AN INVESTIGATION OF THE INFORMAL MARKET VALUE CHAIN FOR PRICKLY PEAR (*Opuntia ficus-indica*) IN NELSON MANDELA BAY, EASTERN CAPE.

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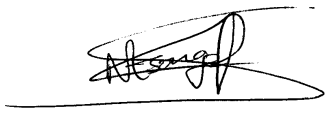
Declaration

I, Sinazo Ntsonge, declare that this is my original work and that it has not been submitted to another higher education institution other than Rhodes University. Ideas taken from other authors have been referenced and their names cited in acknowledgement of their contribution to this research project.



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ABSTRACT

The use of alien plant species as part of the livelihood resources of poor people raises conflicts with national legislation, which views these plants as threats to native plant biodiversity. However, there is also increasing body of literature on the contribution that some of these plants make to the livelihoods of poor people. The level of significance of some alien plant species to livelihoods is mostly highlighted in the case of female market participants who are in a position of household headship. Since most African cultures dictate the role of females as solely being that of homemaker while males are assigned the role household headship and breadwinner, women often find themselves having to shoulder the household responsibilities when the household head is no longer there. This was the case in the Nelson Mandela Bay informal prickly pear market that this study sought to investigate. Even though there were also male participants in the prickly pear market, the majority of participants in the market were female who also mentioned they were the sole breadwinner for their households.

This study investigated the economic contribution that the prickly pear (*Opuntia ficus-indica*) informal market makes to the livelihoods of people living in the Nelson Mandela Bay. The significance of the market's contribution to their livelihoods was examined through using the Sustainable Livelihoods Framework. The study revealed that although the prickly pear income was largely supplementary due to it being available for only three months of the year, the income was a safety net resource for the market participants who had limited access to other sources of income. The results also highlighted the reasons people were engaging in the informal prickly pear market. The main reason that was mentioned was unemployment. Through a livelihoods analysis using the Sustainable Livelihoods Framework, it was revealed that the other factors that were contributing to their unemployment were low levels of education, low levels of marketable skills, and old age. The study revealed through calculations of the estimated economic value of each market activity the potential of the prickly pear to be used as a poverty fighting tool. Although the results of this study only highlight the economic value of the prickly pear to people in a small area compared to the rest of the province and the country, the informal market's significance still presents a strong case for the establishment of an agroprocessing industry, which would support the production of value-added products. Since the largest populations of the prickly pear in Uitenhage are currently under effective control by the cochineal species, promotion of its economic value instead of eradicating it without considering its value to the livelihoods of the people in the market could also ensure that its populations are kept under control. Job creation in the agroprocessing industry would not only improve the livelihoods of those involved in the market, but would also feed into the national economy instead of taking from it via the costs incurred during clearing.

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1.1. Context of the Study

The livelihood benefits of invasive alien plants are often overshadowed by their negative impacts on the environment. The negative impacts of alien plants are often more severe in areas where people depend on subsistence farming as the main source of household income (Admasu, 2008). In such cases, invasion by exotic plants can directly affect the productivity of agricultural land through reducing its grazing potential and taking up land space that could be used for planting crops (Chenje and Mohamed-Katerere, 2006; Admasu, 2008). Some indirect ways by which alien plants affect local livelihoods is through their ability to replace native plant species that are useful locally for commercial and non-market uses. In the case of the prickly pear, its negative impacts include its ability to form dense canopies in the areas it invades, which makes it difficult for livestock to graze and the thorns pose as a health risk to livestock which consume the prickly pear fruit (Beinart and Wotshela, 2011; Ferrell and Sellers, 2011).

The economic benefits of the prickly pear are mainly from selling the fruit to supplement household income during the period of the prickly pear fruiting season which is usually begins in January and ends in March (Beinart and Wotshela, 2003; Paumgarten, 2005; Shackleton *et al*., 2007; Shackleton *et al*., 2011). The non-economic uses of the *Opuntia ficus-indica* include medicinal uses to treat hypertension, asthma, diabetes, burn wounds, and various sexually transmitted diseases (Semenya *et al*., 2012; Osuna-Martinez, 2014). Beinart and Wotshela (2003) documented the different products that can be made from different parts of the prickly pear tree including the fruit and these involved making prickly pear jam, syrup, bath soap, blood purifying medicine, and the brewing of prickly pear wine which was locally known as *iqhilika* (Beinart and Wotshela, 2003). However, the processing of the prickly pear to make commercial products has declined and this is attributed to the labour time involved in making the products as well as the availability of substitutes that can be bought from the store (Beinart and Wotshela, 2003). Presently, the use of the prickly pear is almost exclusively limited to selling the fruit (Shackleton *et al.*, 2011).

As an alien plant which was estimated to have invaded nearly 900 000 hectares in the 1930s in the Eastern Cape alone. The prickly pear is listed as a category 1b invader in the National Environmental Management Biodiversity Act No. 10 of 2004 (Government Gazette, 2004; Annecke and Moran, 1978). As a category 1b

invader, the prickly pear cannot be traded except for the fruit, but only if it is used for human consumption (Henderson, 2001; Government Gazette, 2004). In cases of severe invasions, the legislation specifies strict control of the prickly pear or for its complete removal and destruction to protect native species biodiversity (Government Gazette, 2004; Henderson, 2001). To carry out the mandate of the national environmental legislation, the Working for Water (WfW) programme was instituted in 1995 as a way to control and clear alien invasive plants while also providing temporary employment to poor people in the communities where the programme operates (DWAF, 2009). The programme employs strategies which are appropriate to each stage of alien plant invasions, namely; prevention, controlling, eradicating and monitoring all species which are known to have a high invasive potential (Poona, 2008; Government Gazette, 2004). The government public works initiative aspect of the programme created an aggregate of 32 000 jobs for people in rural and other low-income (Marais, 2009). The job creation aspect of the programme is meant to reflect the demographic reality of poverty, which is often concentrated in rural areas, especially those in the Eastern Cape, KwaZulu-Natal and Northern Cape where poverty is most widespread (IOL News, 2000). Therefore, in addition to considering priority areas for clearing, WfW also aims to target poverty (Marais, 2009; DWAF, 2009). Although the economic costs of clearing alien invasive plants can be high, through the value-added furniture manufacturing initiative, the programme is able to plough back into the national economy as some woody alien species that are cleared are used to make furniture (DWAF, 2009).

Although employing people in low-income areas on the WfW programme contributes to livelihoods, there is often little consideration of the economic and non-market benefits that local people may be deriving from the species being eradicated through Working for Water. This knowledge gap regarding these trade-offs, specifically in the case of the prickly pear, has been addressed by a number of authors focusing on the economic benefits derived from selling the fruit of the *Opuntia ficus-indica* species (McGarry *et al*., 2005; Shackleton *et al*., 2007; Beinart and Wotshela, 2011; Shackleton *et al*., 2011). The livelihood benefits that resonated throughout studies conducted in the Eastern Cape. The prickly pear's contribution to livelihoods were that due to the fruiting season beginning at the same time as the start of the new school year, the income was mainly used to cover school-related expenses such as the payment of school fees and buying school uniforms (Beinart and Wotshela, 2003; Shackleton *et al*., 2011). The informal prickly pear market income's contribution was stated as largely supplementary since it was only available for the three months of the prickly pear fruit season from January to March (Beinart and Wotshela, 2003; Shackleton *et al*., 2007; Shackleton *et al*., 2011).

However, of the studies that have been done in the Eastern Cape on the economic contribution of the prickly pears to local livelihoods, the focus has been on economic benefits only to sellers of the wild fruit

in local informal markets. Therefore, this study aimed to investigate if there were other people involved in the market, and if so, what their duties were in the Nelson Mandela Bay (NMB) informal prickly pear market. Moreover, this study aimed to investigate how much income was made by each participant in their respective market activities as well as the prickly pear's contribution to the household incomes relative to other household sources of income. The NMB was chosen because Uitenhage, which is the host town of the annual prickly pear festival and where majority of the prickly pears grow in the Eastern Cape, is housed within the municipality.

By studying the informal prickly pear market, this research intended to discover other people that may be involved in the market, the market activities that they each perform, and how they each make their incomes in the market. To understand the socio-economic circumstances of the people involved in the informal prickly pear market, the Sustainable Livelihoods Framework (SLF) will be used to assess the livelihoods of the market actors in terms of the asset endowments that they have at their disposal. This will shine a light on the level of importance of the prickly pear's contribution to their households' livelihood portfolios.

1.2 Problem Statement

The use of invasive alien plants to supplement household income is important especially in the context of food insecurity in most developing countries in sub-Saharan Africa. On the other hand, the responsibility of the government to ensure that native plant ecosystems remain intact to ensure the uncompromised delivery of ecosystem goods and services is also crucial. However, policymakers tend to get swayed towards supporting the eradication of the species without much consideration for how some invasive alien plants might be contributing to the livelihoods of low income households. Therefore, highlighting the scale of the informal prickly pear market's contribution to livelihoods in Nelson Mandela Bay could reveal the trade-offs that arise at the local level when pro-eradication national environmental legislations are passed. At the same time, studying the dynamics of the informal prickly pear market will reveal some obstacles in the market chain which through the appropriate interventions, could improve the informal prickly pear market participants' earning potential. The purpose for researching this topic is to contribute to the already existing literature on the economic value of the prickly pear to livelihoods, with the aim of contributing to policy decisions regarding current strategies on dealing with invasive alien plants. Moreover, comparing the gross income from the informal prickly pear market to other household income

sources over the period when it is available will give an idea of the prickly pear's potential as a poverty-fighting tool.

1.3 Aim and objectives

1.3.1 Aim

The final overarching question that this study will seek to answer is:

- How significant is the informal prickly pear market income to the livelihoods of market actors in the Nelson Mandela Bay?

1.3.2 Objectives

This study sought to meet the following objectives:

- To identify the people involved in the Nelson Mandela Bay informal prickly pear market and compile socio-economic profiles of their households
- To assess the market value chain of the prickly pear in this context
- To identify the marketers' reasons for engaging in the Nelson Mandela Bay informal prickly pear market
- To assess the informal prickly pear market income's importance to the household livelihood portfolios of the informal market actors
- To identify some of the market opportunities and challenges met by the Nelson Mandela Bay prickly pear marketers

1.4 Structure of the Thesis

This research is divided into five different chapters and the contents of each one is outlined below:

This chapter (Chapter one) introduces the study, situates it within already existing literature on the topic, and provides the study and the study rationale. This chapter also presents the aim and objectives of this study and the outline of the thesis structure.

Chapter 2 surveys the literature on the livelihood contributions of various exotic plant species. Literature outlining the reasons many people are depended on wild plants, including those that are invasive, to sustain their livelihoods is presented, and specifically highlighting features that link with the sustainable livelihoods framework. The chapter also discusses literature related to agricultural market value chains.

Chapter 3 is a description of how this research was carried out. A description of the Nelson Mandela Bay, the study area is indicated with a map showing the areas within the municipal borders where this study was conducted. The chapter also gives the steps to conducting a livelihoods analysis using the steps outlined in the sustainable livelihoods framework. The chosen method of sampling is introduced as well as the methods used in data collection and analysis. The possible limitations of the study are also presented.

Chapter 4 presents the findings of the study. Summary statistical analysis is used to give an outline of the socio-economic profiles of the prickly pear marketers and their households. The asset pentagon, which is the main feature of the sustainable livelihoods framework, is used to display the livelihood assets of the marketers' households and how access to each of the assets is influenced by socio-economic factors at the individual and household level. The chapter also presents a diagram of the Nelson Mandela Bay informal prickly pear market.

Chapter 5 gives a summary of the previous chapters, the conclusions reached in the study, and the policy recommendations.

CHAPTER 2

The socioeconomic benefits of harvested wild plant resources

2.1 Introduction

The informal economy is a term that refers to the informal sector activities, which are often small-scale in nature, self-financed, and largely feature labour intensive economic activities (Pratap and Quintin, 2006). Some of the activities that are often observed in informal markets include street trading of medicinal plants and other items like fruit and vegetables, roadside shoe repair stalls, selling cooked food from makeshift kiosks especially by taxi ranks, domestic work around the neighbourhood, and offering transport services via own transport means such as pedal power and carts (Makhetha, 2010; Blades *et al*., 2011; Ricochet News, 2015). Street markets for harvested wild plants range from sales of wild fruits, edible tubers, seeds, leaves, and plant roots which are used for a variety of purposes by individuals and households (Clements, 1998; Dold and Cocks, 2000; Kepe, 2007).

Until recently, research on the use of plant resources by poor people for livelihood sustenance has often focused on strategies that would ensure sustainability in harvesting, the commercialization and marketing of wild plants for pharmaceutics, and biodiversity conservation (Paumgarten, 2005; Stoian, 2005; Shackleton, 2009). Most of these studies often fail to balance these priorities with the contribution that wild plants make to poor people's livelihoods at the local level. This is more so the case when considering the livelihood contribution of alien invasive plants. This means that the positive livelihood contribution of most invasive alien plants remains inadequately documented, making their total socio-economic value relatively smaller when compared to that of more mainstream crops (Giuliani and Padulosi, 2005; Davenport *et al*., 2011; Uprety *et al*., 2012; Petersen, 2014).

Various species of plants have become interwoven into people's livelihood strategies including alien plant species whose exotic status local people may not be aware of (Clements, 1998; Campbell and Luckert, 2002; Shackleton *et al*., 2007). The harvesting of plants from their habitats where they grow naturally without human intervention is a practice that dates back to the days of hunter-gatherer societies during which wild plants were the main source of food for these types of societies (Bird-David, 1990; Bharucha and Pretty, 2010). Hunter-gatherer societies were known to be highly adaptive to their surrounding environments and were heavily reliant on wild plants to sustain their livelihoods (Bharucha and Pretty, 2010). Today, some of the plants that

they discovered are still being used by modern society for household consumption and as 'at home' natural remedies, while some have been commercialized by pharmaceutical companies to incorporate into cosmetics and over-the-counter medicine (Clements, 1998; Niemer, 2017).

It is more than likely that some of the plants that were harvested by the khoi khoi were exotic as evidenced by Van Wyk *et al*.'s (2008) list of medicinal plants that were popular amongst early Khoi-san people and the Cape Dutch colonists in Graaff-Reinet and Murrayburg. Of the 88 plant species that were documented, 14 were non-indigenous to South Africa (Van Wyk *et al*., 2008). The non-discrimination between native and exotic plant species shows the lack of knowledge by users of the species of the national status of these plants as alien invasive plants as well as the adaptability and dynamic nature of the African traditional healing system (Dold and Cocks, 2000; Van Wyk *et al*., 2008). Moreover, the widespread use of alien plants alongside native plant species varieties could be taken as evidence of their potential to contribute positively to livelihoods.

2.2 The modern day 'foragers': the survivalist and safety net role of wild plant resources

In the past, the proliferation of industrialized societies both in developing and developed countries was often taken as evidence of a society's progression from dependence on the natural environment, to more civilized ways of making a living. However, evidence from various studies depicts a new generation of foragers – ones who are forced by socio-economic circumstances to rely, to a greater or lesser degree, on natural resources for livelihood sustenance (Campbell and Luckert, 2002; Giuliani and Padulosi, 2005; Bharucha and Pretty, 2010, Feyssa *et al*., 2011; Davenport *et al*., 2011; Petersen, 2014).

'Urban foraging' is the process of collecting wild edible plants from the local environment either as a means of survival or for recreational purposes (Campbell and Luckert, 2002). The information on which plant species to pick is usually rooted in people's cultural and traditional practices, where the knowledge about the uses of each species is passed down verbally from one generation to the next (Uprety *et al*., 2012; Bhat, 2013; Petersen, 2014; Badimo *et al*., 2015). Due to the lack of formal documentation of the plants' benefits to the users, their social and economic value remains under researched. However, since the adoption of the Millennium Development Goals in 2000, poverty alleviation and improving food security of poor and marginalized members of society has since been the goal of human development agents (UN Millennium Declaration, 2000). Along with this came efforts to understand poor people's livelihood strategies with the aim of finding ways to harness the potential of wild plants as a viable livelihood resource (Sustainable Livelihood Foundation, 2015). In support of this idea to promote the use

of wild plants for livelihood sustenance, studies have been conducted to understand the economic contribution that such plants make to household income (Shackleton *et al*., 2008; Shackleton, 2009; Petersen, 2014).

Although wild plants can be used for a variety of purposes including medicinal and aesthetic purposes, their economic benefit as an income-earning source is often touted as the most significant contribution to poor people's livelihoods since it provides trading households with disposable income, which they can use to purchase other household needs (Shackleton *et al*., 2008; Banjade and Paudel, 2008; Davenport*, et al*., 2011). However, this economic approach to understanding livelihoods has been a point of contention amongst researchers in the field of livelihoods analysis as many argue that there is more to the term 'livelihood' than just cash income (Sen, 1999; Gasper, 2002; Clark, 2005; Paumgarten, 2007).

2.2.1 The role of conflict species in the livelihoods of local communities

Conflict species are described as alien plant species that yield socio-economic benefits to humans despite their potential to pose threats to native biodiversity when they naturalize and subsequently become invasive and disrupt ecosystem processes (Dickie *et al*., 2014). Management conflicts raised by this category of alien species are because their management requires an unbiased analysis of their costs and benefits to ensure optimal outcomes for all stakeholders involved – both national government and the local communities that benefit from the species (FAO, 2009; Dickie *et al*., 2014). However, due to their negative impacts, which often seem to outweigh their benefits, the management efforts often lean more towards their eradication (Annecke and Moran, 1978; Dogra *et al*., 2010).

To understand fully the negative effects of alien plant invasions in a particular environment, it is important to recognize the local socio-economic, cultural, and political context of an area and the extent of the conflict they raise in biodiversity conservation and with other human activities such as farming (Young *et al*., 2010). In addition to this, any benefits that local people derive from the species also need to be accounted for to ensure that management methods are context-specific and account for both the negative and positive impacts of the species in that area (Shackleton *et al*., 2011). However, despite their negative environmental impacts seemingly outweighing any positive impacts that they may have on livelihoods, the evidence in literature on their positive contribution to livelihoods has helped revive interest in terms of how the government could steer legislation towards supporting the continued use of these plants to supplement the livelihoods of the poor (Dold and Cocks, 2000; Rogerson, 1996). In some cases, government intervention in the informal market economy has been motivated by the steady

growth of the informal sector over the years in light of rising levels of unemployment in many developing countries, where a trend has been observed where a large informal sector is correlated with persistently high levels of unemployment (Boughzala and Kouki, 2003). In light of this, informal markets for harvested wild products, both indigenous and exotic varieties, have served as a safety net against deeper levels of poverty (Paumgarten, 2007; Shackleton, 2009; Shackleton and Shackleton, 2011).

The safety net function of a natural resource is often observed during times of shocks or stress where it is used as a means to prevent those affected from falling into deeper levels of poverty (Shackleton and Shackleton, 2011). Shackleton and Shackleton (2011) gave three instances by which wild plant resources can function as a safety net. The first is when a household starts utilizing a resource that it did not use in the past in place of purchased commodities or other resources that it can no longer access due to economic shocks or stress. The second case is the increase in the consumption of a natural resource that was already part of the household's livelihood portfolio to make up for the loss of store-bought goods that the natural resource was used in conjunction with. The third instance is the temporary uptake of street trading in natural resources during times of economic stress such as unemployment.

As a safety net resource alongside native wild plants, Paumgarten (2005) states that conflicts may arise in cases where national environmental legislations restrict access to a particular class of alien plants. In the case of exotic plants that are listed in the National Environmental Management Biodiversity Act No. 10 of 2004 (NEMBA), access depends on the level of restrictions that are placed on each species. For instance, the listing of the prickly pear (*Opuntia ficus-indica*) as a Category 1b invader prohibits it from being planted and cultivated in one's yard as a cash crop (Government Gazette, 2004). Despite the implications of the legislation, local communities have continued to harvest the fruits of the prickly pear from places where it is found, and selling it in local street markets, which are usually found located by the side of the road (Shackleton *et al*., 2007; Beinart and Wotshela, 2011; Shackleton *et al*., 2011).

According to Kepe (2007), the level of reliance on a plant species often depends on the species' importance to medicinal uses or otherwise, its availability in the surrounding environment, the popularity of its attributes within the community, and its price. This was illustrated in the case of medicinal plant use in Khanyayo Village where plants that were of high importance were usually scarce because of overexploitation, or a species held a place of importance in people's livelihoods because of its abundance, meaning that local people had found a way to utilize the species simply due to its abundance (Kepe, 2007). This was also the case in Shackleton *et al*. (2007), where one of the pathways by which alien plants become integrated into livelihoods included the scenario where a species does not necessarily have any superior

qualities compared to other plant species to inspire a diversion from using native plant resources but is only used because it is already available in the surrounding environment. As one of the species that were discussed by Shackleton *et al*. (2007), this also applied to the prickly pear. Other pathways that were discussed in the Shackleton *et al*. (2007) study included the introduction of an alien plant into an area with known uses for it from the very outset.

This also applies not only to the *Opuntia ficus-indica* but also to many other exotic plant species which had been introduced into South Africa intentionally either as ornamental plants, for animal fodder, for hedging of homesteads, for commercial use, or for medicinal purposes (Beinart and Wotshela, 2003; Shackleton *et al*., 2015; SANBI, 2017).

However, although some invasive alien plants may be yielding benefits to poor communities, there are private and social costs associated with invasions on private lands. In production terms, private costs are the costs borne by the producer, which include the costs of labour, machinery and transportation of the product, while social costs consider the ramifications of the production process in the wider societal context (PMT Education, n.d.). Producers, sometimes, do not account for the externalities that arise from their production activities and this necessitates the existence of institutions that will hold them accountable. In many cases, government, through targeted policies, intervenes to mitigate the effects of externalities (Saez, 2007). In the case of invasive alien plants being used as livelihood resources, the informal sellers of the plant products could be viewed as the producers since they are the ones who derive economic benefits from the species, although they are not directly responsible for the presence of the species in the area. In informal markets for wild harvested plants, the only costs accounted for by the sellers are costs of hiring someone to harvest, transport costs, buying lunch, and the costs of plastic bags used to package the plant products (Shackleton *et al*., 2007; Kepe, 2007; Shackleton *et al*., 2011). Costs related to reduced land productivity due to invasions by alien plants and loss of aesthetic appeal of some natural areas are not accounted for because in social contexts where the gap between the affluent and poor is glaringly wide. This is because priorities differ as one side views environmental resources as something to be preserved while the other side, in a bid to survive under harsh socio-economic circumstances, views it as a resource from which they can derive economic benefits (Petersen, 2014).

