances; natural capital is the available stock of natural resources from which resources and services flow; human capital encompasses the skills, knowledge and good health needed to pursue a livelihood outcome; social capital refers to the social resources, such as social relations, affiliation and associations, needed to pursue a livelihood outcome when coordination is needed.

Institutions form an integral part of the SRL framework. In the SRL framework, understanding institutional processes allows the identification of restrictions and opportunities to sustainable livelihoods. The institutional context of the actors is identified as a key factor influencing developmental outcomes in the SRL framework.

Livelihood strategies are the combination and means through which an actor uses the available capital to produce a livelihood outcome. Livelihood strategies, hence, are influenced by the availability of, and access to, the different forms of capitals.

The SRL approach provides a framework through which the issue of food security can be analysed. Primarily, food security is centred around three primary concepts, namely food availability, food access and food utilisation. Each of these three pillars can be broken down further, where food availability comprises production, distribution, and exchange; food access comprises affordability, allocation, and preference; and food utilisation comprises nutritional value, social value, and food safety.

In the South African experience, food insecurity stems mainly from food access and utilisation. South Africa is a food secure nation due to national aggregate production outweighing national aggregate food demand. However, households still experience hunger and food insecurity, thus access and utilisation of food is an issue.

Hamburg is located on the south-eastern coast of South Africa in what was formerly the Ciskei homeland but now forms part of the province of the Eastern Cape. The town is situated alongside the Keiskamma Estuary where the Keiskamma River flows into the Indian Ocean. Hamburg is made up of a core tourist centre, which contains about 30 holiday homes, a caravan park, a hardware store, a general dealer that doubles as the post office, a coffee shop, the Keiskamma Art Project, and essential services, such as a police station, clinic and school. Hamburg has a population of 1 344 individuals according to the 2011 National Census.

Human activity in the area of Hamburg dates back to around 1000BC when the area was inhabited seasonally by Early Stone Age hunter gatherers. The area was then inhabited by Khoi pastoralists until the arrival of Bantu agriculturalists. In the 18th century, European settlers began entering the area until the official settlement and proclamation of Hamburg in 1856/57. The town persisted as a multi-racial rural fishing and tourist town until 1961 when

it was declared part of the newly-formed Ciskei homeland and white residents were forced to leave. Following the democratic transition in 1994, Hamburg was re-integrated into South Africa and has since battled with common issues of poverty and lack of service delivery, with local livelihoods based on natural resource extraction as a supplement to the assistance provided by government through state cash grants.

This research formed part of a broader inter-disciplinary research project under the auspices of the Global Change System for Analysis, Research and Training (START). The researcher was involved in the design and administering of the household questionnaire along with researchers from other disciplines while additional research was conducted by the various other researchers that contributed to the final research output.

At the end of the data collection process, 134 questionnaires were accepted. This represented a significant portion of the local population. The method of analysis used the research primarily took the form of descriptive statistics drawn from the socio-economic household survey. Some statistical analysis in the form of correlation analysis was also conducted to determine correlations between income and various livelihood activities. The unit of analysis was primarily the household, but some analysis of income and expenditure was conducted using the Adult Equivalent Unit (AEU) where appropriate.

For financial capital, Hamburg households are heavily reliant on state transfers for cash income. Child support grants and state old age pensions make up the majority of cash income into the Hamburg community. Formal employment is restricted to government posts and some minor private sector positions. The need for recipients of state grants to travel to Peddie to draw the monies results in a large loss of buying power in the local Hamburg community and restricts the development of the local economy.

In terms of natural capital, the local estuarine and agricultural resources are numerous. However, agricultural activity has been shown to be in decline, with GIS mapping showing declining use of the use of fields for crop agriculture, coupled with little increase in livestock agriculture. Many households, as a result, do not rely on agriculture as a major source of livelihood and food security. In terms of the estuarine and marine resources, the relative contribution of these resources to household livelihood portfolios is also limited. Natural resources, therefore, play only a supplementary role to livelihoods and food security among

households in Hamburg, thus the expected impacts, whether positive or negative, are anticipated to have a relatively small impact on the overall community.

The implications of these findings show that government institutional arrangements, while providing access to state grants and thus a social safety net, do not maximise the potential benefits that could accrue to households in Hamburg. By not having the institutional capacity to allow individuals to draw their social welfare in Hamburg, the institutional arrangement is missing an opportunity to help increase local demand in Hamburg and thus stimulate the local economy which could potentially create additional employment and trading opportunities.

Institutional restrictions on access to natural resources in the estuary and sea may explain the relative small contribution these resources make to the livelihood portfolios of households in Hamburg. It may be that, should restrictions be lifted, households could access the resource more and ultimately improve immediate food security and livelihood status, but place future livelihoods in jeopardy.

Given the situation, the impact of climate change is expected to have only a limited impact on households in Hamburg. Given the relative large dependence of state welfare for livelihoods and food security and the supplementary role that natural resources play in the community, positive or negative impacts of climate change on these resources would have a relative small impact on households in Hamburg.

5.3. Recommendations

The recommendations that emerge from this research focus on the institutional environment and are conceptualised with the intention to improve access and sustainability of the local rural livelihood outcomes, and hence food security, in Hamburg.

5.3.1. State Welfare

The provision of state welfare grants to the residents of Hamburg should be brought to the community. Infrastructure for the drawing of welfare grants should be set up in Hamburg in order to improve the intended impact of the welfare grants, through reducing the need to pay for transport to Peddie, reducing the opportunity cost of travel and increasing the purchasing power in the local Hamburg economy.

The increased purchasing power in the Hamburg economy will stimulate local trade, as goods can be purchased locally instead of in Peddie. Stimulated local trade may also then stimulate renewed production from abandoned agricultural fields, as local residents with access to fields are then incentivised to produce surplus agricultural goods to supply local demand. In addition, the opportunity to travel to Peddie will still exist and will thus ensure that local Hamburg traders still compete with traders in Peddie, preventing Hamburg traders from charging excessive economic rent for convenience.

5.3.2. Agricultural Support

Given that residents of Hamburg identified a lack of access to government agricultural extension officers, it is recommended that access to these extension officers needs to be improved. Should increased demand for agricultural products in the local community materialise, support structures will need to be in place to advise and guide local farmers in rehabilitating their fallow fields for growing of crops.

Providing knowledge and access to the latest seed technologies, fertilisers and organic control mechanisms will further allow local farmers the opportunity to maximise resilience to potential climate change impacts on local conditions. Specialised drought or flood resistant crops would allow for increased productivity and surplus production to enter the local market.

5.3.3. Envisioned Outcomes of Interventions

Through diversifying livelihood strategies, based on increasing local economic growth, and increased agricultural activity, food security could thus be improved. This is due to increased access to food through lower transaction costs to access state welfare and increased local food production. Livelihood diversification is identified as a livelihood strategy in the SRL framework to achieving a sustainable livelihood outcome. Through diversifying livelihoods, risks associated with relying on fewer livelihoods are decreased. Should one livelihood become affected by institutional restrictions or changes in climate, a diversified livelihoods portfolio would allow the household to adapt and fall onto additional livelihoods to maintain food security.

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**QUESTIONNAIRE FOR START PROJECT ON RISK AND VULNERABILITY IN
RELATION TO FOOD SECURITY IN THE CONTEXT OF CLIMATE CHANGE IN
THE EASTERN CAPE, WITH SPECIFIC REFERENCE TO THE HAMBURG AREA
(January 2012)**

Information to respondents at the beginning of the questionnaire process:

linkcukacha nolwazi olujoliswe kwabo baza kuphendula imibuzo

1) This questionnaire is not part of a government process. It is part of a research exercise by the University of Fort Hare, Nelson Mandela Metropolitan University and Rhodes University. The information obtained will however, be valuable to government in its planning for the Eastern Cape and for the Hamburg area. Your participation in answering this questionnaire is entirely voluntary, and your choosing either to answer or not to answer it, will not in any way either favour or penalize you or your family in relation to anything, such as access to service provision, pensions or other benefits, or to any employment opportunities that may arise in the area.