In terms of private and social benefits, the income earned from selling harvested wild plants serves as the private benefit. Since externalities, whether positive or negative, are usually larger than the private cost or benefit which set them in motion, the social benefits of informal markets for harvested wild plant

products are seen in the way the incomes are used to enhance the human capital of children of trading households by financing the payment of school fees and buying uniforms (Shackleton *et al*., 2007; Shackleton *et al*., 2011). Moreover, being able to earn an income through non-criminal means is also a social benefit. Although in some cases the incomes earned from selling wild plant products are usually not enough to cover all household expenses, the two expenditures mentioned have a much larger contribution than the cash income amounts themselves.

The following section discusses in more detail the different ways by which wild plants have been incorporated into the livelihoods of poor communities. The section also provides some historical references of medicinal plant use as well as how these uses have been adapted by different cultures.

2.3 The types of benefits derived by local people from wild plants

Many ethnobotanical studies reveal how humans have used wild plants for centuries to treat various ailments and as a food source (Clements, 1998; Shackleton, 2009; Feyssa, *et al*., 2011; Shackleton and Shackleton, 2011; Bhat, 2013; Van Andel, 2016). Ethnobotany "is the science of people's interactions with plants over time and space including uses, knowledge, beliefs, management, and classification systems of both modern and traditional societies" (Van Andel, 2016: 1). In the same way that different species of plants occur in different areas, their uses for shelter, food, medicine, and for cultural and traditional needs also varies by region according to the species of plants that are present in that region (Turner, 2014; Dold and Cocks, 2000). To preserve this knowledge and thus be able pass it on to next generations, the species are often given vernacular names which are often derived from their perceived use, taste or appearance (Beinart and Wotshela, 2012; Bhat, 2013; Tibuhwa, 2013). For example, *iNtelezi*, a popular mixture of various medicinal herbs used by the Xhosa people, derives its name from the Xhosa word '*ukutheleza'* which means 'slipperiness', denoting the user's ability to 'slip' out of trouble when they use the medicine (Dold and Cocks, 2000). This naming system, or folk taxonomy, is the people's way of signifying the species' importance to them and the names are unique to each group of medicinal plant (Tibuhwa, 2013). As such, the knowledge becomes an extension of the people and can be used as the key to understand their livelihood strategies and customs. For instance, the diet of hunter-gatherers who were the pioneers of the plant-based food regime, can be understood through studying and observing modern day hunter-gatherer societies such as those found in the Kalahari Desert (the San), the Mbuti tribes of the Ituri Forest in central Africa or the Copper Inuit of the Arctic (Ember, 2014). Alternatively, records of ethnographic

research on the livelihood strategies of early hunter-gatherer societies could be consulted to see if the same plant species are still being used and to what extent compared to when they were first discovered.

Perhaps a notable example of the preservation of cultural knowledge related to plant use in medicine is the discovery of the Kahun Gynaecological Papyrus found in El-Lahun, Egypt (Van Andel, 2016). The scroll, which is touted as the oldest medical scroll in human history and estimated to have been written in 1800 BCE, provided the blueprint for the treatment of women's health conditions (Loundou, 2008; Smith, 2011; Van Andel, 2016). To give credence to the writings in the scroll, numerous paleoecological, archaeobotanical, and molecular/genetic data have emerged as evidence of plants that existed in the past and correlations are drawn between this evidence and ethnographic studies to study their various uses and whether some eventually became domesticated during the advent of agriculture in the Fertile Crescent (Brown *et al*., 2009; Dickau, 2010; Piperno, 2011).

In South Africa, the main use of wild harvested plants is mainly for medicinal purposes (Mander *et al*., 2007; Loundou, 2008; Truter, 2013; Van Andel, 2016). The South African medicinal plant trade is estimated to be worth R2.9 billion per annum, making it the dominant industry in rural areas in terms of also the number of people that it employs, which is estimated to be around 133 000, with rural women making up the majority (Mander *et al*., 2007).

However, despite the current size of the medicinal plant market, the supply of some popular plant species has been steadily declining while demand has increased (Mander, 1998; Mander *et al*., 2007; DWAF, 2005). In Cape Town, renewed interest on Khoisan medicinal practices and the reappearance of Rastafari philosophy from the late 1970s – early 1980s period meant that the number of medicinal plant traders increased by at least 1000 Rasta bush traders (Petersen, 2014; Sustainable Livelihoods Foundation, 2015). Another factor that has been blamed for the accelerating increase in the harvesting of Fynbos biome plant species is the increase in informal settlements as a result of people migrating from rural to urban areas in search of employment opportunities (Sustainable Livelihoods Foundation, 2015). The migrants, majority of whom were found to have come from the Eastern Cape, also had their own knowledge of traditional and cultural uses of some Fynbos plants and this contributed to the increasing demand for medicinal plant species (Sustainable Livelihoods Foundation, 2015).

The Sustainable Livelihoods Foundation (2015) reported that 71 of the 252 plant species types that were harvested daily in Cape Town were on the IUCN (International Union for Conservation of Nature) Red List,

a status that strengthens the national argument for the protection of native biodiversity against unsustainable harvesting practices. Therefore, the increased presence of Rastafari herbalists and other traditional healers has meant that the harvesting of wild plants became a real incremental threat to the Fynbos plant biodiversity (Sustainable Livelihoods Foundation, 2015).

As evidenced by the size of the medicinal plant market in South Africa, the use of wild plants in medical practice is much more pronounced in developing countries where access to basic modern healthcare is often inadequate therefore people turn to traditional medicines to cure various ailments ranging from minor to life-threatening (Bodeker, 1997; Nzue, 2009). Some examples of sicknesses which are treated using medicinal plants include treating respiratory infections such as colds and influenza, as a diuretic, for hypertension, eczema, to prevent sunburn, arthritis, stomach problems, blood cleansing, and many other common diseases and infections (Truter, 2007; Loundou, 2008; Van Andel, 2016).

The cultural importance of the prickly pear was discussed in Shackleton *et al*. (2007) where some respondents stated that prickly pear stands that were near bodies of water were sacred as they made them feel connected to their ancestors.

Saenz *et al.* (2003) documented the use of the prickly pear as a food source in Mexico, mainly the agroprocessing of fruits and leaves of the prickly pear to make differentiated products that were sold commercially. Some of the food products that were made included canned *nopalitos* or young stems of the prickly pear, cactus fruit jam, cactus pear fruit juice, and cactus pear dried fruit. These were similar to the products that were reported by Beinart and Wotshela (2003) in a case study of the uses of the prickly pear in the Eastern Cape dating back to the 1960s. The products mentioned by Beinart and Wotshela (2003) included bath soap, syrup, jam, and wine.

Although the household production of these products was contributing significantly more to household income, the availability of cash incomes through remittances allowed people to substitute the prickly pear products with store-bought alternatives and the household production of these products fizzled out over the years (Beinart and Wotshela, 2003). Another reason that was mentioned for the decline in household production of products from prickly pear was the increased entrance of women into the labour market, which reduced the time that could be allocated to household production (Beinart and Wotshela, 2003). Following this decline, the main way by which people continued to make an income from the prickly pear was through street trading of the wild fruits of the *Opuntia* in local informal markets (Shackleton *et al*., 2003; Shackleton *et al*., 2011; Beinart and Wotshela, 2011).

2.4 The socio-economic benefits of wild plants

In the literature on the livelihood contribution of the prickly pear, the importance of its contribution to each household's livelihood portfolio was indicated by the household expenses that were financed with the income from selling prickly pear (Shackleton *et al*., 2007; Shackleton *et al*., 2011). In these case studies on the economic contribution of the prickly pear in Makana Municipality and in the Kat River Valley, the income from selling prickly pear was mainly used to purchase groceries, to pay school fees, and to buy school stationery (Shackleton *et al*., 2007; Shackleton *et al*., 2011). In the Kat River Valley case study (Shackleton *et al*., 2007), prickly pear traders also engaged in a barter system with neighbours by exchanging buckets of prickly pear for staple food items. Contextualizing this scenario within the Sustainable Livelihoods Framework, this sort of interaction helped cultivate strong reciprocal networks within the community, thereby increasing social capital (DFID, 1999; Shackleton *et al*., 2007). The Sustainable Livelihoods Framework is discussed in more detail later on in the chapter.

Since the prices charged for the prickly pear fruit are usually low, sellers adopt certain strategies to maximize the incomes that they make from selling the prickly pears. Shackleton *et al*. (2011) revealed that the prickly pear sellers in Makana Municipality maximized their prickly pear incomes by increasing the number of hours that they committed to participating in the informal prickly pear market. Therefore, since each prickly pear seller did not commit the same number of hours daily to selling prickly pears, the income earned by each one of them was highly variable (Shackleton *et al*., 2011). Another factor, which contributed to the Makana Municipality prickly pear sellers' incomes were the amounts of prickly pears that each of them, harvested on a daily basis. The gross monthly income range that was quoted in the Kat River Valley study was R20 to R100 (Shackleton *et al*., 2007), and R40 to R3773 in Makana Municipality (Shackleton *et al*., 2011).

Studies on the importance of wild plants to the livelihoods of poor people illustrate that the importance of wild natural resources to livelihoods is usually determined by each household's levels of wealth, education levels of those trading in the informal markets, and on how long the individual has lived in the area where the species is found which in most cases reveals whether the species serves merely as a temporary safety net resource or has been integrated into the livelihood portfolio of a household (Shackleton *et al*., 2007; Shackleton *et al*., 2011; Barirega, 2014).

The incomes were significantly higher for sellers of medicinal plants and this is usually due to the traditional and cultural practices that certain medicinal plants are usually associated with, thus increasing demand for these plant species. Income earned by medicinal plant traders in the Nelson Mandela Bay ranged from R480 to R7200 per month throughout the year (Ah Goo and De Wit, 2015). As with the Shackleton *et al*. (2011) study, the amount earned by each individual trader was related to the varying degrees of earnestness with which the traders took part in the market. Contrary to Shackleton *et al*. (2011) though, where the income was supplementary due to the seasonality of the prickly pear fruit, 27 percent of respondents in Ah Goo and De Wit (2015) mentioned that the trade in medicinal plants was their only source of income in the household. Even in households that had other sources of income, the medicinal plant trade's contribution was still the most significant source of income to the households of the medicinal plant traders (Ah Goo and De Wit, 2015). Similar to Shackleton *et al*. (2011), the proportion of the contribution to household income was significantly higher for poorer households that did not have or had limited access to other income sources (Ah Goo and De Wit, 2015).

In Kepe (2007), the prices charged by traders of wild plants was largely dependent on the popularity and demand for the species, the time and effort it took to find or access the species in the wild, the unit or bulk amount required by the customers, and on the trader's title whether they were merely an herbalist with some knowledge of medicinal plants or a more established individual possessing the ancestral calling to be a traditional healer (Dold and Cocks, 2000; Kepe, 2007). Based on each of these factors, the income accruing to each household from the trade often varied significantly. The accessibility of the medicinal plants was determined by the legislative restrictions placed on the plants and this also had an effect on the incomes earned from selling medicinal plants.

Therefore, medicinal plants that were classified as scarce or very scarce tended to be more expensive than those that were classified as abundant. Likewise, the restrictions placed on the levels that could be harvested also made the medicinal plants expensive as the demand for them exceeded their supply (Kepe, 2007). For example, the incense plant species locally known as '*Impepho'* (*Helichrysum melanacme*) and (*Callilepis laureala*) were the most abundant and the cheapest out of the 12 medicinal plant species that were traded in the local markets and were priced at R10 per bundle (Kepe, 2007). These two species were both classified as 'abundant' (in terms of supply) and 'unrestricted', so their prices remained low to attract customers. Some species, such as *Umayisaki* (*Agathosma ovata; Thesium pallidum*), were in high demand and prices for them were also high to maximize profits from their sales (Kepe, 2007). The annual gross income from the trade was estimated to be US$986 (the rand was approximately R7 to the dollar in 2007).

When this amount was divided by a standard of 8 trips to the market, the potential income that each medicinal plant trader was estimated to be US$121 (Kepe, 2007).

A common thread among the studies quoted above was that the income earned by market actors from their respective market activities depended on whether the person was selling from a public market place or private premises, the availability and accessibility of the species being sold, how much other sellers were charging, the costs incurred by the traders in getting the product to the customers, on perceived demand, the popularity of the species, and how much customers were willing to pay for the products on offer (Kepe, 2007; Shackleton *et al*., 2011; Barirega, 2014). All these factors in turn contributed to determining the household incomes of the people involved in these informal markets. For example, going back to the Shackleton *et al*. (2011) study, the prices charged by the sellers of the prickly pear fruit varied from one group of sellers to another based on the mutual price setting agreement of sellers in the same area.

Amongst those who sold the prickly pears by the roadside, the prices were flexible and ranged from R5, R6, or R15 for a five-litre container (Shackleton *et al*., 2011). Amongst those who sold the prickly pear door to door in Grahamstown's Joza location, the prices were R5 or R6 for a five-litre bucket. The prices were kept low since the prickly pear is not a mainstream fruit and therefore it is usually the older generations that are familiar with prickly pear as they grew up in areas where *itolofiya* (Xhosa name for the prickly pear fruit) was popular (Beinart and Wotshela, 2003; Beinart and Wotshela, 2011).

2.5 Challenges in accessing wild plant resources

The institutional environment governing access to wild plants can sometimes be restrictive especially in the case of wild plants that are in the endangered plants list due to unsustainable harvesting practices and habitat destruction (Petersen, 2014; Sustainable Livelihoods Foundation, 2015). The institutions that govern these areas often fail to consider the political, social, and economic effects of their policies, which are often borne by local communities that derive benefits from the natural resources (West *et al*., 2006). Moreover, the political aspect often clashes with and undermines local people's traditional ways of managing and regulating natural resources (Guijt *et al*., 1995; DeGeorges and Reilly, 2009). As such, in the extreme case where a protected area is established to curb unsustainable harvesting, conflicts often arise between local people and the state or institutions responsible for the protected area (Guijt *et al*., 1995; DeGeorges and Reilly, 2009; Tondhlana *et al*., 2011). The conflicts arise from the exclusionary nature of

the rules governing the management of natural resources in protected areas, rules that often revoke local access to resources within the boundaries of a nature reserve and change the status of local collectors of natural resources to that of illegal poachers and trespassers (Guijt *et al*., 1995; Kepe, 2008).

Prior to the establishment of protected area laws, indigenous or traditional institutions often exist for the conservation of wild resources in the surrounding areas and under these traditional laws, local people do not need permission from 'outsiders' such as conservation biologists to harvest wild plants for personal consumption (Guijt *et al*., 1995; Kepe, 2007). Local traditional rules governing access to natural resources in the local environment are usually based on an authoritarian social hierarchy where chiefs or traditional leaders are usually the overseers of the resources. This social hierarchy consists of clans and extended families, chiefs or community elders, religious leaders (DeGeorges and Reilly, 2009). Under each of these local authorities, the success of management initiatives of wild resources hinges on a number of rules loosely described by Scoones *et al*. (1992) as follows.

Firstly, local rules on natural resource management are often implemented more effectively in a small homogenous group of individuals who have common goals as to how management should be conducted. Secondly, areas that are under management by the group clearly defined, and there needs to be stricter rules on managing resources of relatively high economic value. Lastly, rules that the local authorities come up with have to be enforceable and backed by a set of rules formulated into an institutional framework that all natural resource users abide by (Guijt *et al*., 1995; DeGeorges and Reilly, 2009).

On the other hand, natural resource use rules associated with protected areas are non-inclusive and documented cases of protected area establishment depict scenarios where local people's access rights were revoked (Guijt *et al*., 1995; Tondhlana *et al*., 2011). Rules and laws to restrict access to natural resources within protected areas by local people are enforced through putting up fences and walls to curb the unsustainable harvesting of limited resources, which if not curtailed, is believed to result in a 'tragedy of the commons' situation (Hardin, 1968; Guijt *et al*., 1995). The belief is that in the face of high demand by local people who base a large portion of their livelihoods on natural resources, traditional rules of natural resource management are insufficient in preventing overexploitation and continued harvesting beyond healthy environmental thresholds compromises the ecological integrity of a natural area (Guijt *et al*., 1995). However, this view neglects the existence and efficiency of community-based natural resource management (CBNRM) initiatives whose effectiveness hinges on the local people's respect and reciprocal relationships that they have with their surrounding environment. These CBNRM initiatives are often tied

to local people's need to preserve their cultural heritage and traditional practices which are performed using some resources from nature (Cunningham, 2001; Loundou, 2008; DeGeorges and Reilly, 2009). Therefore, in local communities, the preservation of natural resources is more than maintaining a natural environment in its pristine condition, but conservation has strong ties to the unique culture and traditions of the local people and this contributes towards improving the sustainability of many traditional systems of natural resource management (Cunningham, 1993; Guijt *et al*., 1995).

The theory of the tragedy of the commons is based on the idea that in the case of a local resource that local people can access freely, individuals usually seek to obtain as much as they can of the resource without much regard for the next person as each person is focused on securing their own share before the resource gets depleted (Hardin, 1968; Chow and Weeden, 2011). Hardin (1968) postulated that the ultimate result of this was irreversible environmental degradation. Therefore, under these conditions, protected areas are established to prevent this situation from occurring because in a social setting where natural resources form the bulk of local people's livelihoods, local rules and regulations for the conservation of biodiversity will fail so long as the motivation for using the resources is individual gain. However, some authors have argued that anticipating a tragedy of the commons was not the only reason for the establishment of protected areas (Kepe, 2008; DeGeorges and Reilly, 2009; Tondhlana *et al*., 2011). They argue that denying local people access to resources in their vicinity under the guise of biodiversity conservation is usually a way merely to shift ownership of traditional lands to those seeking to exploit those lands for their own financial gain (DeGeorges and Reilly, 2009). Exclusionary laws pertaining to the environment have their roots in colonialism where Western ideas of conservation were viewed as a way to bring harmony to a state of perceived anarchy and chaos resulting from poor management by local institutions (DeGeorges and Reilly, 2009). Not discounting the negative environmental impacts that often arise from weak traditional systems of natural resource conservation, Ostrom (1990) presented a counter-argument to the formulation of the tragedy of the commons idea.

Contrary to this self-interested behaviour presented by the theory, Ostrom (1990) argued and demonstrated that some communities were able to avoid the tragedy of the commons through sustainable self-governed and self-organized systems of community-based management strategies. At the core of these systems of management were eight principles which Ostrom (1990) illustrated with case studies meant to debunk the idea of an inevitable Hardinian tragedy (Ostrom, 1990; Chow and Weeden, 2011). These principles should be adhered to by community members to ensure that community-based natural resource management initiatives yield the desired results. The principles presented in Ostrom's (1990) framework were outlined by Chow and Weeden (2011) and Walljasper (2011) as follows:

1. The common pool resource has clearly defined boundaries that exclude external parties who are not entitled to the resources
2. There is congruence between the rules governing the use of resources and local needs and environmental conditions
3. Ensure that those affected by the rules can participate effectively in modifying the rules
4. Making sure that the rule making rights of community members are respected by outside authorities
5. Develop a system, carried out by community members, for monitoring the behaviour of members
6. Use graduated sanctions for those who violate the rules
7. Provide accessible, low cost means for resolving disputes
8. Build responsibility for governing the common resource in nested tiers from the lowest level up to the entire connected system.

Ostrom's (1990) approach to creating sustainable governance of common-pool resources illustrates that in a situation where people's livelihoods could potentially be under threat from overexploitation, natural resource users can work collaboratively to prevent environmental degradation while ensuring that their livelihoods are maintained. Therefore, based on results from the case studies used by Ostrom (1990), these principles serve as a checklist to ensuring a sustainable governance regime (Chow and Weeden, 2011). However, despite Ostrom's (1990) insights into the common pool resource governance issue, the literature is fraught with cases of exclusion and the conflicts that arise between local people and state powers responsible for the implementation of protected area laws (Kepe, 2008, DeGeorges and Reilly, 2009; Tondhlana *et al*., 2011).

However, despite the leeway provided by the Act concerning local people's use of natural resources within protected areas, the implementation of the legislation has been exclusionary as local people were forbidden from utilizing the resources (Borrini-Feyerabend *et al*., 2004; Adams and Hutton, 2007; Tondhlana *et al*., 2011; Andrade and Rhodes, 2012; Baker *et al*., 2013). This resulted in illegal harvesting as Kepe (2007) discussed that people from Khanyayo village invoked their local rights drawn by leaders of the community as justification for access to the natural resources within the Mkambati Nature Reserve. This method of legitimized stealing was the local people's way of rebelling against the management regulations, which restricted harvesting by local people. This was because before the apartheid regime

was put in place, the local people did not have to obtain permission from 'outsiders' to harvest medicinal plants from the Umkambati Nature Reserve (Kepe, 2007).

Prior to the National Environmental Management: Protected Areas Act 57 of 2003, the apartheid government instituted Proclamation 224 of 1932, which was aimed at governing smaller forests in rural villages. Under the legislation, traditional authorities were instructed to subject their local rules to natural resource access to the laws stipulated in the Proclamation (Kepe, 2007). The Transkei Forest Act No.6 of 1969 was subsequently implemented to affirm the restrictions of the previous legislation. The new Act completely took decision-making power away from traditional authorities by specifying that permission to access all natural resources found within protected areas was to be sought from the Department of Forestry (Kepe, 2007).