1) Olu qulunqo lwemibuzo aluyonxenywe yeenkqubo zikarhulumente. Luyinxenye yophando olwenziwa ziiYunivesithu iFort Hare, iNelson Mandela kwakunye neRhodes. Kodwa kunjalo ulwazi olufunyenweyo luza kuthi lube lulutho kurhulumente xa eza kuthi alungiselele eli phondo leMpuma Koloni kwakunye nela cala laseHamburg. Inxaxheba oza kuthi uyithathe ngokuphendula imibuzo ixhomekeke kuwe akunyanzelekanga ukuba uthathe inxaxheba nokuba akufuni. Akukho bani oya kubeka ityala kuwe okanye usapho lwakho, ngakumbi malunga nezinto ezifana nokuhanjiswa kweenkonzo, indodla, amathuba emisebenzi angathi avuke kule ndawo ohlala kuye, okanye nayiphina into oneemfanelo zokuyifumana.

2) While we are asking to enter your name on the questionnaire form, this is only to help us to get a representative sample of respondents covered in our research, e.g. in terms of men and women, in terms of younger and older people, etc, and so that we do not make the mistake of coming back to the same houses again. Your identity will be kept completely anonymous. We will not be mentioning the names of anybody in anything we write, and we will take care to describe people and what they tell us in such a way that they cannot be identified afterwards by anybody who reads our reports. We are seeking to obtain representative information that tells us about what is going on in the area, not personal journalistic material.

2) Nangona siza kukucela ukuba ubhale igama lakho kwiphepha elinemibuzo, oku kwenzelwa ukuba silazi inani labantu abaza kuthatha inxaxheba kolu phando, umzekelo siza kufuna ukwazi inani labo

bangootata kwakunye nabo bangoomama. Kananjalo oku kuza kuquka ukwazi malunga nobudala babantu abaza kuthatha inxaxheba, oku kuza kusinceda ekubeni singenzi impazamo yokuya kwizindlu ebesiyile kuzo ngaphambili. Iinkcukacha zakho ziya kuba yimfihlo ngokupheleleyo. Asizi kubhala amagama abantu kuyo nayiphina into esiza kuthi siyibhale, kananjalo siza kuqinisekisa ukuba sibachaza ngendlela eyiyo abantu kwakunye noko baza kube besixelele kona ukuze bangabi sisisulu sokwaziwa nguye nabanina oza kuthi afunde iingxelo zalo msebenzi. Esikunqwenelayo kukufumana ulwazi oluza kusixelela ukuba kwenzeka ntoni kule ngingqi enihlala kuyo, ingelulo ulwazi olungqamene nomntu lowo uza kube ephendula.

3) In our research, we are seeking to understand the factors that affect people's level of food security. People may be seen as having food security when the "at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (World Food Summit of 1996). We want to understand what places people at risk in relation to having such food security, and whether this has changed over time. Could this be related to changes in the weather and climate patterns over time, and how do we think that is likely to develop in the future?

3) Kolu phando lwethu, sifuna ukuqonda malunga nezinto ezichaphazela yaye zibe ngumqobo kwindlela abaphila ngayo ngakumbi kwicala lokutya okukhuselekileyo okungenaziphako. Abantu bangakhangeleka befumana ukutya okukhuselekileyo okungenaziphako, ingakumbi xa kuphuma imipoposho echaza ukuba "Yidla yaye fumana ukutya okwaneleyo, okukhuselekileyo ngokwasempilweni, okunesondlo, okuneninxaso kubomi nempilo engcono" (World Summit of 1996). Sifuna ukuqonda ukuba yintoni ebeka abantu emngciphekweni xa kufikelela ekubeni bafumane ukutya okukhuselekileyo ngokwasempilweni, kananjalo sifuna ukuqonda ukuba, ngaba oku kuye kwatshintsha ekuhambeni kwexesha? Ngaba oku kungqamene nokutshintsha kweemozulu ngokubanzi, yaye sicinga ukuba oku kuza kuhamba kuye kuma phi kwixesha elizayo?

4) We would be very grateful if you would be prepared to help us by answering this questionnaire with us. We will do the writing, so that you can relax and think about what you want to say. Please take your time-there is no pressure to answer immediately. Please ask the interviewer to explain anything you are not clear about. It should not take us more than 45 minutes to go through the questionnaire together. Thank you very much for your willingness to participate.

4) Singavuya kakhulu ukuba ungaba nomdla wokusinceda ngokuthi uphendule le mibuzo iqulunqiweyo kunye nathi. Siza kubhala ngokwethu, ukuze ukwazi ukucinga malunga noko ofuna ukukuthetha. Nceda uthathe ixesha lakho, asingxamelanga ukuba uphendule msinyane. Ukuba akuqondi, cela lowo uza kube ebuza imibuzo ukuba akucacisele. Oku akuyi kuthatha ngaphezulu kwemizuzu engama-45. Siyabulela kakhulu ngomdla wakho wokuthatha inxaxheba kulo mcimbi.

QUESTIONNAIRE IDENTIFICATION

Enumerator's name/ Igama lalowo obalayo/obuza imibuzo	
Date/ Umhla	
Village Ilali	
Name of respondent/Igama lalowo uphendulayo	
Questionnaire reference number/ Inombolo yencwadana yoqulunqo mibuzo	
GPS Coordinates/Isalathisi se GPS	1)North/ePhuma
	2)South/eNthsona

DEMOGRAPHIC INFORMATION A. IINKCUKACHA EZIPHELELEYO ZOMNTU NGAMNYE

A1. Household composition and characteristics

A1. Umzi ngamnye kwakunye neempawu zawo

Name of Head of Household/Igama lentloko yekhaya:

	Name Igama	Relation to head Ngokuphathe lene nentloko yekhaya	Age DoB Umhla wokuza lwa	Gender Isini	Marital st. Utshatile ?	Education Imfundo	Employ Status Uyasebenza?	Occupation Yintoni umsebenzi wakho?	Place of Employ Indawo yengqesho?	Where now Uphi ngoku?	When Last home Ugqibele nini ekhaya?
A1.1											
A1.2											
A1.3											
A1.4											
A1.5											
A1.6											
A1.7											
A1.8											

B. LAND AND AGRICULTURE/ UMHLABA NEZOLIMO

B1 Does this household have its own residential site?

Yes = 1 No = 2

B1 Ngaba le ndlu ikwisiza sayo ?

Ewe = 1 Hayi = 2

B2 How did you obtain this site? Did you buy it, or inherit it, or lease it?

B2 Uyifumeme njani indlela yokusebenzisa le siza? Wa thenga le siza.? Okanye, wafumana le siza njengelifa? Okanye uyaxesha le siza?

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B3 What is the size of your residential site?

B3 Ungakanani umlinganiselo wesiza sakho?

Pace out the size of the site Paces by Paces

(Also accept local size estimation)

(Yamkela uqikelelo lomlinganiselo wale ndawo)

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B4 Do you have a garden on your residential site?

(Yes = 1 No = 2)

B4 Unesitiya kwisiza sakho?

(Ewe = 1 Hayi = 2)

B5 What is its size?

B5 Uthini umlinganiselo waso isitiya?

Pace out the size of the gardenPaces by

Paces

(also accept local size)

(Yamkela uqikelelo lomlinganiselo wale ndawo)

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B6 Do you grow crops or vegetables in your garden?