Although these legislations did not deter medicinal plant collectors in the villages, there was some uncertainty concerning whether local rules and rights to natural resources were recognized by the state (Kepe, 2007). This was because some of the natural resource users that were interviewed mentioned that they were often stopped by conservation authorities on their way to the Durban city markets where they sell their resources and authorities sometimes confiscated their harvests of medicinal plants which were obtained illegally (Kepe, 2007). This case study points to the exclusionary nature of the protected areas regime when it comes to the economically disadvantaged in rural areas and the mismatch between local goals for conservation and those of the state.

In some cases, the local people are aware of the biodiversity status of the plants, but this often does not deter them from utilizing the plant species in question (Loundou, 2008; Kepe, 2007). In cases where the people were not clear on which plant species to avoid due to ever-changing state legislation, calling on local laws to resource access, which predate the government laws was their only way (Kepe, 2007). This permission was often given tacitly by local traditional leaders and sometimes by those who worked in the nature reserve out of sympathy for those whose livelihoods relied on selling medicinal plants (Kepe, 2007; Kepe, 2008).

In addition to restrictive man-made rules, ecological factors that determine availability of the species also play a role in limiting people's access to natural resources. The seasonality of a species also limits the socio-economic benefits that people can derive from it as it affects the species availability (Kepe, 2007; Feyssa *et al*., 2011). For example, prickly pear (*Opuntia ficus-indica*), which is available only from January

until March, can only be benefited from during the time when it is available (Shackleton *et al*., 2011). In the case of medicinal plants that can be substituted for another species which performs a similar function such as two species which are both used as traditional incense (*Impepho),* when the favoured *Helichrysum melanacm*e species goes out of season at the end of spring, people switch to using other *Helichrysum* species which are available all-year round (Kepe, 2007). Also, plant parts that are collected from tall tree species like *Cassipourea gerrardii* (*Ummemezi obomvu*) are often limited in terms of availability as they are often too high up on the trees for harvesters to be able to access (Kepe, 2007).

The classification of a wild plant as alien species also places restrictions on people's access to them as government seeks to contain them in specific areas to prevent them from spreading becoming invasive. For example, the specification of prickly pear in the NEMBA (Act 10 of 2004) document as a Category 1b species places limits people's use of the plant as a potential as a stable cash-income source (Agricultural Research Council, 2014). However, despite its legal status, it does not diminish their contribution to livelihoods, which is in some cases is on par with that of indigenous wild plant varieties during its season (Dold and Cocks, 2000; Beinart and Wotshela, 2003; Shackleton *et al*., 2007; Semenya *et al*., 2012).

2.6 Costs incurred by informal marketers

The costs reported by traders in Shackleton *et al*. (2011) were mainly transport costs, the portion of income spent on buying lunch, and buying plastic bags to package the prickly pears. In Peddie, the prices charged per customer were higher due to high transport and harvesting costs incurred by the sellers. The transport costs, mentioned by more than half the number of respondents, were incurred by those who lived some distance from the harvesting sites or were harvesting in Grahamstown. Transport costs averaged R30 per trip while the amounts paid to those who were hired to harvest were R5 or R10 depending on the load harvested (Shackleton *et al*., 2011). Plastic bags were 30 cents each and costs took up nearly 46 percent of income earned by trading households (Shackleton *et al*., 2011).

In another study by Barirega (2014) on the value chain of the Cape Gooseberry (*Physalis peruviana L.*) in Uganda, 10 percent out of the 120 respondents that were interviewed mentioned transport costs as the main cost that they incurred in the market. However, the high demand for the species, easy access, and abundant supply ensured that the income from selling exceeded the costs by a large margin, as evidenced by the 49.6 percent income contribution that the Cape Gooseberry informal market was making to the household incomes of traders (Barirega, 2014). Likewise, in Shackleton *et al*. (2011), the income earned

from selling prickly pear was contributing a net income of R844 over one season, accounting for 0.22 percent to 32 percent of household income, although income was dependent on the number of hours that each trader committed to selling prickly pears (Shackleton *et al*., 2011). The income from selling prickly pears was accounting for significantly more to poorer households. This conclusion appears to be in line with the consensus in the literature that it is often the poorest households that reap the most benefits from the use of wild plants, including those that are regarded as alien (Shackleton and Shackleton, 2006; Kepe, 2008; Davenport *et al*., 2011; Petersen, 2014; Ah Goo and De Wit, 2015; Sustainable Livelihoods Foundation, 2015). This is because for the poorest households, the trade in natural resources is usually their only source of income.

In Kepe (2007), the transport costs incurred by each medicinal plant trader reduced the income earned so the actual income was often less than the potential income quoted previously. Majority of their customers were located near and in the urban areas since neighbours in the rural areas could harvest the plants for themselves instead of buying from the sellers. As such, the major cost that was incurred by the medicinal plant traders were for transportation. Some traders used the local bus, which travelled between Durban and the villages and paid R80 per person for a return trip (Kepe, 2007). Additionally, the traders had to pay an extra R5 or R10 per bag of medicinal plants when getting on the bus. Lunch was another cost added to the costs, as traders had to use some of the income to buy food that would sustain them for the duration of their stay in the city.

Moreover, to be able to generate the money to buy food, traders would initially sell their bags of medicine at reduced prices, sacrificing 85 percent of potential income (R170) (Kepe, 2007). The informal market activities that were carried out by the medicinal plant sellers would classify them as harvesters, transporters, as well as traders as these were the market activities that were mentioned in the study. Cunningham (1993) described the medicinal plant sellers in the Durban markets as commercial harvesters since they sold most of their medicine in large quantities. These were sold to herbalists and other traditional medicine practitioners in the city to satisfy the large urban demand (Kepe, 2007). As such, Cunningham (1993) argued that the prices were determined by the city markets and harvesters. Similar to the case in Kepe (2007), traders had no choice but to oblige and sell at those prices to avoid having to travel back to the rural areas with the leftover medicine.

Despite the challenges that the traders faced, they continued in the market. This was because for many poor people, the trade in wild plants was a major contributor to their household incomes. Therefore, it is important to understand the socio-economic circumstances of the individuals and households who are usually dependent on wild plant resources. The following section outlines the socioeconomic

characteristics of users of wild harvested plants as described in various literature sources. This will help to bring attention to the level of importance of the species to livelihoods.

2.7 Common characteristics in the socio-economic circumstances of wild harvested plant users

The observed trend of increasing reliance on wild plants for food and medicine by poor people, particularly in developing countries, reflects much deeper issues of social and economic inequality (Loundou, 2008). The World Bank (2016) outlined some of the main factors that characterise the multidimensional nature of urban poverty in developing countries as inadequate access to quality education and healthcare, poor housing and sanitation services, lack or limited access to employment opportunities, and living in crime-ridden neighbourhoods that threaten their lives. Linked to these factors, Armstrong *et al*. (2008) list 'poverty markers' which are described as the key characteristics often used to identify those that are most likely to be living in poverty in developing countries. These indicators include population group, gender, the age of the head of a household, household structure, geographical location, and employment status (Armstrong *et al*., 2008). Through proper analysis, these indicators can provide a snapshot of poverty for a region of interest while also providing insight into the potential impacts of other dimensions of poverty such as high transport costs, lack of access to infrastructure services, limited opportunities to attain quality education, and exposure to hunger (Armstrong *et al*., 2008). Identifying these social indicators is key to ensuring sustainable and capability-enhancing policy interventions that will adequately address poverty in particular contexts (Sen, 1999; Armstrong *et al*., 2008; Evans, 2010). The following section gives an outline of the factors that contribute to poverty as highlighted in the literature.

a) Inadequate and insecure housing

Turok (2015) discussed the case of informal settlements in the urban areas of South Africa. Two perspectives are given for the existence of shacks in many urban areas. The first perspective views them as ladders out of poverty as they house those who have migrated from the rural areas to urban areas to have better access to jobs (Turok, 2015). Therefore, according to this perspective, informal settlements are temporary low-cost reception areas that are usually located near suburbs for transport convenience where people can work as domestic workers, security guards, or gardeners (Turok, 2015). The other perspective postulates that they are 'poverty traps' since dwellers, majority of whom are from the rural areas, often lack the skills required by potential employers (Turok, 2015). As a result, many people end up working in low-paying dead-end jobs from which they get an income that is just enough to put food on

the table (Turok, 2015). In extreme circumstances, some people end up scavenging in landfill sites for food while some undertake various activities like firewood collection and selling medicinal plants in urban informal markets to sustain themselves and their families (Shackleton *et al*., 2007; Shackleton, 2009; Davenport *et al*., 2011; Petersen, 2014; Turok, 2015).

Perhaps the most important aspect about informal settlements being entry points into the urban economy is that they also inspire an entrepreneurial spirit amongst the dwellers (Turok, 2015). In light of the economy's low absorption capacity of new entrants into the labour market and the corresponding lack of skills amongst those who are unemployed, some people end up starting small businesses selling small food items that are commonly used by the local people (Sheikh, 2014; Charman and Petersen, 2015; Sustainable Livelihoods Foundation, 2015; Turok, 2015).

b) Limited access to employment and income opportunities

In a study by Rogerson (1996) assessing the poverty circumstances in three regions of Gauteng, the informal sector was characterized by two categories of informal markets – the 'survivalist' enterprises and micro-enterprises. The survivalist enterprises consisted of 'street commerce' activities such as hawking, shoe shiners, shoe repair stalls, and street barbers; while micro-enterprises consisted of the more homebased market activities such as selling liquor from the home (*shebeening*), hair salons, *spaza* shops (at-home retail shops) and child minding (Rogerson, 1996). The evidence from surveys taken for the study showed that there were low levels of education and sometimes illiteracy amongst those who were interviewed.

It was also noted that most of these types of businesses were found in predominantly black township areas, many of which were informal settlements and where the majority of people had migrated from the rural areas for various reasons (Rogerson, 1996). In a follow up study by Williams *et al*. (1997) on the medicinal plant trade in the Witwaterstrand, it was found that there were nearly 244 herb traders selling traditional medicine in the three study areas, namely, East Rand, West Rand, and Johannesburg. More than half of traders that were interviewed were blacks residing in the township areas, with the remaining number being made up of Indian and White traders. Furthermore, males made up 62.7 percent of the traders for all three regions. The differences in gender participation rates could have been as a result of the effects of the 1987 mineworkers strike and the liberalization of trade in the 1990s (Fedderke and Vaze, 2001). The strike brought about a transformation of the governance structure and workplace practices by the apartheid government so that the industry would appeal to international investors (Malherbe, 2000;

Pons-Vignon and Anseeuw, 2009). This was followed by the liberalization of the nation's trade environment (Fedderke and Vaze, 2001; Pons-Vignon and Anseeuw, 2009).

The liberalization of South Africa's mining industry coincided with an overall decrease in global mineral prices, which compromised the profitability of the sector (Pons-Vignon and Anseeuw, 2009). This resulted in job losses for miners as mines struggled to cover labour costs, which at the time were almost half of the mines' production costs (Pons-Vignon and Anseeuw, 2009). A wave of retrenchments ensued where the number of mining jobs fell from 750 000 in 1990 to 402 000 in 1999 (Pons-Vignon and Anseeuw, 2009). In relation to Williams *et al*.'s (1997) findings on male traders dominating the medicinal plant trade in the Witwaterstrand, this could have been because of the job losses in which males who had migrated from rural areas to work in the mines were desperate to make ends-meet for both themselves and their families following the retrenchments. This could well have been the case as Pons-Vignon and Anseeuw (2009) stated that the pre-1994 mining sector was heavily reliant on an abundant and cheap labour force that was coming from the rural areas.

In the medicinal trade markets studied by Williams *et al*. (1997), the traders sold their medicine for different prices depending on the classification of their business. For instance, the amount of income earned by each of the sellers of medicinal plants depended on whether someone was trading formally from a licenced 'muthi' store, or as an informal trader hawking health products from open markets on the roadside (Williams *et al*., 1997). As such, the latter operations were seen to be more 'survivalist' in nature and the incomes earned by those who sold under the latter conditions were lower than those who sold from 'muthi' stores. However, even though the income generated from the more survivalist market activities was less than the minimum wage rate, the motivation to participate in the informal economy was a desperate need to survive and to shield themselves from falling into deeper levels of poverty brought on by unemployment (Rogerson, 1996; Williams *et al*., 1997).

c) The gendered dimensions of poverty and lack of education

In studies that showed women as the dominant actors in the market, limited education or illiteracy were the main reasons for their involvement in informal markets. For example, in the study by Rogerson (1996), a significant number of female traders in survivalist markets were women who had little to no educational experience. Davenport *et al*.'s (2011) findings also show a similar pattern where the education levels of female heads from households who made use of commonage resources were significantly lower

compared to that of female household heads from households that did not depend on the commonage resources for their livelihoods.

Orr and van Meelis (2014) attributed the difference in labour participation rates between the genders to idealized socio-cultural norms. In many African societies, women are viewed as the primary caregivers and are expected to perform the majority of unpaid household labour, such as childcare, maintaining the household, and taking care of the sick and elderly. In this idealized notion of gender roles, men are the breadwinners. In most cases, this places women at a disadvantage economically because they often must depend on income transfers either from the male head of the household or through social grants (Orr *et al*., 1998; Orr and van Meelis, 2014). Moreover, the household responsibilities placed on women also limit their ability to participate effectively in the labour market, let alone getting an education to improve their chances of securing formal employment (Orr and van Meelis, 2014). This could also explain the limited participation of women in the medicinal plant trade in the Williams *et al*. (1997) study. Since it was inferred that the majority of the male traders were retrenched rural migrant mineworkers, perhaps they had left their families in the rural areas where the wife was taking care of the children and the elderly, as was the norm back then (Moodie and Ndatshe, 1994; Bezuidenhout and Buhlungu, 2011). However, in instances where the male household head is no longer around to carry out his socially determined role of being the sole breadwinner of the household, many of the women who were formally housewives are often forced by economic circumstances to find ways of earning an income to support themselves and their families (Nairametrics, 2013). Due to the low education levels that they possess, many of them are left only with the option of participating in informal market activities to make a living (Nairametrics, 2013).

In addition, similar to the findings in the studies quoted previously, 57 percent of households that were interviewed were headed by females (Ah Goo and De Wit, 2015). Furthermore, 67 percent of the medicinal plant traders interviewed were the sole breadwinners in their households. Of this number, 33 percent revealed that at least one other person in the household was engaged in other income-earning activities or employed informally either as a domestic worker, a gardener, or as a fruit and vegetable hawker (Ah Goo and De Wit, 2015). The socio-economic trends observed in Ah Goo and De Wit (2015) are in line with Armstrong *et al*.'s (2008) observations in their study profiling poverty in South Africa using household surveys. In the study, 45 percent of female-headed households were living below the lower bound poverty line compared to only 25 percent of male-headed households. As such, selling wild plant whether it be medicinal or those that are used domestically as food, contributes significantly to household income especially in those that are headed by females (Cunningham, 1993; Rogerson, 1996; Williams *et al*., 1997; Kepe, 2007).

Rogerson (1996) also found that, compared to the micro-enterprises, most of the survivalist market participants were women, providing evidence of gender division in the informal market sector. In the context of a patriarchal society, there was a disproportionately large number of women who participated in the survivalist markets compared to the male-dominated micro-enterprises. Consequently, women were found to be earning significantly less from informal market activities than men were. As such, the informal business activities performed by women were mainly supplementary in terms of their contribution to household income (Rogerson, 1996).

The trend of women dominating the more survivalist sectors of the informal trade was also highlighted in Ah Goo and De Wit's (2014) study of the role that the trade in medicinal plants played in sustaining the livelihoods of traders in the Nelson Mandela Bay. In the study, 67 percent of the medicinal plant sellers were female of which 57 percent were the heads of their households. Furthermore, the age profile of the traders showed that the majority of the traders were elderly, with the average age at 52 years, although it varied significantly between 28 to 73 years (Ah Goo and De Wit, 2014). The age profile could be an indication of the effects of unemployment on those who are still of working age and migration in the case of the elderly who migrate to the urban areas either temporarily for healthcare reasons or permanently to be closer to relatives (Ezeh *et al*., 2006).

d) Reliance on state social grants

It is estimated that at least 17 million poor South Africans receive government social grants of which 11 million of recipients are children under the age of 18 years (Coetzee, 2014; Rossouw, 2017). The monthly cost of the social grant system to the national government is R10 billion per month and the various grants are the main source of income for a substantial proportion of poor households in South Africa (Rossouw, 2017). SASSA was established in terms of the South African Social Security Agency Act (Act No. 9 of 2004) with the mandate of "ensuring the provision of comprehensive social security services against vulnerability and poverty within the constitutional legislative framework" (SASSA, 2014: 1; Joseph, 2012; Kelly, 2017).

The SASSA social grant system was formed as part of the wider scope of the National Development Plan, which plans to bring the percentage of absolute poverty down to 0 percent by 2030 (NPC, 2011; NPC, 2013). To this end, the eleventh chapter of the National Development Plan (NDP) introduced social protection as the key to ensuring a decent standard of living.

Perhaps most important is the view of social security as a basic right enshrined in Section 27 of the Constitution (Republic of South Africa, 1996; Joseph, 2012; NDP, 2013). As such, the Plan states that individuals have a right to social security especially in cases where they are unable to provide for their basic needs and those of dependents in their families (NPC, 2013). Under these circumstances, government provides qualifying individuals with the appropriate social assistance to prevent them from falling below the poverty line or 'social floor' (NPC, 2013). Therefore, the provision of social grants is to ensure that individuals can afford the basic needs, which are necessary to life. The Plan introduced social protection as an all-encompassing term referring to a bundle of programmes, which include subsidised public transport, no-fee schools, and free basic services (NPC, 2013). Under the umbrella of social protection, social grants and other government cash transfer schemes are there as a policy tool that feeds into a much broader initiative to social development.

The social grants are targeted at the elderly, at those with disabilities, and children from poor households as these groups are viewed as being the most vulnerable to the effects of poverty since they cannot provide for themselves under their unique circumstances (SASSA, 2014; Joseph, 2012; Kelly, 2017). The five categories of social grants that cover each of these vulnerable groups of people are the state old-age pension, the child support grant, the disability grant, the care dependency grant, and the foster care grant all of which differ in the amounts given to recipients (NPC, 2013; SASSA, 2014). Of these, the child support grant is the largest cash transfer in the country as evidenced by the high uptake of nearly 11 million children being supported, a substantial increase from 20 000 in 1998 when the social grant was first introduced (Coetzee, 2014). The reasoning behind the issuing of child support grants for children from poor families is to provide parents and guardians with the means to finance the basic needs of children who are still of a school-going age (Joseph, 2012; NDP, 2013). As a social development tool, the provision of child support grants is to ensure that children of school-going age are provided with the nutritional support essential for their growth and development (Department of Social Development, 2015; NPC, 2013; Coetzee, 2014). This is in line with Sen's (1985) Capability Approach, which counts nutrition and food security as contributors towards the enhancement of one's capabilities.

The majority of households in the literature that was reviewed also showed different levels of reliance on social grants (Shackleton *et al*., 2001; Davenport *et al*., 2011; Ward, 2012; Ah Goo and De Wit, 2015). Ward (2012) studied the impacts of urbanization on livelihoods and natural resource use in Phalaborwa and Queenstown and found that 37.2 percent and 45.2 percent of the people interviewed in the respective towns indicated that they were receiving the state pension. The study compared natural resource use along a rural-urban continuum in the CBD, town, townships, and rural areas of Queenstown

in the Eastern Cape and Phalaborwa in Limpopo (Ward, 2012). In Queenstown, the state grants were the largest contributor to household income in both the townships and rural areas of the town with 72.5 percent and 70 percent of recipients, respectively. Similarly, in Phalaborwa the contribution of state grants to household income was noticeably higher for the township (54.8 percent) and rural areas (76.7 percent) compared to the CBD and town areas (Ward, 2012). This trend stands as a justification of rural-urban migration as individuals and families often migrate in search of greener pastures in the urban areas. Moreover, compared to other income sources that included formal wage employment, self-employment, pensions, remittances, and income from renting out backrooms; state grants were found to have been contributing significantly more to respondent households in the rural areas and in the townships, even though the contribution of formal wage employment was the greatest overall in both study areas (Ward, 2012).

Similarly, Davenport *et al*. (2011) found that the number of social grant recipients was significantly higher for households that were making use of commonage resources to sustain their livelihoods in all three towns that were covered in the study. This was attributed partly to the size and composition of households, which meant that each household had more than one social grant recipient. As such, for those households, the social grants were the main source of household income.

Likewise, Ah Goo and De Wit (2015) found that 33 percent of respondents were receiving social grants in the form of child and disability grants while 30 percent were recipients of the old-age pension. The recipients of these grants are the most vulnerable to poverty as already stated. As such, the social grants were the most reliable source of household income for those who relied on selling traditional medicine as their only other source of household income since the cash amount of the social grants was the same each moth, unlike the incomes they were receiving from selling traditional medicine. In Shackleton *et al*. (2011) it was found that since the fruiting season of the prickly pear only lasts for three months of the year, the income was supplementary, therefore making social grants the most stable source of household income for the prickly pear sellers. Shackleton *et al*. (2011) quoted the percentages of social grant recipients at 58 percent for both child support and disability grant recipients. The percentage of those who were recipients of the state old grant was 47 percent, which was almost half the number of prickly pear seller that were interviewed (Shackleton *et al*., 2011).

In an earlier study by Shackleton *et al*. (2007) in the Kat River Valley, 80 percent of households were reported as recipients of at least one child support, old age, or disability grant. The extent of a household's reliance on state social grants reflects deep levels of poverty, which go deeper than just income poverty.

Therefore, considering the dire socio-economic conditions to which the poor are subjected, the incomes accruing to households trading in wild plant resources have proven invaluable in cushioning many from falling into deeper levels of poverty. However, relying on economic measures as indicators of a household's level of poverty regardless of whether the activities pursued are sustainable in the long term or not, conceals the underlying issues of inequality at the individual and household level. The next section unpacks the different aspects that are necessary for a livelihood to be sustainable and this is done through a drawing from ideas from the leading schools of thought in development theory.