(Yes =1 No = 2)

B6 Ukhulisa izityalo okanye imifuno kwisitiya sakho?

(Ewe = 1 Hayi = 2)

B7 What crops have you grown in your garden in the last year (2011)?

B7 Walima ntoni kule gadi yakho lo nyaka ophelileyo (2011)?

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B8 Do you have access to an arable field (on your site)?

Yes =1 No = 2

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B8 Unayo intsimi apha kwa siza sakho ?

Ewe = 1 Hayi = 2

B9 What is the size of the field?

B9 Ungakanani umlinganiselo le intsimi?

Pace out the size of the fieldPaces byPaces

(also accept local size estimation)

(sebenzisa uqikelelo olusetyenziswayo apha ekuhlaleni)

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B10 Did you cultivate all or only part of this field last year?

All = 1; Part = 2; None = 3

B10 Uwalime yonke intsimi yakho kunyaka ophelileyo okanye ulime iindawo ezithile?

Yonke = 1; Iindawo ezithile = 2; Khang ndilime = 3

B 11 If Part or None, why was this the case?

B 11 Ukuba ulime iindawo ezithile okanye khang ulime, besiyintoni isizathu?

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B 12 How did you obtain access to your field?

B12 Uyifumene njani indlela yokusebenzisa la masimi?

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B13 What crops did you grow on your field in 2011?

B13 Walima ntoni kule ntsimi yakho lo nyaka opheliliyo

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B14 Is there anyone in your household with training in agriculture?

B14 Ukhona umntu apha ekhayeni lakho oqeqeshelwe ezolimo?

Ewe = 1 Hayi = 2.

Yes = 1 No = 2.

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B15 Do you have access to another field here in Hamburg? Please explain.

B 15 Ungasebenzisa intsimi enye apah eHamburg? Ucacise.

Ewe = 1 Hayi = 2.

Yes = 1 No = 2.

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B16 Do you have any fruit trees on your land?

B16 Unayo imithi yeziqhamo kumhlaba wakho?

Ewe = 1 Hayi = 2.

Yes = 1 No = 2.

B17 How many trees do you have?

B17 Mingaphi imithi onayo?

B18 What kinds of trees do you have?

B18 Loluphi uhlobo lwemithi onayo?

B 19 Do you preserve vegetables and fruit?

Yes = 1 No = 2

B 19 Uyayigcina imifuno neziqhamo?

Ewe =1 Hayi = 2

B 20 If yes, what methods of preservation do you use? (Specify)

B 20 Ukuba uyayigcina, usebenzisa eziphi iindlela zokuyigcina? (Cacisa)

C) LAND AND LIVESTOCK/UMHLABA NEZEMFUYO

C1 Which of the following livestock do you keep? Please indicate numbers involved.

C1 Kule mifuyo ilandelayo? Ngeyiphi oyifuyileyo?

TYPE Uhlobo	Number owned /Inani lemfuyo yakho
Chickens/ Iinkuku	
Pigs/ Iihagu	
Sheep/ Iigusha	
Goats/ Iibhokwe	
Cattle/Iinkomo	

C2 Are there any challenges hindering livestock production?

C2 Ikhona imingeni ephazamisa imveliso kwakunye nemfuyo?

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D) SOURCES OF CASH INCOME/IINDAWO APHO IMALI IVELA KHONA

Source Indawo evela kuyo imali	When Last Received ? Ifunyenwe nini?	Amount? Ibiyimalini?	When Before That? Ubuyifumene nini phambi koku?	Amount? Ibiyimalini?
Remittances (Cash) Imali oyithunyelwayo				
Remittances (Kind) Uhlobo lwezinto ozithunyelelwayo				
Child support from parents outside household Inkxaso- mali evela kubazali xa ungahlali nabo				