2.8 The concept of a livelihood

Chambers and Conway (1991) suggested a holistic view of livelihoods that also considers the different conditions under which certain livelihood outcomes can be achieved. Firstly, in considering what constitutes a livelihood, they define a livelihood as comprising of "the capabilities, assets (stores of material resources, and social resources such as claims and access to those resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base" (Chambers and Conway, 1991: 6). According to this definition, access to cash income is mediated by one's innate capabilities to perform those activities that will earn them an income. Therefore, to ensure the sustainability of an individual or household's livelihood, it is important to target those areas where capabilities seem to be lacking (Sen, 1999).

Examining the individual and household conditions to ensure that decisions on the appropriate interventions are appropriate and effective in a particular environment, this definition employs Sen's (1999) Capability Approach. The Capability Approach is a theoretical approach that emphasizes the abilities of an individual to achieve their desired state of wellbeing. This is seen as being of high moral importance as their freedom to achieve certain wellbeing status is understood as flowing from their innate capabilities to pursue the resources required to achieve it as these capabilities enable them to choose or take advantage of opportunities to be or to do the things that they value (Wells, n.d.; Sen, 1999; Gasper, 2002; Stewart and Deneulin, 2002; Clark, 2005; Frediani, 2010; Robeyns, 2016). The sets of capabilities that often come to mind when tackling issues related to human development are adequate nourishment, access to health and medical services, education, adequate shelter, healthy social relationships, availability of infrastructure and institutions that will enable the realization of capabilities, and a safe environment (Sen, 1999).

These factors are neatly represented under the five different types of capital assets in the Sustainable Livelihoods Framework (discussed later in this chapter). The Framework also shows the effects of policies and environmental phenomena on the ability of individuals and households to achieve their desired livelihood outcomes (DFID, 1999). Therefore, while the Capability Approach looks at the links between innate capabilities and how those are expressed through 'functionings', the Sustainable Livelihoods Framework goes beyond to consider the impact of the external environment on an individual's ability to live out those capabilities (Sen, 1999; DFID, 1999).

Gasper (2002) distinguishes between capability and functionings by describing the former as the individual's skills or potential, while functionings reflect a person's 'state of being' manifested through their achievements. The types of functionings that an individual can perform vary with each level of skill that they possess. In this regard, Sen (1999) proposed that developing country governments need to focus on harnessing the potential of individuals through capability-expanding programmes rather than on increasing a country's Gross Domestic Product (GDP) per capita as a measure of the wellbeing of a nation (Gasper, 2002). Investing in human capital would ensure that growth in GDP per capita truthfully reflects the socio-economic wellbeing of society since arming people with the necessary capabilities to build sustainable livelihoods could potentially improve income distribution (Gasper, 2002; Evans, 2010)

The conceptual framework of the Capability Approach is founded on a critique of the utilitarian nature of mainstream welfare economic theories to human development (Clark, 2005). The philosophical concept of utilitarianism is based on the idea of maximizing the satisfaction or *utility* of an individual through adopting policies that yield the "greatest good for the greatest number of people", while minimizing or reducing suffering (Anderson, 2004: 1; quoting Jeremy Bentham, one of the founders of utilitarianism). A critical assumption in utilitarianism is that the fulfilling of perceived human needs maximizes an individual's utility and that those needs can be generalized to the rest of society in a particular context (Anderson, 2004). Utilitarianism does not unpack the various issues that may be contributing to poverty such as lack of education or skills. Moreover, utilitarian approaches to development often assume people's livelihood preferences, that to improve their lives, the distribution of economic resources will need to be improved, regardless of whether the outcome will be long-lasting. An example of this is the government social grant system, which, depending on the amount received and the size of a household, provides a temporary financial solution to a problem that goes deeper than income poverty. This way of thinking about poverty is dismissive of the unique struggles of each individual and offers no real

sustainable solutions that will ensure that the people are able to sustain themselves in the long run (Ruggie, 1982; Gasper, 2002; Best, 2010).

Therefore, to understand why people engage in informal markets for wild plant resources, it is important to unpack the individual and household level socio-economic issues that cause people to rely on markets for wild plant resources for their livelihoods.

2.8.1 Using the Sustainable Livelihoods Approach for poverty analysis

The definition of poverty has changed over time to focus more on the root causes of poverty rather than only on income poverty (UNESCO, 2017). According to the old definition, poverty was measured as the amount of disposable income required to meet a household's basic needs such as shelter, food, and clothing (UNESCO, 2017). Therefore, if a family's command over resources that are required to maintain a minimum standard of living fell below a minimally accepted threshold, such as the internationally accepted poverty line standard of less than $1 per day, that household was said to be experiencing income poverty (UNESCO, 2017). Criticism of this definition resulted in the development of a new concept of poverty as being relative, where a household is defined as poor if its living standard falls short of those in a societal context (OECD, 2015; UNESCO, 2017).

However, both definitions have been criticized for their measurement of poverty in terms of a household's income and consumption levels, rather than on the underlying reasons for poverty such as the effects of social structure, culture, power relations, and other factors, which are often largely out of the control of the individuals concerned. Kanji *et al*. (2005) argued that people's state of vulnerability fluctuates over time in response to the vulnerability context at the household, community, or regional level. Therefore, to reflect a more complete picture of the multi-dimensional nature of poverty, they argued that two perspectives be added to improve on the income poverty perspective and thus promote a more people-centred approach to development. One of these is Sen's (1999) capabilities perspective or function, which was discussed earlier which is based on the premise that increasing an individual's ability to realize a life that he values should be the goal of development as factors that limit individual freedoms go beyond the realm of the economy (Sen, 1999; Mowafi, 2004).

The other perspective which Kanji *et al*. (2005) argued for was the basic needs approach which defines poverty as a lack of access to the basic social services such as food, housing, clothing, public transportation and education which prevent people from falling into poverty (Emmerij, 2010). This approach identifies

employment as both a means and an end to eradicating poverty so long as the income earned through some form of employment is able to meet all the basic necessities of the household (Emmerij, 2010; SOAS, 2016).

Therefore, narrow economic definitions of poverty that consider high economic growth and increasing incomes as proxies for improved livelihoods and wellbeing are only effective if the income earned is spent on the basic necessities of the household and there are no shortfalls (SOAS, 2016). Although this outcomes-based approach has been effective in drawing attention to the marginalized members of society, it has been criticized for being shortsighted and unsustainable as it only promotes household consumption that is just enough to meet basic needs and rising above the $1 per day poverty line (SOAS, 2016).

However, despite the criticisms levelled against these approaches, their premises provide the starting point for considering poverty-alleviation approaches that will have long lasting effects in emancipating people from poverty. As such, using the Sustainable Livelihoods Framework as a unifying framework for purely economic, social, and political considerations in discussions about reducing poverty in developing countries allows for the identification of the linkages between the approaches as well as the limitations of each approach and how those limitations are addressed by other poverty approaches combined within the SLF. In addition, both definitions of poverty express the priorities of the sustainable livelihoods approach which is to evolve thinking about the lifestyles of the poor and vulnerable and the way in which existing policies and institutions can be used to formulate multi-level development activities that are people-centred, participatory, sustainable, and flexible to the changing priorities of the stakeholders concerned (Serrat, 2008).

Serrat (2008) argued that the Sustainable Livelihoods Framework promotes a more process-oriented approach to the issue of food security as it invites practitioners to look into the specific contexts and relationships, instead of the usual homogenous or one-size-fits-all conventional approaches that are often restricted to identifying problems and finding solutions, which may not even fit a particular context. In other words, the sustainable livelihoods approach moves from universal prescriptions, to context-specific approaches, which allow local people's views to manifest themselves in the form of a policy framework (Serrat, 2008).

Morse *et al*. (2009) argued that a central element in the new definition of poverty is that it emphasizes the creation of resilience in poor people's livelihood strategies to stresses and shocks, which can be

achieved through the diversification of the elements that comprise livelihoods. This, by extension, would include the use of exotic plant species such as the prickly pear, which is also a drought-resistant plant. Serrat (2008) argued that decisions on livelihood strategies should also include natural resource-based activities as well as off-farm income generating activities, migration and remittances, government social grants and pensions since they all form the basket of household livelihood diversification.

Although favouring one or more of these strategies could compromise the outcomes of poverty alleviation strategies. Since each approach is inadequate on its own, the promotion of natural resource-based livelihood strategies seem the most viable option promising increased wellbeing and improved food security while restoring the dignity of the poor who have had to rely on hand outs such as he social grants to sustain themselves (Serrat, 2008). Supporting local people's skills in forming their livelihoods using local resources, especially through promoting the economic benefits of invasive alien plants could contribute significantly to fighting poverty and improving food security.

The FAO (2008: 1) defines food security "as a situation when all people have physical, social, and economic access to safe, sufficient, and nutritious food that meets their food preferences and dietary needs for an active and healthy life". This definition introduces four dimensions to the issue of food insecurity, namely, food availability, the accessibility of the food, the stability of the food system, and food utilization, which changes the focus from the national and international food production and trade to include access of food by individuals and households (Mavengahama *et al*., 2013). The importance of shifting focus from the national level to the household is that looking at the issue from a wider viewpoint often masks food deprivation at the household level where it matters the most. Petersen (2014) added to this point by arguing that household analyses highlight the urgency to employ a more subjective view of food security because households experience different levels of hunger and food insecurity, which are also mitigated through different means based on the assets that the households have at their disposal. Moreover, because rural poverty often results from limited economic opportunities, lack of assets, poor education and capabilities, the state of poverty is predicted to worsen in both the rural and urban areas of most African countries as more and more people migrate to the urban areas to seek employment (FAO, 2006; Hazell *et al*., 2006).

On the argument about the subjectivity of food security, some authors argue that it is important to consider the different use values of plants before policymakers make decisions which are generally derived from a preservationist outlook, disregarding the economic and cultural necessity of some exotic

plants to those who make use of them (Flyman and Afolayan, 2006; Petersen, 2014). Therefore, instead of focusing on further promoting indigenous mainstream crops, which may have already been fully or partially domesticated, more research needs to be conducted on the potential of wild species that local people make use of (Flyman and Afolayan, 2006). This is more so the case for exotic plant varieties where, as mentioned previously, their direct use value is not accounted for in typical local economic analysis even though there are communities who make use of them despite legislations in place making it illegal to harvest the plants (Petersen, 2014).

2.8.2 The Sustainable Livelihoods Framework

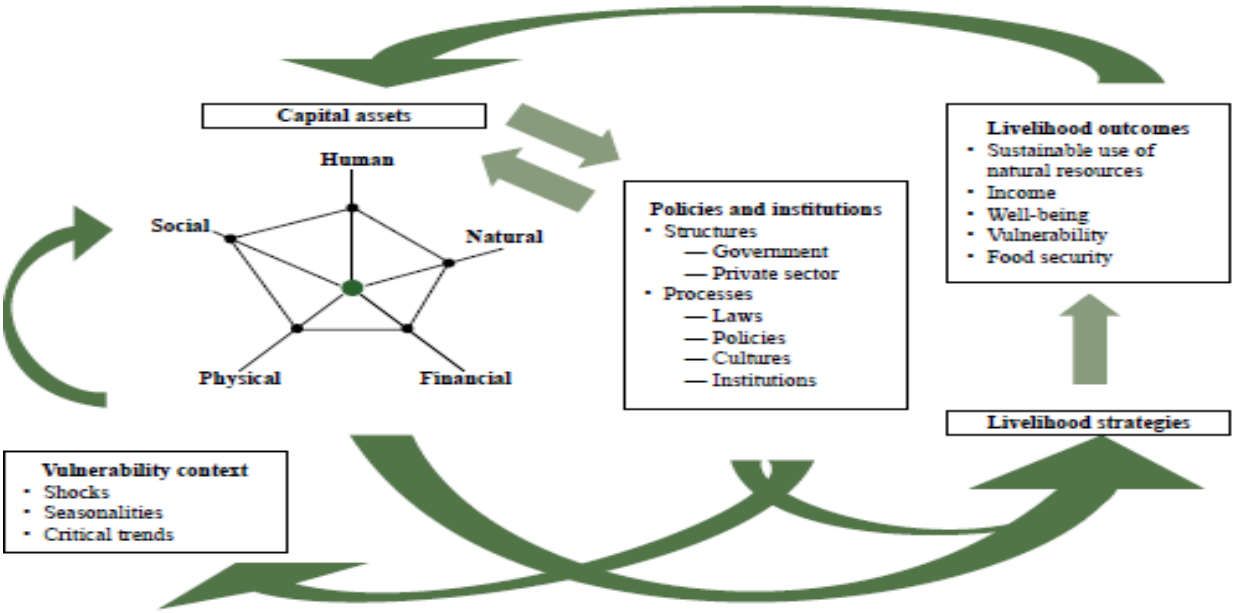

Figure 2.1: The Sustainable Livelihoods Framework

Source: Serrat, 2008

The idea of a Sustainable Livelihoods Approach was first introduced by the Brundtland Commission on Environment and Development "as a way of linking socio-economic and ecological considerations in a cohesive, policy-relevant structure" (Krantz, 2001: 6). The Sustainable Livelihoods Framework diagram (Figure 2.1) outlines the factors that form part of an individual's or household's livelihood as well as the relationships among these factors (Serrat, 2008). At the centre of the diagram lies the "asset pentagon" which varies in shape in response to the effects of policy changes and impacts of the vulnerability context components on the five categories of livelihood assets, namely, human capital, social capital, physical capital, natural capital, and financial capital (DFID, 1999). In the above diagram, the imbalanced shape of the asset pentagon shows that the individual or household whose livelihood was analysed has varying access to each of the livelihood assets represented by the asset pentagon (Krantz, 2001; Serrat, 2008).

2.8.3 The Asset Pentagon

The asset pentagon organizes the five livelihood asset types into a diagram, which changes shape when access to any of the livelihood asset types is affected by factors at the individual or household level (DFID, 1999). Since different households pursue different livelihood strategies according to the assets at their disposal, the shape of the asset pentagon changes to reflect the limits placed by factors such as low education levels or old age on the ability to secure gainful employment and thus improve one's livelihood prospects.

The Sustainable Livelihoods Framework classifies the effects of individual and household level issues as internal factors, while those that come about through policy changes and the phenomena, which characterise the vulnerability context are referred to as external factors (DFID, 1999). As a diagrammatic representation of the asset endowments of a particular social group, the asset pentagon responds to changes over time in response to the internal and external environment in which people exist (DFID, 1999).

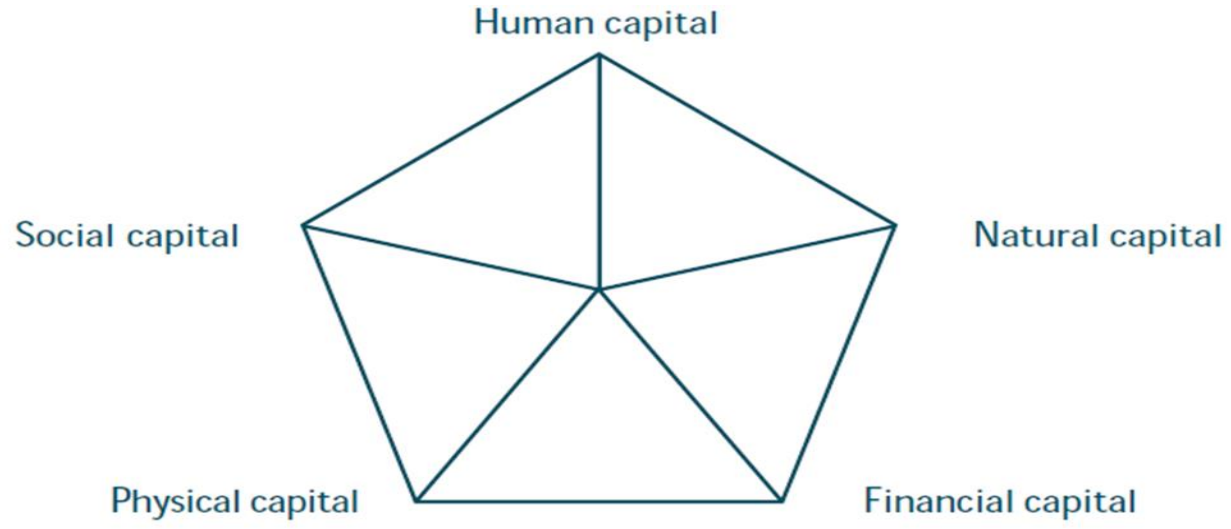

Figure 2.2: The asset pentagon (*Source:* DFID, 1999).

The meeting point at the centre connecting the lines for each of the livelihood assets represents a situation where a household has zero access to all the livelihood assets while the border represents optimal access to assets (DFID, 1999). The constraints and complexities that livelihoods are subjected to as reflected by the variation in the shape of the asset pentagon, allow the framework to be modified and made appropriate to local circumstances and local priorities (DFID, 1999; Krantz, 2001; Serrat, 2008; Christensen and Pozarny, 2008).

For example, an asset pentagon like the one in Figure 2.1 shows limited access to financial, physical, and natural capital.

Scoones (1998) argued that the range of livelihood strategies that can be pursued fall under three broad categories covering a range of options that people could pursue to improve their livelihood. These livelihood pathways are agricultural intensification or extensification, diversifying their livelihoods through pursuing various livelihood streams, or relocating to urban areas to find employment (Scoones, 1998). In cases where agricultural activity is the main livelihood strategy, adequate access to natural capital, physical capital, and social capital is required and when either of these is inaccessible, people will often seek to diversify away from agricultural activities towards the other two livelihood pathways.

In relation to the Sustainable Livelihoods Framework, the choice of livelihood strategy is influenced by the policy and political systems that govern access to livelihood resources, the socio-economic and environmental context of the area under study, and the livelihood resources that can be accessed at a point in time (Scoones, 1998). The sum of these factors contributes to the food security of a region and highlight suitable entry points for the improvement of those livelihoods.

As can be seen in the framework, the five types of 'capital' are identified as; human, natural, financial, physical, and social capital and what each of these consists of is explained below:

Human capital: consists of intangible factors such as the skills, knowledge and manpower possessed by people, which also includes capabilities such as good health and general physical ability that together enable people to pursue various livelihood strategies and thus achieve their desired livelihood outcomes (Morse *et al*., 2009). A household's level of human capital is determined by the level of education of each individual member; their work experience in a particular field where performance improves or increases over time due to training; age which determines access to gainful employment; the gender of each household member which determines a person's participation in particular informal market activities; as well as household composition and size which determine the overall access of a household to different livelihood assets (DFID, 1999; Serrat, 2008; Morse *et al*., 2009). Human capital is the starting point to building sustainable livelihoods as it determines the livelihood options that can be accessed by households and their level of access to them and is thus a necessary component to the achievement the desired standard of living (DFID, 1999).

Social capital: refers to the social relationships that exist within communities and which can help individuals to expand their networks in the pursuit of better livelihood outcomes (Scoones, 1998). These

social relationships are usually characterised by trust and mutual support and provide the basis for informal safety nets among the poor as they act collectively to meet their various livelihood outcomes (DFID, 1999; Serrat, 2008).

Physical capital: refers to the roads, transport, vehicles, secure shelter, energy, adequate access to water supply and sanitation, and access to information, which are required to form livelihoods (DFID, 1999). The role of infrastructure is also linked to the realization of other livelihood assets such as health. For example, a lack of access to reliable clean water and energy services could result in the deterioration of human health while giving rise to an opportunity cost where more time and effort is spent on meeting basic needs like when people have to walk long distances to collect water and fuelwood (DFID, 1999; Serrat, 2008; Morse *et al*., 2009). Insufficient access to physical capital therefore constrains productivity and people's ability to meet their livelihood objectives.

Economic or financial capital: refers to financial resources such as cash, savings, pensions, wages, and remittances that people may have at their disposal as well as any that they may have saved either in a commercial bank or in an informal saving scheme such as *stokvels* (Scoones, 1998; DFID, 1999; Serrat, 2008). In poor regions, cash savings in commercial banks tend to be the least available to the poor due to many factors such as unemployment, which means that most of the income that is received in the household is mostly spent on purchasing food.

Natural capital: Natural capital describes the natural environment from which livelihood resources are derived including the various forms of ecosystem services that flow from the environment (Costanza *et al*., 1997; DFID, 1999). The natural resource base is divided into two broad categories of tangible and intangible environmental resources. Tangible resources consist of ecosystem services such as land, water, aquatic resources, trees and wild foods (Serrat, 2008). On the other hand, those that are intangible include air, the nitrogen fixing ability of plants, and soil formation. Ecosystem goods and services are divided into the four categories of provisioning, regulating, cultural, and supporting services (Costanza *et al*., 1997). Provisioning services are tangible products that are derived plants and animals such as food, fibre, firewood, freshwater, and medicinal plants (UNEP, 2008). Regulating services are the intangible benefits such as clean air, pollination by bees, erosion control, climate regulation, and storm protection by natural environments such as mangroves (Costanza *et al*., 1997; UNEP, 2008). The other class of ecosystem services are cultural services, which include recreation, spiritual practices that are performed in certain natural environments, aesthetic appeal, and the use of the natural environment for educational purposes (UNEP, 2008). Some examples of cultural services include the

bequest value, which is tied to the recognized value of natural spaces such that an environment is preserved for the benefit of future generations (Tietenberg and Lewis, 2012).

2.9 Value chain analysis of agricultural markets

A value chain is defined as "a framework that describes how inputs and services are brought together to physically transform or manufacture a product and how the product then moves physically from the producer to final consumers, including the input of various producer services along the chain" (Kaplinsky and Morris, 2000: 4; Webber and Labaste, 2010). The conceptual framework of the value chain was originally presented by Porter (1985) as a business approach that firms could adopt to increase their competitive advantage compared to their competitors in an industry. The concept was formed through a merging of ideas from industrial sociology and new institutional economics to inform the practical approach of value chain analysis (Porter, 1985). The influence of new institutional economics was that it helped introduce a focus on legal and social systems that govern market relationships and how these influence the practical application of value chain analysis in different contexts.

The value chain is divided into primary or supporting activities, where primary activities are the activities performed in the process of transforming raw materials into a final product up until the delivery of the product to the final consumers (Porter, 1985; Recklies, 2001). Primary activities are grouped into five sub-categories as shown in Figure 2.3. Support or 'overhead' activities are the administrative structures that an organization or business carries out to obtain or gather the necessary resources required to begin and maintain the manufacturing or primary process (Porter, 1985; Van Weele, 2009). Support activities ensure the efficiency and effectiveness of the primary activities as the dotted lines going across from primary to the support activities section show that each support activity plays a role in each primary activity (Porter, 1985; Recklies, 2001). The margin section in the diagram refers to the profit margin or the value added and captured, less the costs incurred in production (Recklies, 2001). Therefore, the more value a firm creates in terms of being able to make a product in the most cost-effective way compared to other firms in the industry, the more profitable it makes and the more competitive advantage it will be said to have. Figure 2.3 depicts the value chain of one firm among a group where the end of the firm's value chain directly links to the next firm's value chain in the direction of the arrow, which the previous firm may be outsourcing some of its activities that it is not efficient in producing (Porter, 1985; Recklies, 2001).

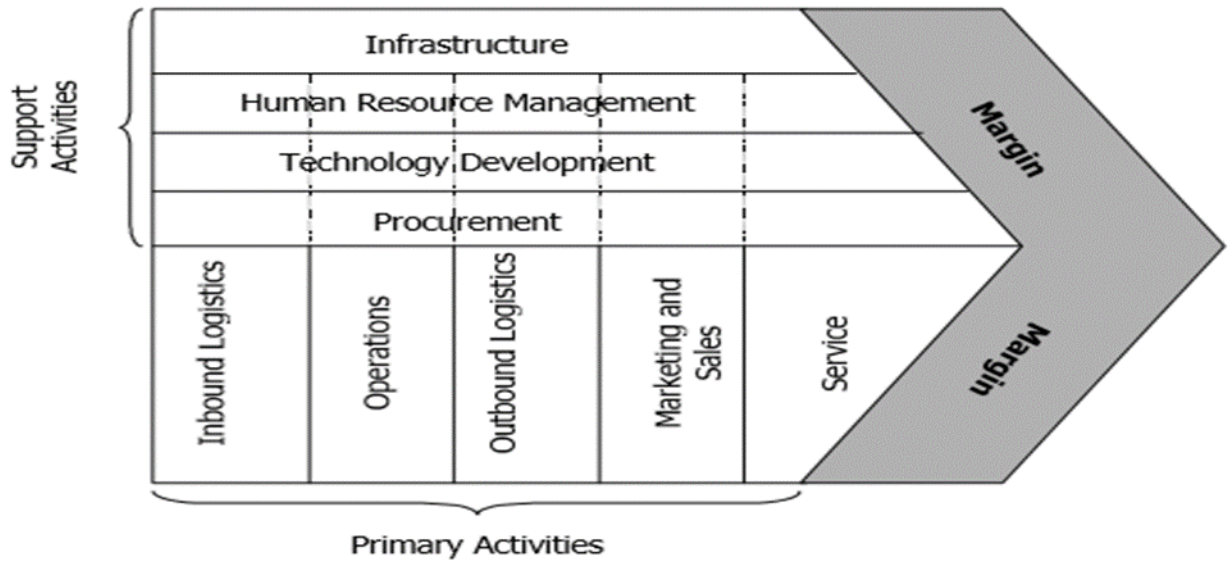

Figure 2.3: The generic structure of a value chain

Source: Porter, 1985

The value chain concept was subsequently adapted for use in agriculture as a way to improve production in agriculture-based businesses which are aimed at reducing poverty by enhancing the economic value of food crops through adding value and making them competitive in global agricultural markets (World Development Report, 2008; Trienekens, 2011).

Agricultural value chain analysis allows for a broader view of informal agricultural markets beyond just an individual tending a small piece of land. It considers subsistence markets as complex systems comprising of suppliers of various inputs such as labour hours, processors, and transporters who are tasked with moving the agricultural products to the local market places to be sold (World Development Report, 2008; Trienekens, 2011). Moreover, agricultural value chain analysis studies the strategies employed in meeting consumer demands and expectations in terms of product quality as well the rules and regulations and social norms that govern the markets (World Development Report, 2008; Trienekens, 2011).

By applying the same principle of analysing the primary and supporting activities separately as in corporate value chains, agricultural market value chains can be deconstructed, and each step analysed to identify limitations that may be contributing to lack lustre profitability of the informal market (World Development Report, 2008). Following this, addressing the issue through strategic interventions aimed at stimulating the profitability of the market and improving its contribution to livelihoods (World Development Report, 2008). To reach the decision on where strategic market interventions should be

implemented, value chain analysis exposes the limitations inherent within each step and suggests solutions to reduce the inefficiencies in each step to improve overall profitability of the market and thus enhance livelihoods (Kaplinsky and Morris, 2000; World Development Report, 2008). With this market-oriented view, the scope and objectives of value chain analysis can be described as primarily focusing on how the economic, social and institutional contexts within which the poor operate can be influenced through strategic interventions can be employed to also link poor subsistence farmers to global agricultural markets (World Development Report, 2008). Unlike value chains in the formal corporate sector of the mainstream economy, agricultural value chains are driven by more diverse objectives beyond just the motive to maximize profit, more so the informal market systems' value chains which are aimed at emancipating people from poverty while harnessing their entrepreneurial spirit (UNIDO, 2009).

2.9.1 Limitations of Value Chain Analysis

The UK Department for International Development (2008) outlined the failure of corporate value chain analysis in addressing the multi-dimensional issues surrounding poverty affecting the marginalized groups of the population. The limitation of the method in providing a clear picture of poverty in a particular context is that the focus in value chain analysis is often on the production systems of the poor in the context of the larger market system (DFID, 2008). Therefore, the objectives of value chain analysis are merely to alleviate any systemic constraints that may be limiting the ability of the poor to engage productively in value chains and to intervene in the markets to address the specific constraints (World Development Report, 2008).

This is similar to top-down approaches to poverty alleviation, which are often one-size-fits-all lack and are not tailor-made to the particular socio-economic circumstances of each region (Best, 2010). This limitation of value chain analysis has given way to the Sustainable Livelihoods Framework as the means by which value chain analysis can be adapted and used for the benefit of the poor. The complementary nature of the frameworks is that while value chain analysis is largely market oriented in its approach, the Sustainable Livelihoods Framework seeks to improve overall access to the different livelihood assets through giving attention to each individual or household's unique circumstances (World Development Report, 2008; Krantz, 2008). The Sustainable Livelihoods Approach uses participatory methods to engage the poor and give them a platform to express their livelihood priorities as it realizes that merely increasing incomes without delving into the issues that contribute to poverty does not yield sustainable outcomes.

Another limitation of purely market-oriented value chain analysis, at least from the perspective of value chain actors, is that the development of value chains might weaken social ties and affect traditional norms when power is ceded to funding agencies or the national government for the purposes of improving conditions in informal markets (DFID, 2008). Power relationships may be modified when global market actors are involved, often in the form of first world countries looking for cheap imports of raw materials. In such cases, the focus is no longer on improving the profitability of the trade for the benefit of the poor on their own terms (De Silva, 2010).

These limitations point to the purely economic and top-down nature of corporate value chain analysis, which only views value chain actors as the means to an end in the process of creating and adding value to a product. As such, the method is inappropriate for situations where practitioners are seeking to address poverty in ways that go beyond the economics to tackle it all its dimensions as indicated by poverty markers existing in that context (Kanji *et al*., 2005; Armstrong *et al*., 2008; De Silva, 2010).

2.9.2 Combining Value Chain Analysis and the Sustainable Livelihoods Framework: making VCA relevant to informal markets for harvested wild products

Similar to the utilitarian approaches to studying the livelihood strategies of the poor, the value chain analysis framework on its own is inadequate in seeking to understand the dynamics of informal survivalist markets. As such, a deeper look into how these markets are arranged and the role played by each participant is essential to understanding their socio-economic contribution to livelihoods. Therefore, used on its own, Porter's (1985) corporate value chain analysis is exploitative of low-income producers (De Silva, 2010). According to Kanji *et al*. (2005), research on markets and livelihoods tend to be carried out under different academic disciplines. The study of agricultural markets tends to employ an economic approach using quantitative methods, while social scientists focus more on the social context and employ qualitative methods that foster participation with market actors to ensure that planned interventions are in line with the livelihood needs of the people on which the study is conducted (Kanji *et al*., 2005).

Therefore, to ensure a thorough assessment of informal markets for harvested wild products and their potential to enhance the livelihoods of the poor who participate in these markets, an interdisciplinary approach is required. This is necessary because the motivations for taking part in these markets are often subsistent in their nature. An interdisciplinary approach allows for the creation of a common analytical framework which utilizes different but complementary research methods to uncover the social, political

and economic factors that influence the livelihoods of low income groups as well as the functioning of the market chains that they are a part of (Cappell and MacGregor, 2003; Kanji *et al.*, 2005). The social aspect introduced by the Sustainable Livelihoods Approach to value chain analysis ensures the adaptation of value chain analysis to the particular context in which the research is taking place.

The insufficiency of a purely market-oriented approach such as value chain analysis in addressing the social issues that drive people to engage in these markets is addressed by the Sustainable Livelihoods Framework (Kanji *et al*., 2005; Serrat, 2008; Krantz, 2008). Therefore, to ensure the effectiveness of a value chain analysis project, Kanji *et al*. (2005) argued that three conditions need to be met. Firstly, practitioners need to understand the current state of livelihood assets that are available to the market actors and the strategies that are employed to make use of them. Secondly, practitioners should also seek to understand the nature of the market being studied and that of the agricultural product as both are affected by processes occurring at the local, national, and international scale. Upon meeting the previous two conditions, the interactions between local livelihoods and markets need to be examined to ensure the development of poverty reduction policies, which will contain elements of both the Sustainable Livelihoods Framework and value chain analysis.

Meeting these three conditions will ensure that value chain analysis is conducted in a participatory manner where involvement by the poor and marginalized people results in policy outcomes that will be sustainable in the long term. Taking elements from both approaches could influence policies aimed at poverty reduction by expanding on market-oriented approaches to reflect the real causes of poverty, which manifest as the inability to participate effectively in the economy.

2.10 Conclusion

This chapter reviewed the contribution that wild harvested plants make to the livelihoods of poor and marginalized communities using evidence from literature both in South Africa and in other regions of sub-Saharan Africa. The Sustainable Livelihoods Framework was used to explain the factors that contribute to forming a livelihood. Using Sen's (1985) Capability Approach represented in the framework as the human and social capitals, the Sustainable Livelihoods Approach was used to explain how a lack of access to one or more of the asset classes could affect an individual's ability to achieve certain 'functionings'. Included in the livelihoods of poor communities is the use of some invasive alien plants, which contribute in terms of livelihoods in various ways including medicine, food, and to the cultural and spiritual practices of local

communities. In highlighting the significance of these plants to livelihoods using case studies, it became apparent that although there is some knowledge on the positive aspects of these plants, few studies have examined the extent of their livelihood contribution through the study of their informal markets for these plants. Thus, this research study will do so using the market for prickly pear (*Opuntia ficus-indica*) in the Nelson Mandela Bay area as a case study. The review of the literature also helped in the identification of appropriate methods to follow in conducting a livelihoods analysis study. The next chapter discusses the Sustainable Livelihoods Approach as a theoretical framework for conducting a livelihoods analysis. Details about the methods of data collection and analysis are also given.

CHAPTER 3

Research paradigm and methods of data collection and analysis

3.1 Introduction

This chapter presents the methods that were followed in generating the data for this study on the economic contribution of the prickly pear to livelihoods of people participating in the Nelson Mandela Bay informal market. To unpack the factors that contributed to the poverty of each individual and household, the Sustainable Livelihoods Framework (SLF) was used. Taking lessons from literature on how the SLF has been used to analyse the livelihoods of poor people in various regions, the SLF is discussed in this chapter in terms of the steps that it follows based on each social context within which a study is being conducted. The SLF approach can be used to provide the basis for justifying a livelihood strategy's importance to the livelihoods of those pursuing it by assessing household's socio-economic profiles and how said livelihood strategy contributes to ensuring that household achieves its desired livelihood outcomes. The interpretivist research paradigm is also discussed in this chapter as the analytical approach guiding this research study. This chapter also provides a description of the study area, which includes a discussion of the Eastern Cape province and specifically the Nelson Mandela Bay Municipality's socio-economic circumstances to validate the study being carried out within its boundaries. A discussion of the research design, the data collection methods, data analysis methods and study limitations is presented. The ethical considerations that informed the research approach are also outlined in this chapter.

3.2 Theoretical framework: The Sustainable Livelihoods Framework

The starting point of a livelihoods analysis is usually at the household level since households are the basic units of analysis as far as economic analyses are concerned (Molina, 2011). To achieve this, the SLF approach follows a number of steps, some of which may be omitted depending on the scale of the analysis and what practitioners are aiming to achieve through the analysis (Krantz, 2001; Serrat, 2008; Petersen and Pedersen, 2010). Therefore, the first crucial step that is followed is specifying the goal of the livelihood analysis in a particular context. This often involves accounting for the different social and cultural contexts and thus formulating the study to reflect the concerns of the people whose livelihoods the study aims to understand and possibly improve (Petersen and Pedersen, 2010). In doing so, practitioners identify the disconnects between the macro political structures through which poor people can improve their

livelihoods and the local or micro level politics that are subject to the former (Krantz, 2001; Petersen and Pedersen, 2010). The link between micro and macro scales is important in ensuring the sustainability of development projects as well as obtaining buy-in from those with the resources to enable livelihood improvement projects to be carried out. To understand micro level concerns that may be as a result of macro legislation, communities are often encouraged to participate in projects through giving their input regarding what would best improve their livelihoods and thus influence decision making that will impact their livelihoods in the long run (Heller, 2003; Petersen and Pedersen, 2010).

According to the International Fund for Agricultural Development (IFAD) (2015) this first initial investigative step is usually followed by the 'targeting strategy' stage where the group of people targeted for an intervention are profiled in terms of their "resources, livelihood activities, priorities, constraints and opportunities" (IFAD, 2015: 3). Based on the results of this step, intervention strategies that are most appropriate in terms of their relevance to the unique poverty context of the local people are implemented. This often involves recruiting local people to take part in knowledge sharing and also in collaborating with practitioners in the process of formulating livelihood outcomes that suit their particular circumstances and are sustainable in the long term (IFAD, 2015). Therefore, looking at livelihoods through the lens of the Sustainable Livelihoods Framework ensures that issues related to poverty are diagnosed and the appropriate strategies to target them designed in accordance with the desired development outcomes.

IFAD (2015) outlines ten types of strategies that are often employed in livelihood intervention projects, which are often carried out in developing countries to improve the sustainability of livelihood interventions. These interventions are decided upon based on how much of a threat a particular factor of the vulnerability context is to livelihoods and whether those threats carry on into the future (IFAD, 2015). However, in the process of negotiating on the areas requiring urgent intervention, local people are bound to hold different views which often leads to trade-offs for those whose priorities are not in line with those of the majority (Scoones, 1998). Such conflicts are resolved through deciding on assets that can yield more benefits and can perhaps facilitate access to the other assets (Scoones, 1998). In this case, human and natural capital can be described as core assets since utilizing one's skills obtained through education and training allows one to access financial capital through paid work. Moreover, a physical asset as land can be used in various ways including agricultural production or leasing it to someone else (Department for International Development, 1999). Therefore, by highlighting the dynamic nature of some of the livelihood asset types, practitioners are able to reach a consensus with poor people on which livelihoods

interventions should take precedence (Morse *et al*., 2009). The interventions employed by development agencies such as IFAD (2015) usually focus on improving food access and food security since this is often the main issue affecting the livelihoods of poor people in developing countries.

The aim of this study was not to launch a livelihoods intervention, although that could be one of the recommendations for this study after a thorough analysis of the Nelson Mandela Bay informal prickly pear marketers' livelihoods. The aim is to understand the significance of the economic contribution that the informal prickly pear market makes to the marketers' livelihoods. This significance will be judged on the household expenditures that it pays for as well as the prickly pear income's ability to directly or indirectly improve access to other types of livelihood assets.

3.3 Study area

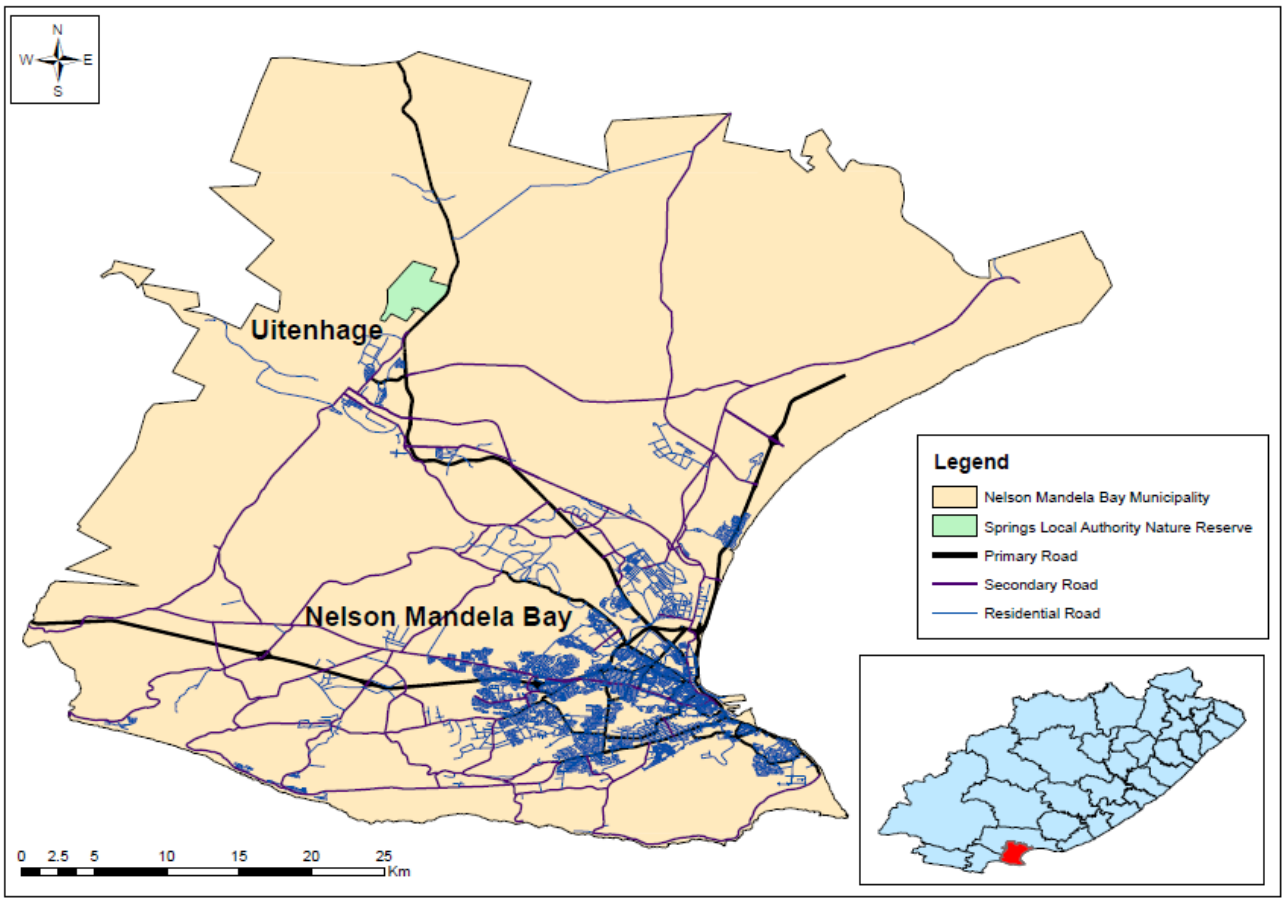

Figure 3.1: Map of the study area

3.3.1 Geographic location, socio-economic status and plant biodiversity in the Eastern Cape and Nelson Mandela Bay

(a.) Geographic location

Nelson Mandela Bay Municipality was formed in 2000 as one of eight metropolitan municipalities (Category A), which include the Buffalo City Municipality, City of Cape Town, Ekurhuleni Metropolitan Municipality, City of eThekwini, City of Johannesburg, Mangaung Municipality, and City of Tshwane (Municipalities of South Africa, 2012). The eight metropolitan municipalities were founded in accordance with the Organized Local Government Act No. 52 of 1997, which fulfils the national Constitution's requirement for an Act of Parliament to make provision for the recognition of national and provincial organizations that represent municipalities (Government Gazette, 1999). The municipalities are further divided into 44 districts and 226 local municipalities which are meant to oversee the growth of local economies within each of the municipalities based on the two main areas of infrastructure-expansion, service delivery (Municipalities of South Africa, 2012).

The Nelson Mandela Bay Municipality overlooks the Indian Ocean at an altitude of 33.745° S 25.5681° E on the shores of Algoa Bay. The geographical borders of the municipality are formed by Van Stadens River Mouth (west), Sundays River Mouth (east), Cassie Mountain View (north), and Cape Recife (south) (Municipalities of South Africa, 2012). The municipality serves the towns of Port Elizabeth, Bethelsdorp, Despatch, Uitenhage, KwaNobuhle, Bloemendal, Blue Horizon Bay, Colchester, and Clarendon Marine and covers a geographical area of 1 959 km² (Municipalities of South Africa, 2012). There are 60 Wards or electoral sub-divisions within the municipality, each headed by a ward councillor and the towns that will be covered in the study fall under some of the municipal wards (Municipalities of South Africa, 2012).