Salaries & Wages Umvuzo				
Overtime Imali yexesha elongezelelweyo				
Bonuses Imali yombulelo				
Pensions Imali yenkam-nkam				
Disability grant Isibonelelo sokukhubazeka				
Child support grant Imali yesibonelelo sabantwana				
Other grants Ezinye izibonelelo				
Other income – e.g. payment of accounts Enye imali engenayo – umzekelo: ukubhatalelwa iiakhawunti				

OTHER SOURCES OF INCOME/Ezinye iindlela zokufumana imali

Source Apho ivela khona	When Last Received ? Ugqibele nini ukuyifumana?	Amount? Yimalini?	When Before That? Ubugqibele nini ukuyifumana phambi koku?	Amount? Yimalini?
Hawking Ukuthengisa esitalatweni				
Spaza shop Ukuthengisa evenkileni				
Other trade Olunye uhlobo lokuthengisa				
Agriculture: Crops Ezolimo/nemfuyo: Ukulima izityalo				
Agriculture: Animals				

Ezolimo/nemfuyo: Imfuyo				
Casual Jobs Imisebenzi engesosigxina				
Other sources of income/Ezinye iindlela zokufumana imali				

E) EXPENDITURE/ INDLELA YOKUSEBENZISA IMALI

E1) Starting with the most expensive items, what are the main sources of expenditure in your household?

E1) Qala ngeyexabiso eliphezulu kakhulu, zeziphi ezona zinto zibiza ixabiso eliphakamileyo ekhayeni lakho?

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F) LOCAL SOURCES OF FOOD /Iindawo zokufumana ukutya apha ekuhloleni

F1) What crops did you actually eat from your field and garden in 2011??

F1) Sesiphi isivuno esisuka emasimini akho oye wasitya e 2011?

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F2) Did your animals provide you with any food or money last year (2011)? Please explain.

F2) Ngaba imfuyo yakho iye yakwenzela imali okanye yakunika ukutya kulo nyaka uphelileyo? Ucacise.

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F3) Did you obtain any food from fishing last year? (2011) Please explain.

F3) Ukhe wafumana ukutya ekulobeni kwakho kulo nyaka uphelileyo? Ucacise.

F4) What kind of fish did you eat last year?

F4) Hlobo luni lweentlanzi oye walutya kulo nyaka uphelileyo?

F5) Did you obtain any money from fishing last Year? How much?

F5) Ukhe wafumana imali ekulobeni kwakho kulo nyaka nakulo uphelileyo? Ufumene malini?

Type (uhlobo)	Quantity (inani)	Value (ixabiso)

**G) PATTERNS OF FOOD CONSUMPTION and FOOD SECURITY/ IINDLELA
ZOKUTYA KWAKUNYE NOKHUSELEKO EKUTYENI**

G1) What are the main kinds of food that you/your family eat?

G1) Wena nosapho lwakho nitya oluphi uhlobo lokutya?

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G2) Which of these do you produce yourself?

G2) Kolu hlobo lokutya kokuphi okuyimveliso yakho?

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G3) Which of these do you purchase?

G3) Kokuphi ukutya okuthengayo?

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G4) Do you get any of your food anywhere else? e.g. from the river or the sea or the forest?
Please explain.

G4) Ufumana ukutya emlanjeni okanye elwandle, okanye ehlatini? Ucacise.

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G5) Which kinds of food do you eat most often?

G5) Kokuphi ukutya okutya kakhulu, phantse yonke imihla?

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G6) Does your household have enough food to eat? Yes=1 No=2 .

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If NOT, please could you tell us in what ways you do not have enough food to eat?
E.g. is it the amount of food, or the kind of food that is not enough, or that sometimes there is food and sometimes there is not?

G6) Ngaba umzi wakho unako ngokwaneleyo ukutya? Ewe = 1 Hayi = 2

Ukuba akunjalo, nceda usixelele ukuba akwanelanga ngayiphi indlela? Umzekelo: Ngaba ukutya kuncinci, okanye uhlobo oluthile lokutya alonelanga, okanye ngamanye amaxesha kukhona ukutya ze ngamanye kungabikho?