(b.) Socioeconomic profile of the Eastern Cape and Nelson Mandela Bay

The municipal region of Nelson Mandela Bay (NMB) has a large economic influence in the Eastern Cape due to its agricultural sector, which consists of a globally recognized wool and mohair manufacturing industry (Municipalities of South Africa, 2012; Nelson Mandela Bay Tourism, 2017). The success of the manufacturing sector, which accounts for 25 percent of the region's economy, has earned the Nelson Mandela Bay Municipality a reputation as the world's largest exporter of mohair as Port Elizabeth contributes nearly 75 percent of the mohair that is produced within the municipality (Nelson Mandela Bay

Tourism, 2017). Moreover, the municipality has also been synonymous with the motor industry for many years and still is the home to Volkswagen in Uitenhage and the two Port Elizabeth-based car manufacturers; FAW which manufactures heavy duty vehicles and General Motors, although GM will be ceasing its operations in South Africa at the end of 2017 and will be selling the plant to another car manufacturer, Isuzu (Furlonger, 2017). The large presence of automotive plants in the Nelson Mandela Bay has resulted in a number of manufacturers of motor industry related parts locating in NMB. According to a report by the Department of Economic Development, Environmental Affairs, and Tourism (DEDEAT) (2017), the percentage of car part manufacturers in the Nelson Mandela Bay make up a total of 30 percent of the Eastern Cape's total number of car part manufacturers. However, despite the success of these two sectors of the municipality, income measures of economic growth usually conceal underlying inequalities in the distribution of income. As a testament to this, the Nelson Mandela Bay Municipality is nested within the Eastern Cape, which is known as the poorest province in the country (IOL News, 2000).

The report referred to earlier by the Department of Economic Development, Environmental Affairs, and Tourism (2017) states that measurements in the Eastern Cape using the South African Multidimensional Poverty Index (SAMPI) reveal that poverty levels in the province are the highest in the country, with a Gini Coefficient of 0.74 in 2015 for the Nelson Mandela Bay. Poverty was more rampant in the former homeland areas and this was attributed to rural people migrating to urban areas, which meant that the incomes they earned from jobs in the urban areas were counted under urban income pattern studies (DEDEAT, 2017).

Moreover, the high levels of poverty were accompanied by a high unemployment rate of 29.6 percent in the last quarter of 2016, having fallen from 31.8 percent in the previous quarter (Stats SA, 2016; Herald Live, 2017). This percentage of unemployed people in the Nelson Mandela Bay was even higher than the average for the province, which was 28.4 percent in the fourth quarter of 2016 (Stats SA, 2016). The high levels of poverty and unemployment in the municipality has resulted in some people engaging in informal market activities as a survivalist strategy (Ah Goo and de Wit, 2015; Ricochet News, 2015). The high levels of poverty within the municipality despite people migrating from the rural areas to find jobs could be attributed to the lack of industry-related skills in those looking for jobs. This is plausible since the Nelson Mandela Bay is characterised by the presence of a large manufacturing sector.

(c.) Endemic plant biodiversity housed within the Eastern Cape

The Nelson Mandela Bay is the region where the Fynbos, Forest, Grassland, Nama-Karoo, and Thicket biomes overlap, making it the only place in the world with such a large representation of biodiversity as these are five of the seven South African biomes (Nelson Mandela Bay Tourism, 2017). To preserve and protect these native species of plants, various methods are employed which include eradicating any exotic plants that may encroach in the native plants' territory (Marais *et al*., 2004; Richardson and van Wilgen, 2004). Although the eradication of alien plants is justified considering their destructive impacts on native ecosystems, the narrow focus on eradicating invasive alien plants often fails to account for the benefits that local people may be deriving from the species. However, a number studies highlight the economic and non-economic benefits of some invasive alien plant species (Dold and Cocks, 2000; Shackleton *et al*., 2007; Kepe, 2008; Shackleton *et al*., 2011). This study uses the *Opuntia ficus-indica*, also an invasive alien plant, as case study on how such species can be a valuable livelihood resource for poor people.

3.4 Research methods and study design

This study employed a mixed methods approach to analyse the findings obtained through interviews by using descriptive statistical analysis to illustrate the economic importance of the informal prickly pear market to the livelihoods of the marketers in Nelson Mandela Bay. Caracelli (in Johnson *et al*., 2007: 119) defines a mixed methods approach as "one that planfully juxtaposes or combines qualitative and quantitative methods to provide a more elaborated understanding of the phenomenon of interest, including its context, to gain greater confidence in the conclusions generated by the evaluation study". The mixing of research methods occurred in the data collection stage where the interview questions included questions on demographic information as well as estimates of total household incomes from the different livelihood strategies that were pursued within each of the informal marketers' households.

The interviews were questionnaire-based, with the first half of the questionnaire consisting of closed-ended questions on the demographics of each household as well as information on the income streams that were contributing to the household's livelihood portfolio. The second part consisted of open-ended questions on their day-to-day experiences in the market. The use of open-ended questions was to encourage respondents to volunteer more information and to provide more clarity on their experiences in the informal prickly pear market. The quantitative aspect of the data provided the facts and figures that would validate the claims that were made during the interviews, as well as illustrate statistically some

trends in the data. The complementary relationship between the two approaches was such that background theory from literature and from the interviews about the typical socio-economic characteristics of people in these types of informal markets was tested quantitatively for contextual uniqueness (Borland, 2001). The emerging trends and relationships between the factors that were analysed were then interpreted to gain an in-depth understanding of the respondents' socio-economic circumstances and insight on the significance of the data collected in answering the research question.

3.4.1 Sampling methods

Non-probability sampling was employed for this study. Battaglia (2011) defines the non-probability sampling procedure as one that uses subjective methods to select research subjects instead of randomly selecting a sample from the population of interest. Therefore, unlike random sampling where the researcher does not have a specific target population but anyone who is willing to participate in the study is recruited, non-probability sampling targets specific individuals who are experienced and knowledgeable about the phenomenon under study (Battaglia, 2011; Vosloo, 2014).

To identify research participants, snowball and purposive sampling techniques were used. Etikan *et al*. (2016) define purposive sampling as a procedure where the researcher establishes what needs to be known regarding the phenomenon under consideration and sets out to locate and select people who are well-informed about the topic and are willing to share their opinions and experiences (Etikan *et al*., 2016). The informal prickly pear marketers were selected using the purposive sampling technique and the first people that were interviewed were sellers who were found selling prickly pears by the roadside in Uitenhage. Palinkas *et al*. (2016: 2), citing Cresswell *et al*. (2011), define purposeful sampling as the "identification and selection of individuals or groups of individuals that are especially knowledgeable about or experienced with the phenomenon of interest". The reason the study commenced in Uitenhage was that in the study by Annecke and Moran (1978) it is mentioned that the biological clearing programme that was launched in the early 1930s was not entirely successful in completely eradicating the prickly pear species. Moreover, Uitenhage is also known for hosting the annual prickly pear festival, which showcases a variety of processed products made from the *Opuntia ficus-indica* fruit (George *et al*., 2006).

Atkinson and Flint (2001) define snowball sampling as a technique that allows the researcher to access populations that are difficult to reach or hidden by taking advantage of the social networks of respondents that have already been identified. This sampling method is often referred to as the chain-referral method

since participants that have been interviewed give the researcher the names of other potential contacts who can also provide information on the topic. The series of referrals by previous respondents supply the researcher with an ever-expanding set of potential research participants until the researcher feels the number of people selected for the study is enough to base a study on (Atkinson and Flint, 2001). This process of selecting research participants until the researcher feels they have enough people for the study is guided by the criterion of saturation where adding more people to the study would only introduce redundancy in the data (Elliott and Timulak, 2005).

Since referrals were made by acquaintances, the researcher had to build rapport and a certain level of trust with the initial participants. This was achieved through researcher self-disclosure, which included sharing some life experiences which matched the respondents' personal stories. Liamputtong (2007) states that self-disclosure is especially crucial when conducting research with marginalized groups as establishing a common ground with research participants creates a conversational space of mutual understanding. The interviews were conducted in the local language (IsiXhosa), which was also the researcher's mother tongue. This was to ensure that the rapport that had been established through the initial conversations was maintained and to allow them to share their stories without the language barrier. For interviews with respondents who were native Afrikaans speakers, the researcher relied on a translator. The translator was an employee at the Uitenhage Biological Control Facility and a native Afrikaans speaker.

3.4.2 Sample size and composition

The sample was comprised of people from various areas of the Nelson Mandela Bay. Majority of them had temporarily or permanently migrated to the urban areas of the Nelson Mandela Bay Municipality from the rural former-homeland regions or from other provinces. Three of the respondents were from Zimbabwe. A total of 38 respondents participated in the study and they were classified either as a harvester, transporter, or seller based on what they said was their main activity in the prickly pear market. None of the respondents were under the age of 18 years.

3.4.3 Secondary data collection

Secondary data was obtained by means of a desktop review of the literature on the economic benefits of harvested wild plants, including those that are characterised as invasive alien plants. This included

literature on the economic benefits of the prickly pear to the livelihoods of poor people. The previous studies on the prickly pear were useful in highlighting the gap in knowledge, which this research study attempts to fill. The secondary literature included books both online and from the university library, published journal articles, government policy documents, and online newspaper articles from trusted sources.

3.4.4 Primary data collection

This study was conducted in Nelson Mandela Bay, starting in Uitenhage. The areas that were covered by the study were mostly in Port Elizabeth and included Greenacres, Korsten, Newton Park, William Moffett, Sunridge Park, Walmer, Motherwell, Despatch, Nanaga, KwaNobuhle, Veeplaas, Daku Road and New Brighton. The study commenced in Uitenhage because the town is known for its abundance of prickly pear, or *itolofiya*, as it is commonly known locally by the people (Annecke and Moran, 1978). In Uitenhage, interviews were mainly conducted with people who stay in and around the commonages (Amanzi and The Springs Local Authority Nature Reserve), or with people who were found harvesting at these places. The study used semi-structured interviews. Interviews took place from the 6 February 2017 to the 16 February 2017 and were conducted face-to-face at the stalls where prickly pear sellers were stationed and inside the commonages where harvesters were found cleaning the prickly pears after they were harvested. One transporter was interviewed in one of the commonages where he had gone to fetch two harvesters. The harvesters had told the researcher what time the transporter usually arrived at the commonage to pick them up. The other two transporters who identify mainly as transporters in the informal prickly pear market were interviewed at prickly pear stalls; one was selling prickly pears while the other one was keeping his friend and client company while the friend manned his prickly pear stall.

Permission was requested from the respondents before the interviews were recorded. The recording of the interviews was important since in answering the open-ended questions, respondents provided long-winded answers, which at times tended to deviate from the main question. Therefore, the researcher had to revisit the interviews via the recordings when collating the data into spreadsheets. Moreover, since the respondents were interviewed during their working hours, the interviews were rushed and there was no time to record all the answers in the questionnaire scripts while the interview was being conducted.

Another reason it was important to record the interviews was to allow the respondents to tell their stories without interruption as some would stop and wait for the researcher to finish writing before continuing

their story and at times they would lose their train of thought. Therefore, recording the interviews contributed to the accuracy of the data especially since almost all the interviews were conducted in the local languages (IsiXhosa and Afrikaans), recording ensured that they could later be translated accurately back into English.

3.4.5 Data analysis

The qualitative data were collated and saved in a Microsoft Excel spreadsheet prior to converting it to frequency tables and using the income data to formulate graphs. The data was separated into three separate spreadsheets for harvesters, transporters, and sellers. The separation of the data was to allow for an analysis of the economic benefits derived by research participants in each category. There was an overlap in the market activities undertaken by each of the prickly pear market participants, which majority of them revealed that it was a means to cut costs. However, their separation into the categories was based on what they identified as their main function in the Nelson Mandela Bay informal prickly pear market. The individual and household profiles were described in the context of the Sustainable Livelihoods Framework in terms of each characteristic's implication for the livelihood asset that it was classified under.

Descriptive statistics was used to present the basic features of the individual and household data. The data were recorded in a spreadsheet using some of the interview questions as column headings and the responses were recorded under each heading. Following this, some data on the socio-economic characteristics of each household, migration patterns, reasons for being in the prickly pear market, number of years they had been engaging in the market, and the number of hours spent engaging were presented using tables. For the income data, bar graphs were used to illustrate the variation in the monthly incomes that were earned by the respondents from their respective prickly pear market activities. The transporters graph showed income that was earned daily since their engagement in the prickly pear market depended on whether harvesters or sellers requested to be transported and on the number of days per week that the marketers made use of their transport services.

When data was organized on a spreadsheet, it was coded using qualitative content analysis, which Hsieh and Shannon (2005: 1278) define as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes and patterns". This involves a thorough analysis of the language used in the responses and finding similarities in the responses. In this study, some of the interview questions were used as headings for categories. These

were questions that the researcher felt were most relevant in answering the research question. After the data was organized, themes were identified using a combination of the compare and contrast and pawing methods (Ryan and Bernard, 2003). One of the benefits of combining theme-discovery techniques is that it ensures that the researcher does a thorough interrogation of the data, which can allow for the development or identification of more themes (Ryan and Bernard, 2003).

The compare and contrast method was conducted through a line-by-line analysis of word-based data and comparing it to the responses of other participants to identify any similarities or differences and make sense of those in the context of the research question (Glaser and Strauss, 1967; Ryan and Bernard, 2003). The data was also compared with the findings of secondary data sources to see if there were any similarities and differences with findings by other authors who have done similar work. Any differences or inconsistencies with other authors' findings were accounted for using the unique context of the study area. Pawing entails the reading of the textual data multiple times and underlining recurring phrases in the participants' response (Ryan and Bernard, 2003). This method is useful for the discovery of patterns in qualitative data, which can be formulated into themes (Bernard, 2000; Ryan and Bernard, 2003).

Employing these two methods, the researcher was able to discover themes in the Nelson Mandela Bay informal prickly pear marketers' responses. The following themes were identified:

- Low education levels
- The effects of age on ability to work
- High levels of unemployment
- Low financial resources
- Inadequate access to infrastructure
- The influence of household size and composition on poverty.

a.) Analytical approach

This study used the interpretivist approach as the analytical approach for this study. Willis and Jost (2007) describe interpretivism as the way in which a researcher makes sense of research participants' understanding and interpretation of the world around them. To achieve this, interpretivism relies on interviews, observations, and case studies as the strategies by which data is collected (Sabharwal, 2007; Willis and Jost, 2007). Through interviews with research participants, the researcher observes any

patterns that may emerge in the responses and interprets those in the context of the social setting of the study area (Thomas, 2010; Bhattacherjee, 2012). To derive a pattern from responses, the researcher focuses on language, signs and meanings that the participants assign and use to interpret the phenomenon being studied.

The case study aspect of the interpretivist approach refers to the use of background theory from secondary data. The use of secondary data has several advantages. In interpretivist research, case studies can be used as a way to highlight the social constructs that the researcher should look for when collecting data (Bhattacherjee, 2012). Any new theories that emerge from the primary data collection process will serve to build on already existing theories on the phenomenon being studied (Thomas, 2010; Bhattacherjee, 2012). In the data analysis stage, the theories from secondary data sources are compared and contrasted with those from the collected data to derive a richer and context-specific interpretation of the topic under study (Bhattacherjee, 2012).

The unique advantages to using the interpretivist approach are: the researcher can unpack the complex relationships between interconnected social processes which may not be obvious; the subjective and context-specific approach to gathering data has the potential to increase knowledge on the phenomenon under study; and the possibility of uncovering more questions and scope for further research is also high since the interpretivist process is about exploring new avenues of research on a phenomenon which has already been explored by other authors to some extent (Bhattacherjee, 2012).

Perhaps most importantly, as was the case during the data gathering process for this study, the interpretivist approach allows the researcher to collect data, code, and analyse it immediately after each or a number of interviews (Bhattacherjee, 2012). This helps to reveal potential mistakes in the way interviews are being conducted before the researcher carried on conducting more interviews. For this research study, these adjustments to the interview schedule extended to the editing of the original questions, some of which were changed depending on each question's ability to generate useful and relevant information. Bhattacherjee (2012) states that this is one feature that distinguishes interpretivism from other research paradigms, such as positivism, is that other research approaches do not allow for such flexibility.

Criticisms levelled against the interpretivist approach are mainly on the validity and reliability of the primary data collected since the outcome of a research project employing interpretivism is dependent on

the researcher's subjective beliefs and understanding of what is happening in the study area (Dudovskiy, n.d.; Bhattacherjee, 2012). Since the researcher is the primary instrument through which the data is collected and analysed and any observations made during fieldwork are filtered, albeit at times unknowingly, through his or her own constructions of reality, this could 'taint' the data and influence the outcome of the data analysis process (Atieno, 2009).

This criticism is based on the formulation of themes from text, which may also be influenced by prior study of secondary data sources and may not necessarily be strongly represented in the study being conducted. Bhattacherjee (2012) notes that using the interpretivist approach to research is time and resource consuming. The researcher has to employ his/her own judgment when deciding on the size of the sample to be included in the study. Choosing too small a sample could compromise the outcome of the study as it could lead to the researcher making premature or incorrect assumptions; while having a large data set could sacrifice some detail due to hurried processing of the data due to time constraints (Bhattacherjee, 2012). The recommended sample size is 25 participants, although determining the appropriate sample size usually depends on the period within which the study should be conducted and the available resources (Thomas, 2010). The choice to select only 38 respondents was at the discretion of the researcher and the data was beginning to reflect redundancy, which was an indication that the point of data saturation had been reached (Elliott and Timulak, 2005).

If self-disclosure does not yield the desired result in terms of gaining the trust of the research participants, the people may not fully open up about their experiences (Liamputtong, 2006). In this study, some respondents complained that in the past they had participated in a similar study by another researcher where they were falsely promised financial rewards once the study had been completed and this made them reluctant to participate in this study because they felt 'used' and taken advantage of. Another possible limitation to conducting an interpretivist study is that some participants may assume that the researcher is looking for specific types of responses, thereby resulting in them providing false information that is not truly reflective of their experiences (Atieno, 2009). At the start of the interviews, some respondents were not forthcoming about certain aspects of the lives as they were still suspicious of the researcher. Through building rapport with them through self-disclosure, explaining the research objectives and purpose, and answering any questions that they had about the research, they started sharing information in a seemingly unbridled fashion. Atieno (2009) provides another critique of the interpretivist approach, which is rooted in the support of quantitative data approaches by stating that findings from interpretivist studies are too context-specific to be replicated elsewhere with absolute

certainty that the replicator of the study will get the same results. This is because qualitative findings from studies of this nature are not tested using tests of significance to validate their objectivity (Atieno, 2009). Therefore, there is no way to tell if findings from studies of this nature are merely by chance.

b.) Links to the sustainable livelihoods framework

The identified themes were categorized under each of the five livelihood assets, namely, human capital, social capital, physical capital, financial capital, and natural capital (DFID, 1999). After classifying each theme under the respective livelihood asset categories, the cause and effect relationships among the themes were highlighted as a way to form a coherent argument, which would justify the reasons the market participants, were engaging in the Nelson Mandela Bay informal prickly pear market. The description of each theme's influence on each livelihood asset was restricted to its relevance to the research study. An explanation of what each theme entails is given in the discussion section, which follows the section on the analysis of research findings in the next chapter (Chapter 4).

3.5 Limitations of the study

Respondents were reluctant to share personal information and information relating to their households. They were embarrassed to share this confidential information with a stranger. Self-disclosure helped to put them at ease. However, some of the information that was volunteered may still have some inaccuracies, which the researcher is not aware of. The researcher gave the interviewees a small token of appreciation after each interview. The possible effects of this on the data may be that since there were strong social linkages among the marketers, those who had already been interviewed may have disclosed to other potential participants that they were going to be rewarded for participating in the study. The possibility of this was high since the selection of potential participants was heavily reliant on referrals by previous respondents. To mitigate the effects of this potential problem, the participants were not told that there was a small financial reward at the end for participating. In some instances, the researcher merely bought a bag of prickly pears or any other fruits that the respondent was selling other than prickly pears. With some participants, a simple expression of gratitude sufficed.

3.6 Ethical considerations

This research study was conducted according to the ethical guidelines of the Rhodes University Research Ethical Standards Policy. The Economics Department's Research Ethics Sub-committee granted ethical clearance for the use of the questionnaires. The front page of each questionnaire had a paragraph giving a brief introduction on who the researcher was the purpose of the research, how the results from the study were going to be used, and the institutions affiliated with the research study. Potential research respondents were also told briefly the types of questions they were going to be asked and this was to ensure that they gave their informed consent to participate in the study.

Respondents were also told that their participation in the study was entirely voluntary and that they could skip answering questions that they were not comfortable with answering. They were also told that they could withdraw from the study at any point during the interview should they feel the need to. The participants were ensured that confidentiality would be maintained and were also encouraged to give pseudonyms if they wished to do so. Some respondents did not mind having their first name recorded and referred to in the discussion of the study and having their pictures taken for the purpose of enriching the research findings. There was a section to sign on the front of the questionnaire as evidence that they had given their consent to participate in the study once a potential research participant agreed to take part in the study.

3.7 Conclusion

This chapter gave a brief outline of the study area including the socio-economic profile of the municipal region. This provided the basis for the importance of the study in that particular context. A combination of methods was used to carry out this study. Snowball and purposive sampling were used to identify research respondents and the resulting data was analysed using the interpretive approach. Following this, the data was contextualized using the Sustainable Livelihoods Framework, which unpacked the individual and household-level issues that were contributing to the dire socio-economic conditions of the research participants. The following chapter provides an interpretive analysis of the 'themed' research findings. Following this, the research findings are interrogated in the context of the Sustainable Livelihoods Framework. The income from prickly pear is analysed in the context of it being a form of financial capital. The next chapter concludes with a section on the Nelson Mandela Bay informal prickly pear market value

chain, which will show the market's reach throughout the municipality as well as how the different market activities are linked.

CHAPTER 4

Analysis of livelihoods benefits of the prickly pear and assessment of the informal prickly pear market chain

4.1 Introduction

The harvesting and selling of prickly pear is a livelihood strategy that is undertaken by those that are unemployed and have limited income options to fall back on. This chapter presents the research findings from the study of the Nelson Mandela Bay informal prickly pear market, highlighting the contribution that the informal market makes to the household incomes of the harvesters, transporters and sellers of prickly pears. The importance of the income earned from the prickly pear market was quantified through assessing what the prickly pear income was spent on in each household. In the discussion, the Sustainable Livelihoods Framework is applied by categorizing the prickly pear marketers' livelihood assets using the framework's classification. In assessing the livelihood assets that the informal marketers have at their disposal and focusing specifically on the factors contributing to their inability to access other types of assets, the livelihoods assessment highlights the respondents' reasons for engaging in the market. Likewise, the vulnerability context of the informal marketers is formulated using the description provided by the framework of what constitutes vulnerability when looking at the livelihoods of the poor. The institutional structures and policies that affect the livelihood strategies and outcomes of the people are discussed, focusing on the conflict of interest arising from the use of the species as a livelihood resource in spite of its classification as an invasive alien plant in the national environmental legislation. Lastly, conclusions are drawn, and a diagram of the prickly pear market value chain is presented and some bottlenecks to the economic and livelihood potential of the market are highlighted.

4.2 The key players in the Nelson Mandela Bay prickly pear market

This section presents the demographic and socio-economic profiles of the Nelson Mandela Bay informal prickly pear marketers such as age, gender, education level, marital status, position in the household, average household size, and information on the various income earning activities pursued in each household.

Analysis of the data presented in Table 4.1 shows that the majority of respondents in this market were female who made up 71% across all three groups of market actors. Majority of the female respondents mentioned that they were the heads of their households and their engagement in the market was motivated by not having someone, such as a live-in partner, to help them shoulder the household burdens. Therefore, their engagement in the market was out of necessity to sustain themselves, their families and extended family members.

Table 4.1: Socioeconomic characteristics of the Prickly pear market actors

		Harvesters n=20		Transporters n=3		Sellers n=15		Total n=38	
Attribute	Variables	N	%	N	%	N	%	N	%
Gender	Male	5	25%	2	67%	4	27%	11	29%
	Female	15	75%	1	33%	11	73%	27	71%
Age profile	21 – 30	2	10%	1	33%	3	20%	6	16%
	31 – 40	2	10%	None		2	13%	4	10%
	41 – 50	4	20%	2	67%	2	13%	8	21%
	51 – 60	7	35%	None		4	27%	11	29%
	>60	5	25%	None		4	27%	9	24%
Position in the household	Family head*	13	65%	2	67%	6	40%	21	55%
	Wife	6	30%	1	33%	7	47%	14	37%
	Dependent single	1	5%	-		2	13%	3	8%
Education level	None	7	35%	-		2	13%	9	24%
	Primary (grade 1-7)	7	35%	1	33%	6	40%	14	37%
	High School (grade 8-12)	6	30%	2	67%	7	47%	15	39%
Household composition	Average HH size	4.30 ± 0.37		4 ± 0.24		7.87 ± 2.5		5.68 ± 3.7	
	No. of adults	3 ± 0.29		2 ± undefined		5.53 ± 1.74		3.9 ± 2.6	
	No. of children	2.17 ± 0.51		2 ± 0.58		3.18 ± 0.95		2.6 ± 1.6	
Marital status	Single	12	40%	2	33%	7	53%	21	45%
	Married	8	60%	1	67%	8	47%	17	55%
Other sources of income in the HH**	In/formal job	17	85%	3	100%	14	93%	34	89%
	Child support grant	8	40%	2	67%	10	67%	20	53%
	State old age pension	8	40%	-		6	40%	14	37%
	Disability grant	1	5%	-			-	1	3%
	Remittances	3	15%	2	67%	4	27%	9	24%
	None	2	10%	1	33%	4	27%	7	18%

*Head of household refers to households that are headed by women; ** The percentages overlap and therefore equal more than 100%; **the percentages in this column exceed 100% because of the overlap between the sources of income in each household. *Table adapted from Shackleton et al. (2011).*

Education levels were low comparatively across all three groups of informal market actors as shown in Table 4.1 that 9 people had no education while 14 only had a primary school education. The total sum of these two categories was significantly higher compared to the 15 people who reported having a high school education.

This is synonymous with literature findings on South African informal sectors which show low levels of education among those who are still of a working age in these informal markets as a result of apartheid policies which, through the system of Bantu Education, hindered them from obtaining quality education (Rogerson, 2000; Mafunzwaini, 2013; Gamieldien and van Niekerk, 2017).

The age profile of the respondents was concentrated in the 41 to over 60 range. This shows that the majority of those who were in the informal prickly pear market were older, compared to only 10 people who fell in the age category of 21 to 40. Perhaps the most significant aspect about the distribution of the respondents' ages is that when the ages are considered together with the problem of unemployment that was mentioned by majority of the respondents, it becomes apparent that there is a large number of people who could be employed in more productive work elsewhere. This not only represents lost potential for those whose age qualifies them to be active participants in the labour market, but also highlights youth unemployment, which is shown in the 10 people who were between the ages of 21 and 40 (Table 4.1).

Majority of the female marketers (21 people) were the heads of their households and supported their children and extended family members. One respondent was widowed, the rest mentioned having had a live-in partner. This plays into the literature narrative that households that are headed by females are more susceptible to poverty, especially if their reasons for being in the position of headship in the household is due to a situation outside their control such as death of the household head or abandonment (Orr and van Meelis, 2014; World Economic Forum, 2016). This correlated with the number of people who indicated that they were unmarried (21 people). As illustrated in Table 4.1, the number of female-headed households was significantly higher than those with males in the position of headship. This trend is similar to the trend at the national level which showed that the percentage of female headed households was 16.9% compared to only 11% of those that were headed by males among households that lived in state-subsidised RDP houses (Stats SA, 2016). The rest (72.1%) were households that had two adults sharing the household responsibilities (Stats SA, 2016).

A total of 35 households were state grant beneficiaries which consisted of 20 child support grants, fourteen old age grants and one disability grant (Table 4.1). Of the 38 interviewees, 34 indicated that either themselves or members of their households received incomes from other formal and informal activities. These included harvesting and selling firewood, picking fruit at Addo farms, domestic work, hawking mealies and other items such as handmade sculptures, working in construction, selling herbal medicine and scrap metal, and working as a livestock keeper at one of the farms in Uitenhage. These other income-earning activities were pursued throughout the year both during and after the prickly pear season has ended.

Nine respondents received remittances from relatives and although these were not received reliably each month, their contribution to household income was significant especially under the socioeconomic circumstances of the interviewees. Seven interviewees reported not having any other regular source of income during the year, thus making the income from prickly pear their only reliable source of household income during the season.

Typical of low-income households, where large households usually experience more poverty (Meyer and Nishimwe-Niyimbanira, 2016), the average household size of the prickly pear informal marketers was 5.68. Orbeta (2006) attributed this positive correlation between economic deprivation and poverty incidence to three phenomena, which were apparent in various studies that were conducted in the Philippines. These were the negative impacts of having many children on the ability to participate in paid employment and therefore on the income that can be made in each household, reduced investment on the education of each child, and the decline in household savings per capita when there is a large number of people depending on one source of income (Orbeta, 2006). This was evident in the Nelson Mandela Bay prickly pear market data as 20 out of the 38 respondents reported that they had children for whom they received the state child support grant. The average number of children in each household varied among the three groups of market actors and was highest for the sellers although the average was less overall compared to the number of adults in each household (Table 4.1). Although the state grants helped in contributing towards school expenses, the respondents revealed that the cash was divided between those and other household expenses. The total amount of cash received, which was R380 per month per child, was only enough to cover school expenses for children who attend government school. Moreover, the majority of the female respondents reported having sometimes to go home early during the week so that they would be home when their children returned from school and this reduced the income that they could have made in the market on that day.

The respondents were asked if they were originally from the places, which they were interviewed in and if not, they were probed for their reasons for migrating. De Jong and Fawcett (1981) provide a list of reasons, which are usually quoted by people as their motivations for migrating to different areas from the areas they were born. The reasons are classified into categories of wealth, status, affiliation, comfort, stimulation, autonomy, and morality (De Jong and Fawcett, 1981).

This question was important because the popular narrative is often that people only migrate for two reasons; they migrate in pursuit of better socio-economic circumstances such as education or better income opportunities, or to be closer to relatives since rural areas are often considered underdeveloped compared to urban areas. Majority of respondents who expressed that they had migrated from rural areas mentioned that they were permanently settled in the urban areas and only went back to visit relatives during the festive season (Table 4.2).

Table 4.2 lists the different reasons that were given by the prickly pear informal marketers for leaving their area of origin. Majority of the respondents were originally from the Eastern Cape, having migrated mostly from rural areas like Qobo-Qobo, Alexandria and Transkei. The most stated reason for migration was unemployment, which was expressed by 47% of respondents. This finding resonates with others in the literature, which state the main reason for migration as the pursuit for better socio-economic and educational opportunities for their children as well as for themselves (Gcabashe, 1995; Chidi, 2010). Migration to urban areas is often motivated by the evidence of unequal patterns of development in urban areas compared to their rural counterparts (Chidi, 2010). Undeniably, development programs such as the Integrated Urban Development Framework (IUDF) often have a clear focus on developing urban spaces to make them inclusive of rural migrants and resilient in the face of increased human populations in the urban areas due to high levels of rural-urban migration (Cogta, 2016). Moreover, the tendency of those who have settled in urban areas to pay remittances to those in the rural areas feeds into the idea of urban areas being lands teeming with economic opportunities.

Table 4.2: Respondents' reasons for migrating from rural to urban areas

Reason for migration	Number of respondents	% (out of 38 respondents)
Unemployment or to find a job	18	47%
Moved because of apartheid laws pre-1994	4	11%
To be closer to relatives	4	11%
To take advantage of the prickly pear season	4	11%
Moved as a family when the breadwinner found a job in an urban area	5	13%
Moved from country of birth in search of better socio- economic circumstances	3	8%

*The percentages equal more than 100 percent because there was an overlap in the answers given, with some people citing more than one reason. Three respondents declined to answer the question.

However, this belief that per capita incomes are relatively higher in urban areas does not always hold true. For instance, the age profile of respondents in the market revealed that the majority of those who stated unemployment as their main reason for migrating were within the age range of 15 to 64, which is considered in South Africa as the legal age range within which one can be active in the labour force (see Table 4.1). However, due to their low levels of education and skills, they could only participate in income generating activities that were informal in nature and did not require expert skills. Moreover, the ages of those in the market were also concentrated around the 21 to 40 years range, which encompasses the age range specified by the South African National Youth Policy as that of those who are classified as youth. Amongst those interviewed were three respondents who had migrated from Zimbabwe in search of better economic circumstances after they had finished high school and struggled to find employment in the country of birth.

The second reason, linked to the first one, was that respondents migrated to the urban areas to be closer to relatives who were already settled in the urban areas. This was similar to the findings of Gcabashe (1995) who found that people who had migrated from the rural regions of KwaZulu-Natal to Richards Bay were more willing to make the transition from rural to an urban area because they knew that their families would take care of them financially during the period when they would be job hunting. In this study, migration to be closer to relatives was mentioned by 11% of respondents.

Some respondents mentioned temporary migration to participate in the prickly pear market, which served as a safety net as those who gave this response had no other means of making an income at the time of the season. Only four people (11%) indicated that they had temporarily migrated exclusively to take advantage of the prickly pear season. Unemployment being the main reason they were engaging in the market; these people were engaging in the market as a means to sustain themselves while they looked for more sustainable ways of earning income and had been staying with relatives for the duration of the season. To highlight further the role of the prickly pear market as a safety net for those with limited sources of income, the three people (8%) who had migrated to South Africa from Zimbabwe mentioned that they started selling prickly pear earlier this year in addition to hawking other items. They mentioned that the high demand for the prickly pear and its popularity among customers ensured that they at least went home with something at the end of each day when the other items were not selling.

Five people (13%) mentioned migration because of the family breadwinner finding a job in an urban area around the Nelson Mandela Bay. This was especially the case for families that had children of a school-going age where migrating also afforded them access to better schools. The rest, four people (11%) in each category, mentioned forced removals under the political system of apartheid which enacted laws such as the Group Areas Act of 1950, which sought to racially separate communities (Kgatla, 2013).

Assessing these reasons in the context of De Jong and Fawcett's (1981) classification; migrating in pursuit of 'wealth' such as potential to earn higher income through stable employment, improved access to public amenities, and increased economic opportunity was the main reason that was stated by those in the Nelson Mandela Bay informal prickly pear market for why they had migrated from their area of origin.

The second reason was 'affiliation' or migrating to get married, accompany a spouse who had received a job offer in the urban area, or to be closer to family or friends (De Jong and Fawcett, 1981; Gcabashe, 1995). This was mentioned by 11% of people who moved to join relatives and 13% who reported having moved to accompany a spouse who had found a job in one of the urban regions of the Nelson Mandela Bay (Table 4.2).

The reasons that were given by the respondents who mentioned unemployment as the reason they had migrated from rural to urban areas of the Nelson Mandela resonated with Todaro's (1982) migration model. The model claims people's decision to migrate from rural to urban areas is a rational economic decision. The main point Todaro (1982) makes is that people migrate due to the observed income

differences between the rural and urban areas which causes them to rationalize that the probability of securing a job in an urban area is higher compared to work opportunities, or lack thereof, in rural areas. Therefore, the reason to migrate is taken solely based on 'expected' income rather than on guaranteed income once they migrate. Therefore, if the income they expect to receive in cities is greater than the average incomes in rural areas, migration will occur (Todaro, 1982). However, since each individual migrant rationalizes in the same way, the urban labour market is often unable to absorb the large numbers of rural migrants looking for employment. Therefore, migration rates often exceed the rate of employment creation in urban areas (Todaro, 1982). This process leads to high rates of unemployment in most developing country urban areas. In the Nelson Mandela Bay, the unemployment rate was 28.9% in 2015 according to the official definition (DEDEAT, 2017). Since the municipality has promising industrial and manufacturing sectors, the high rate of unemployment could be because of people migrating into the municipality to find jobs. However, since jobs in industry often require a particular set of skills which most people from rural areas sometimes do not possess, this leads to unemployment and migrants often end up in the informal markets to survive (Misra and Alam, 2014).

Cichello and Rogan (2017) state that earnings from informal forms of self-employment or informal employment are almost as effective as income earned from formal wage employment in reducing poverty. The effectiveness of income from informal self-employment is often measured by estimating aggregate poverty levels if the informal incomes were not there (Cichello and Rogan, 2017). This serves to highlight the impact of each of the informal incomes in cushioning the poor from falling into deeper levels of poverty. In this study, the number of years that the respondents had been in the informal prickly pear market was taken as a measure of the significant impact that the income from prickly pear was making in the livelihoods of the market actors (Table 4.3). For instance, majority of respondents reported having been in the market for 11 to 20 years (nine people) and for 21 to 30 years (seven people) (Table 4.3). The people in these categories were mostly pensioners who were no longer physically fit to be part of the labour force. The people were asked to give reasons for their involvement in the market each year (Table 4.4).

Table 4.3: Number of years that the respondents had been engaged in the prickly pear market

Number of years	Number of people	% (n=38)
Less than a month	6	16%
1-5 years	10	26%
6-10 years	2	5%
11-20 years	9	24%
21-30 years	7	18%
31 ≥ 40 years	4	11%

*Less than a month refers to those who said they had started engaging in the market a week or three prior to the commencement of the interviews

These reasons varied greatly but most respondents stated self-employment, being able to make a financial contribution to their households towards the purchasing of basic household necessities even though they were unemployed, and being able to stay afloat financially during the month while they waited to receive the social grants at the end of the month (Table 4.4). Moreover, the cash income earned from harvesting and selling contributed towards buying school uniforms and other school essentials, which is similar to Shackleton *et al*.'s (2011) findings on the significance of the prickly pear to poor communities in Makana Municipality. These reasons highlighted the respondents' motivations as well as the varying levels of importance that the people placed on the income from prickly pear. The number of people who indicated that they had been in the market for less than five years illustrated that there were new people still entering the prickly pear market. This highlights the role of the market as a safety net for those who were faced with economic hardship due to unemployment.

Table 4.4: Reasons given by the respondents for why they engaged in the prickly pear market

Reasons for engaging in the prickly pear market	Harvesters (%) (n=20)	Transporters (%) (n=3)	Sellers (%) (n=15)
Being self-employed	30%	100%	40%
Being able to contribute financially to my household even though I'm currently unemployed	35%	33%	40%
Financial independence so I don't have to rely on my older children and relatives	15%	-	27%
Being to set my own working hours	15%	-	13%
The additional income I get	10%	67%	7%
Being able to buy school uniforms and cover other basic household expenses during the month while I wait for month end to receive the govt. social grant	40%	-	33%
Making a living through non-criminal means	5%	-	7%
I'm just doing this to survive	10%	-	20%

*The percentages equal more than 100 percent because there was an overlap in the answers given, with some people citing more than one reason.

4.3 The market environment

This section details the day-to-day activities performed by each of the actors in the Nelson Mandela Bay prickly pear market. The overlap in the market activities they perform is also highlighted as a way to draw attention to how the market chain functions. In addition, the distribution of the market stalls around the study area illustrates the size of the informal market. The respondents were classified either as a harvester, transporter or as a seller based on what they identified as their main function in the prickly pear market chain. Of the 38 respondents that were interviewed, 20 of them were harvesters, 3 transporters, and 15 sellers. The functions performed were not mutually exclusive as there were some who engaged in more than one market activity as a way to cut costs. For instance, some of the harvesters in the market also sold the prickly pears in addition to their market function as harvesters. Some harvesters' market activities also extended to transporting the prickly pears via headloads from the harvesting site to where it would be sold while those who made use of public transportation or hired a transporter were not seen as having more than one role in the market besides harvesting. Nine sellers reported that they were also involved in the harvesting and transporting of the prickly pear. In the transporters category, two reported being prickly pear sellers in addition to their main market function of

transporting. The reason given by respondents to justify their participation in more than one market activity was that they did so to maximize the incomes they made from engaging in the informal prickly pear market. The classification was based on respondents' identification of the market activity that they most frequently engaged in compared to other market activities that they also took part in.

4.3.1 Harvesting

Majority of the harvesters were interviewed on the commonages where they were found collecting the prickly pear fruits. After filling 20 litre and 5 litre buckets with prickly pears, the fruit was washed and then rubbed on the grass to remove the thorns. Once the cleaning process was done, the fruit was packaged into plastic carrier bags and displayed by the roadside for selling. Three harvesters reported that they sometimes harvested in bulk for other people in the market for cash. For those who did not live on the farms, the harvested loads were transported to where they would then sell the fruit. In cases where harvesters were hired by other people to harvest for them, the person came with their own transport to collect the fruit or the fruit was harvested and delivered to them. The main areas in which the prickly pear was harvested were the commonages around the Springs Resort, Amanzi Estate, Barkly Bridge, KwaBlou which is a commonage just outside of Motherwell, Koedoesloof, near Despatch, and 'KwaStanki' which is another commonage near Motherwell.

Figure 4.1: Mam' uNontobeko harvesting prickly pears at Amanzi Farm, Uitenhage.

Figure 4.2: A harvester cleaning the prickly pear fruit after harvesting

The preferred method of harvesting was using an '*igwegwe'*, which is a piece of wire bent at the top to form a hook. This was to avoid being injured by the thorns on the surface of the plant. The harvesters also mentioned wearing goggles to prevent the tiny hair-like spines (glochids) from getting in the eyes especially when it was windy. Other safety measures that the harvesters employed included wearing heavy-duty gloves or plastic bags on the hands to prevent the thorns from lodging in the skin. Also checking the direction of the wind to make sure that the spines are not blown into their eyes was another safety measure during harvesting.

4.3.2 Transporting

Prickly pear transporters were found through referrals by the harvesters who made use of their transportation services. Some harvesters also transported their fruit harvests themselves, either through head-loads, hitchhiking and paying for the trip with 5 litres worth of prickly pear fruit; taking a taxi or bus, or using wooden carts that they made themselves. All three respondents that were interviewed owned bakkies (utility vehicles) which they also hired out to people other than those in the prickly pear market. The number of trips depended on the number of days per week that each of the harvesters went to harvest. If the stock of prickly pears on a particular day finished before the end of business day, which was 18h00 for majority of the marketers, sometimes a harvester would ask to do an extra trip to the harvesting site. Therefore, the number of times that the transporters were available to offer their services varied depending on the number of times the harvesters and sellers requested their transport services. The following images (Figures 4.3 – 4.5) show the different modes of transport that were used to transport the prickly pears.

The number of clients that each transporter had in the market depended mainly on referrals by people who were already making use of their services and was also at the vehicle owner's discretion. For instance, one of the transporters was hired by a harvester, umam' uNontobeko, to drive her and one other person who was also a harvester and friend of mam' uNontobeko to and from the harvesting site in Uitenhage. Another transporter mentioned that his involvement in the market began as him doing a favour for a friend who harvested and sold prickly pears. Initially, he did not charge the friend but when he began getting more clients, he started charging for his transport services. At the time of the interview, he was transporting six people between KwaNobuhle and Sandfontein Farm where they harvested. The third harvester started working as a transporter last year after initially transporting a neighbour who then recruited four of her friends. The pricing system used by each of the traders varied greatly. The transporter who had started off transporting his friend mentioned that the friend only had to buy petrol for the trips while the other clients were charged cash per return trip. The other transporter mentioned that the number of people that she transports has since increased to five people including the neighbour, and the amount charged per trip was estimated based on the distance travelled. Mam' UNontobeko paid her driver for each trip and she took care of the petrol costs since the van belonged to her. The only similarity in their pricing mechanisms was that the transport costs did not fluctuate with the prices that were charged for the prickly pears. There were only a few transporters in the market because most of the harvesters and sellers sometimes preferred to transport the prickly pears themselves to avoid incurring transport costs, which would reduce the little income they were able to make from harvesting or selling the prickly pears. Those who opted to walk and transport the prickly pears via headloads reported only being able to harvest one or two containers.