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G7) Please specify the times when you experience food shortages, e.g.
1)all the time 2)before month end 3)certain seasons 4) other times-
specify

G7) Nceda uchaze amaxesha apho kuye kungabikho ngokwaneleyo ukutya. Umzekelo:
1) Ngalo lonke ixesha 2) phambi kokuba Inyanga iphele 3) ngamaxesha athile apha enyakeni 4) Ngamanye amaxesha - cacisa

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G8) How many times a day does your household eat meals?

1)one 2) two 3) three 4) it varies

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G8) Usapho lwakho lutya kangaphi ngemini 1) kanye 2) kabini 3) katathu 4)

kungxomekekile

G9) If your household has less than three meals a day, or it varies, why is this the case?

G9) Ukuba emzini wakho kutyiwa ngaphantsi kunesitathui ngosuku okanye nakangaphina ngosuku, yenziwa yintoni loo nto?

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H) ACCESS TO WATER/ UKUFUMANEKA KWAMANZI

H1) Where do you get water for drinking?

H1) Niwafumana phi amanzi okusela?

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H2) Is the water clean enough to drink? If not, what is the problem?

H2) Amanzi acoceke ngokwaneleyo ukulungiselela ukusela? Ukuba akunjalo, yintoni ingxaki?

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H3) Is the supply of water for drinking reliable? If not, please explain. Is it more reliable at certain times of the year?

H3) Ngaba ithembakele indawo eniwafumana kuyo amanzi? Ukuba akunjalo, nceda ucacise. Ngaba le ndawo niwafumana kuyo amanzi ithembakele ngamaxesha athile onyaka?

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H4) Where do you store water?

H4) Niwagcina phi amanzi?

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H5) Where do you get water for other purposes? E.g. washing

H5) Niwafumana phi amanzi okwenza ezinye izinto ezifana nokuhlamba?

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H6) Where do you get water for your livestock?

H6) Uwafumana phi amanzi okuseza imfuyo yakho?

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H7) Where do you get water for your a) garden b) fields

H7) Uwafumana phi amanzi okunkcenckeshela a) isitiya b) amasimi akho?

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H8) Have you noticed any changes in the availability, reliability, cleanliness of water over the last number of years? If so, what changes have you noticed?

H8) Ukhe waqaphela utshintsho kwindlela afumaneka ngayo, indlela asoloko efumaneka ngayo kwakunye nokucoceka kwawo amanzi? Ukuba kunjalo loluphi utshintsho oluqapheleyo?

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H9) Why do you think these changes have happened?

H9) Ucinga ukuba olu tshintsho lwenziwa yintoni?

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I) ENVIRONMENT AND CLIMATE: PERCEPTIONS OF CHANGE

I) FUMMANDLA KWAKUNYE NEMOZULU: OKURHANELWAYO MALUNGA NOTSHINTSHO

I. 1) Over the last number of years, have you noticed any important changes in the environment, like i) the vegetation or ii) the wild animals, or iii) the fish, or iv) the climate/weather ?

I.1) kwiminyaka eliqela edlulileyo, ukhe waqaphela utshintsho kummandla, ngokuphathelene
i) notyani, ii) amarhamncwa,okanye iii) iintlanzi okanye iv) imozulu?

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I. 2) What kinds of changes have you noticed?

I. 2) Uqaphela tshintsho luni?

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I.3) Why do you think we are seeing these changes?

I.3) Ucinga ukuba olu tshintsho lwenziwa yintoni?

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I.4) Have some plants, fishes, animals become scarcer or more abundant over the last number of years? If so, which ones? Why do you think this has happened?

I.4) Ngaba izityalo, iintlanzi, kwakunye nezilwanyana ziye zinqaba okanye zanda kule minyaka idlulileyo? Ukuba kunjalo zeziphi ezo zinqabileyo? Ucinga ukuba oku kwenziwa yintoni?

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