Figure 4.3: A transporter's bakkie coming to collect the prickly pear fruit after harvesting.

Figure 4.4: A cart (*ikari*) used to transport prickly pear harvests at short distances.

Figure 4.5: A harvester carrying bucket loads of prickly pear from harvesting site

4.3.3 Selling

The prickly pear sellers were the first market actors encountered in the field as they were located by the sides of the road. The interviews with the sellers led to referrals to where harvesters could be found and it was sellers who also occasionally engaged in harvesting that provided the leads to other harvesters' whereabouts. The prickly pear selling sites were located all around Nelson Mandela Bay and twelve sellers were found selling the fruit mainly by the roadside. The rest, three people, were selling prickly pears outside shopping malls in Daku Road, Motherwell, KwaNobuhle, and Despatch, where customers were mainly pedestrians and people visiting the malls. Although nine sellers harvested their own prickly pears to sell, the respondents in this category mainly identified themselves as sellers since this market activity earned the most income. Among those who harvested the prickly pears themselves, the time for

harvesting was early morning before sunrise so they could be at the selling sites by 07h30 until 18h00 in the evenings. Some sellers also participated in the transporting of the prickly pears to the selling spots. Those who stayed on the commonages in Uitenhage mainly transported through headloads while those who were from outside areas used public transport or walked to save on transport costs or if they considered the distance to be reasonable.

Prickly pear harvesters and sellers who lived in shacks with no electricity connection and no refrigerators, mentioned that they had to make sure that they sold everything otherwise the prickly pears would spoil and they would have to throw them away the next day. However, one harvester who was also a prickly pear seller mentioned that she used the leftover prickly pear stock to make '*stroop*' (syrup) which she then sold for R100 in 750 ml bottles at her prickly pear stall by the side of the road. Some mentioned that they harvested the prickly pears while they were still green so that they would be able to store the leftovers and still be able to sell it the next day.

Figure 4.6: A prickly pear seller stationed across the road from Daku shopping centre

4.4 The informal prickly pear market dynamics and procurement of the prickly pear fruit

The main areas for harvesting the prickly pears were in Uitenhage, although there were other places in Motherwell, Barkly Bridge, and Koedoesloof. Sellers who did not harvest their own prickly pears bought it from harvesters staying on the farms in Uitenhage or, as mentioned by several sellers, bought it from either one of two people who sold from their bakkies in Veeplaas Square and in Korsten. After purchasing them, the prickly pears were then transported to the different spots, which the sellers were stationed, mainly by the side of the road and by traffic lights. The most popular selling spots were in the Central Business District (CBD) on William Moffett Drive, Greenacres, Newton Park, and Sunridge Park. Other

places included outside shopping malls in Walmer, Despatch, Daku, Motherwell, and KwaNobuhle. In Uitenhage, the prickly pears were sold just outside the commonages where customers were mainly motorists. Although there were some prickly pear sellers stationed in the location, some revealed that this limited their income because they could not charge the same prices that they charged in town because they had to make allowance for the differences in economic circumstances.

4.5 The challenges faced by marketers in accessing the prickly pear fruit

There were a number of different factors that contributed to the limited availability of the prickly pears. The most significant was the impact of the cochineal strains on the overall supply of the wild fruit (Figure 4.7). Although from a pro-eradication perspective the reduction in the supply of prickly pear is favourable, the result of this was a shortened season, which impacted negatively on the market incomes of the Nelson Mandela Bay informal prickly pear marketers. The effects of the cochineal were expressed mostly by those who harvested, mentioning that they had to spend more time searching for fruit that was not infected with the cochineal. The cochineal insect releases, which the respondents referred to as '*ityhefu emhlophe*' (white poison) is a biological control agent used to control and eventually eradicate prickly pear stands (Annecke and Moran, 1978; Beinart and Wotshela, 2011).

In the harvesting sites, the cochineal had infested large sections of prickly pear stands. The respondents expressed that its presence severely limited the amount of prickly pear that they could harvest as the poison could not be washed off and the infected fruit had to be thrown away. This, in turn, limited the potential income that could be made from selling the prickly pear fruit. Therefore, in addition to the limits in supply of the fruit due to almost a third of the harvesters harvesting from the same area, the presence of the cochineal compromised the prickly pear's contribution to the livelihoods of all three stakeholders identified in the market.

Figure 4.7: A cochineal-infested prickly pear stand at Amanzi Farm, Uitenhage

However, besides the effects of the cochineal, the harvesters and sellers all agreed that they did not experience any problems with accessing the prickly pear on the commonages in Uitenhage. One person who had been collecting the prickly pear from "*KwaStanki*", a farm in Motherwell, reported that he had been stopped several times by police on his way from harvesting prickly pear and asked to empty the containers with the prickly pears to see if he had not stolen anything from the farm.

This was because there had been incidences where some harvesters were stealing and slaughtering pigs belonging to the farm owner and hiding the meat at the bottom of the buckets. Therefore, they were often prohibited from harvesting at the farm and had to go harvest in Uitenhage, which was further away than the farm in Motherwell. Other respondents who harvested their prickly pear from the farms in Uitenhage mentioned that other marketers who stayed on the farms that denied them access to the fruit.

Ecological factors also played a part in determining the level of supply of prickly pear as some respondents revealed that the fruit was sometimes either not ripe enough or too ripe. The quality of the prickly pears was determined by the customers' preferences as customers were not buying prickly pears that they considered as too ripe as those were sometimes often rotten inside.

Therefore, the prickly pear sellers revealed that the black customers, majority of whom did not have refrigerators in their homes to store the prickly pear fruits, preferred the green fruit as it could be stored overnight and sometimes for up to a week. On the other hand, traders who sold their prickly pear outside shopping malls and in the Nelson Mandela Bay CBD and for whom the majority of customers were white, the preferred quality of the fruit was the ripe yellow or red fruit variety. At roadside stalls, where the group of customers was not specific, prickly pear sellers sold both varieties of fruit and displayed it separately to make it easy for the customers, specifically motorists, to pick out the fruit they wanted to buy. Therefore, depending on where the fruit was going to be sold, the level of ripeness greatly affected the amounts of prickly pear that could be harvested. Those who bought their prickly pear supplies from the seller in Korsten complained that it sometimes quickly ran out because there were many people buying from the same supplier. Furthermore, the supply was also unreliable as there were days when the supplier would not come.

4.5.1 Variation in the supply of prickly pears throughout the season

The consensus among the respondents was that the stock of prickly pear is usually abundant at the start of the season but dwindles as the season nears its end. The abundance of the fruit at the start of the season coincides with increased levels of harvesting therefore getting the fruit that is ready for harvesting

and selling is a challenge. The harvesters mentioned having to wake up early so that they would get to the farms before everyone else. Moreover, the respondents mentioned that when the fruit is abundant they are able cater to the demands of their customers, which is to harvest fruits that are at different stages of ripeness according to customer preferences.

Although the harvest levels were high, three harvesters mentioned that the sales were generally low during the first few weeks at the start of the season. They attributed the low sales to the unfamiliarity of some customers with the fruit, which meant that only a few bought the prickly pears. As the season progressed, more people would start buying the fruit and according to one of the harvesters, usually the best time to start engaging in the market is mid-season in February when the market is already in full swing. Towards the end of the season, the prickly pear fruit supply starts to dwindle as the small, green or red inedible varieties of the fruit locally known as '*amakrwala'* start appearing. According to the prickly pear harvesters, these are usually rotten inside and signal the end of the 3-month long prickly pear season.

Majority of harvesters and sellers argued that the falling supplies of prickly pear at the end of the season was mainly due to the presence of cochineal, which not only limited the amounts that could be harvested but also reduced the length of the fruiting season. However, some respondents disagreed and expressed that since the cochineal releases, there has not been much of a difference between the start and the end of the prickly pear season.

They reported that even though the fruit was in abundance, most of it was infected and could not be harvested and sold. Four harvesters who had been engaged in the market for more than a decade (Table 4.3) mainly expressed these concerns. Overall, the presence of the cochineal was seen as a hindrance to how much the prickly pear could contribute economically to the livelihoods of the informal marketers in the Nelson Mandela Bay.

4.5.2 The quantities of prickly pears harvested and sold per day

The harvesters gave rough estimates of the amounts of *Opuntia* fruits that were harvested per day, as they did not keep formal records of how much each person harvested per day. However, the amounts that could be harvested depended on whether the harvester had the means to transport the containers used to carry the prickly pears. For those who did not have their own transport, the distance between their homes and the harvesting or selling sites determined the amounts they could harvest. Therefore,

the estimates of the quantities of prickly pear that could be harvested varied depending on the influence of these two factors – availability of transport and distance. Consequently, the harvesters and sellers who required transport to the harvesting and selling sites due to distance incurred transport costs.

The harvesters mainly used 20 litre buckets as containers when harvesting prickly pear as they could put more fruit in them compared to using only the small 5 litre buckets. The average number of litres harvested was estimated to be 61 litres of prickly pears per trip based on how much each harvester's estimates. As evidenced by the few transporters in the market, majority of harvesters and sellers opted for cheaper transport alternatives or walking, even though walking to and from the commonages meant they could harvest only what they could carry. As such, the amounts of prickly pears harvested by those who mainly walked to and from the harvesting site was two or three 20 litres of prickly pears per trip.

Tshuma and Jari (2013) identified this as one of the problems that often stifle the growth of informal markets as limited financial resources accompanied by high transportation costs limit the profitability of informal market activities for those involved. Six harvesters indicated that they harvested three to four 20 litres of prickly pears only if they were going to use a taxi or if they had someone to help them carry the buckets. Some people harvested relatively more *Opuntia* fruits also to sell to those who could not engage in harvesting but were engaging in the informal market as prickly pear sellers. Two people harvested between eight to twenty buckets of the same size, some of which they sold to prickly pear sellers in the market.

Due to the short shelf life of the prickly pear fruit, harvesters usually harvested the amounts that they knew they could sell in a day. However, depending on how ripe the fruit was when it was harvested, it would either be consumed within the household or thrown away if there were any that were leftover. Therefore, harvesting was done on a regular basis and sometimes every day of the week.

4.5.3 The amount of time spent engaging in each market activity

There was not much variation in the number of hours that each of the market actors devoted to engaging in the market as most people across the three groups of market actors reported that they engaged in the market almost every day of the week. As one of the ways by which the poor construct their livelihoods in the face of unemployment, the number of days and hours that the market actors dedicated to participating in the market highlighted the importance of the income to their households (Tables 4.7 to

4.9). As mentioned by majority of the interviewees, the income made from prickly pear was determined by the time committed to participating in the market, although other factors such as the level of sales also had an influence on how much income the marketers generated. Considering that the respondents also pursued one or several other alternative forms of making income, some chose or could only participate in the prickly pear market on certain days during the week (Tables 4.7 to 4.9). This strategy of pursuing more than one income-earning activity is typical of poor people who often undertake multiple income-earning activities to reduce poverty as well as the risk of falling below the poverty line if they were to rely only on one source of income (Mathebula *et al*., 2017). The typically large sizes of poor households also prevent poor people from falling into poverty since in a household that has more than one adult employed in gainful employment means that more people can contribute towards diversifying a household's livelihood portfolio. This is especially the case if there are more adults than children in each household, which was the case in this study (Table 4.1). Women who had children of a school-going age reported that the time they would have spent in the informal prickly pear market was reduced by having to take care of household duties before leaving to go harvest or sell prickly pears and having to make sure that they were at home when the children returned from school in the afternoon. Some of those who did not harvest on weekends mentioned that they did so for religious reasons or to rest in preparation for the following week. However, although the harvesters gave estimates of the number of days in which they engaged in the prickly pear market, harvesting was largely carried out on an *ad hoc* basis.

To maximize profits, respondents who sold the prickly pears outside the commonages in Uitenhage where most of the harvesting took place mentioned that they sometimes harvested more than once in one day if the stock of prickly pears ran out before they were done selling for the day. The time spent engaging in the market was also affected by weather conditions as the respondents mentioned that they did not harvest or sell on days when it was raining because the markets were operated out in the open with no protection from the rain and other harsh weather conditions. Moreover, the harvesters reported that they did not go to collect prickly pears on days when it was windy to avoid injury.

The transport services were also offered on an *ad hoc* basis depending on the harvesters and sellers requesting to be transported. All the transporters indicated that they engaged in the market a maximum of 3 days per week as many harvesters either did not live far from the harvesting sites so many of them walked; or due to financial constraints, they opted to transport their stock via headloads rather than pay someone to transport it for them. One transporter indicated that she transported people at least twice a

week. As someone who offers transport services to other people besides those in the prickly pear market, some harvesters saw the minimum price she charged for transporting as too expensive.

Since the transport costs charged to the informal prickly pear marketers were relatively lower compared to the transport costs charged to other people requiring transport services outside the prickly pear market, this presented an opportunity costs. Firstly, since the amounts charged for transporting prickly pears were lower, the transporters sacrificed a portion of their incomes as well as time that would have been spent transporting other clients who were paying more. The opportunity cost arose from the transporters being aware of the informal prickly pear marketers' plight, that charging them more than they could afford would impact negatively on the prickly pear incomes and consequently on their livelihoods. Palmer and Raftery (1999) state that since time is a non-market resource, one way of quantifying the opportunity cost of time in situations that involve paid work activities is using the cash amount that would have been earned as a 'shadow price' of the time lost. For the prickly pear transporters, the trade-off was the difference in the price they would have charged to other customers for their transport services on any given day. The amounts that were charged for transport services were at the discretion of each transporter, the 'shadow price' of each hour lost varied accordingly.

Table 4.5: Number of times harvesting is done during the season.

Number of hours/days	**Number of harvesters**	**% (n=20)**
Once a week	-	-
Two or three times a week	4	20%
Four times a week	1	5%
Every day of the week	13	65%
Every day of the week, except on weekends	2	10%

Table 4.6: Number of trips made per week

Number of hours/days	**Number of transporters**	**% (n=3)**
Once a week	-	-
Twice a week	2	67%
Three times a week	3	100%
Depending on when they want to be transported	3	100%

Table 4.7: Number of days per week spent selling prickly pear

Number of hours/days	Number of sellers	% (n=15)
Once a week	-	-
Twice a week	1	7%
Three times a week	3	20%
Every day of the week	7	47%
Every day of the week, except on weekends	4	27%

*the percentage in this table exceed 100% due to rounding up of the figures.

4.6 The costs incurred by prickly pear marketers

The largest portion of respondents' costs were made up by transport costs to and from the harvesting and selling spots. Although there were some who made use of the transporters' services, the majority of harvesters and sellers made use of public transport such as taxis, buses and sometimes hitchhiking to get to the harvesting and selling sites. Among those who made use of public transport, transportation costs for taxi fare ranged from R9 to R13.50 for a one-way trip. For those who harvested in Motherwell, Koedoesloof Farms and surrounding areas, the taxi fare was R20 for a return trip. Some harvesters revealed that they hitchhiked and gave the driver a 5-litre bucket of prickly pears, which was equivalent to one plastic carrier bag, as payment. Those who travelled from Motherwell to Korsten to buy their stock of prickly pears had to take two taxis; one from Motherwell to Korsten for R13 and another one to Greenacres for R9 if that is where they sold their prickly pears. A return trip cost each of these marketers R44 per day. Some prickly pear sellers thought it convenient for them to just buy from Korsten rather than harvest their own prickly pear and then have to take two taxis with heavy containers to their selling sites in Korsten. It was also mentioned that the prickly pear supplier in Korsten was well-known for having good quality prickly pears. A harvester who was also a prickly pear seller estimated that her transport costs from Monday to Friday amounted to R117.50 since she spent R23.50 per day on transport. For transporters, the only cost was petrol. The other cost that were incurred by the informal prickly pear marketers were for the purchasing of plastic carrier bags to package the prickly pear fruit for selling. The purchasing of plastic carrier bags was mostly done monthly. Those who could not afford to purchase them in bulk bought them daily according to how many they would needed on a particular day. The cost of plastic carrier bags ranged from R15 to R45 per month.

4.7 The marketing strategies employed by prickly pear marketers

Various marketing strategies were employed by the informal marketers in their respective market positions. Generally, the links between the actors in the market were formed through referrals by others in the market. For instance, harvesters shared information on the places where the best prickly pear quality could be found, while the sellers mainly shared information on reasonably priced transport services. To ensure harmony among the sellers and that all benefited from engaging in the market, the sellers had a mutual agreement on the price of the prickly pears. However, some sellers revealed that when sales were not going well on some days, they often reduced the price of the prickly pears to boost sales, so they could avoid having to go back home with leftover prickly pear stock. This was often done without the knowledge of the other sellers in the area. All the harvesters collected prickly pears from areas that were either the closest to where they lived, or in areas that were popular among other harvesters for the quality of prickly pear or the ease with which the fruit could be accessed.

The prickly pear sellers preferred to station by the roadside where there were pedestrians and motorists. The sellers stated that motorists did not complain about the prices they charged for the prickly pear, unlike customers in the township area who often negotiated for lower prices. However, there was one seller in Soweto location who mentioned that she preferred to sell close to where she lived as this allowed her to save on transport costs.

Sometimes sellers preferred to operate at locations where they could get higher prices and these were usually areas in Port Elizabeth, such as Greenacres, William Moffett, Newton Park, and Walmer. The other reason for choosing selling spots despite the additional costs of transport was to find a selling spot where there would be less competition with other prickly pear sellers. Where there were many prickly pear sellers occupying an area, individual sellers were forced to peg their prices to those of other sellers in the same vicinity to avoid conflict arising from potentially stealing each other's customers. Besides sellers the controlling price setting at their respective selling stations, some had already built rapport with some customers who frequented the market, and this served as another barrier to other prickly pear sellers who were relatively unknown in the area as being to draw in customers depended on the individual seller's popularity.

Another marketing strategy that was followed by the sellers was to line up 5 litre containers of prickly pears along the side of the road to grab the attention of motorists along major transportation routes.

Overall, despite the apparent barriers to market entry, there was free movement within the Nelson Mandela Bay prickly pear market as sellers mentioned that they were not restricted from selling in other areas if they wanted to, provided that they adhered to the pricing system in the area.

4.8 The economic contribution of the prickly pear to household incomes of the marketers

The poverty-reduction potential of 'pavement economies' especially in a country like South Africa which is plagued by high levels of unemployment, is often significant since it is usually the low and semi-skilled that are absorbed by these markets (Tshuma and Jari, 2013). Informal markets provide an income for those who would otherwise fall below the poverty line in the face of widespread unemployment. Moreover, as a form of entrepreneurship, informal markets also act as tools for job creation (Tshuma and Jari, 2013). Furthermore, the ratio of men to women in these types of markets also tend to favour women as a vulnerable group in society especially if the work is not too labour intensive (Tshuma and Jari, 2013; United Nations Women, 2017).

All these trends identified in the literature were similar to those that were observed in the informal prickly pear market, which is a source of income for the unemployed in Nelson Mandela Bay. The strategies that were employed by the informal marketers for profit maximization were either through working more hours, switching selling spots, or engaging in more than one activity in the market.

As already mentioned previously, the income made from engaging in each of the market activities was largely determined by the number of hours the marketers devoted to their respective market activities. The quantities of prickly pears they harvested and sold per day, on the weather conditions especially windy and wet weather conditions, which determined whether they would be able to engage in the market on some days, and on the prices charged for the prickly pears. Although the respondents gave income estimates, no formal records were kept of how much they made from the market activities that they engaged in because the cash income was often spent immediately on household items after it was earned.

Figure 4.8 illustrates the variability of the harvesters' gross monthly income earned from engaging in the Nelson Mandela Bay informal prickly pear market. Some harvesters reported that the incomes were earned daily or weekly, with the majority stating monthly figures. The incomes were aggregated to monthly figures since some of those incomes that were earned daily and weekly were sometimes earned

monthly, or respondents reported that those were incomes that they were sure to get per month even if prickly pear sales were poor on certain days throughout the month. The aggregation of the income was also to reduce variation in the income data. When all the daily, weekly, and monthly incomes of the harvesters were added together, the average income of the harvesters before accounting for costs was R653.40 per month. Six harvesters earned less than R200 either daily or weekly if sales were not going well, while seven revealed that their incomes were between R400 to R550. This was a combination of income from harvesting for other people in the market and from selling the prickly pears. Harvesting for cash for other sellers in the market was mostly carried out by prickly pear marketers who were staying in proximity to the prickly pears inside the commonages or marketers who had the means of transport to be able to harvest more. In this case, was an overlap in market activities as harvesters in the commonages could manage to both harvest and sell the prickly pears since it was easily accessible to them.

Moreover, staying in the vicinity where the prickly pear grew meant that they could harvest as frequently as they wanted to, and therefore sell relatively more fruits compared to other marketers. Likewise, respondents who had reliable transport could fill many containers both for their own sales and to sell in bulk to other prickly pear sellers in the markets. In addition, having their own reliable transport meant that it was easy for them to switch between selling spots during the day if sales were not going well in a particular area.

On the other hand, prickly pear harvesters and sellers who did not utilize transport or were looking to save on transport costs made less income in comparison. This was because walking meant that they could only fill the number of containers that they would be able to carry. Therefore, for the prickly pear harvesters with limited access to transport, it was more profitable for them to harvest in bulk for other sellers in the market and as a result, they identified harvesting as their main activity in the prickly pear market.

The main hindrance to increased profitability in the prickly pear market was time. Firstly, since majority of the participants had to walk long distances going to the harvesting sites in Uitenhage, the number of hours they could spend in the market was lesser compared to the number of hours that were committed by other marketers who were staying relatively closer to the harvesting sites. Secondly, female marketers who were in the position of household headship and had young children had to divide their time between household responsibilities and participating in the prickly pear market. These two factors contributed to the differences in the incomes earned by harvesters and sellers in the Nelson Mandela Bay informal prickly

pear market. Figure 4.8 shows the influence of these factors to the monthly incomes that were earned by the prickly pear harvesters. Two harvesters, who also participated in selling prickly pears, reported that they harvested four 25 litre buckets and ten 20 litre containers weekly, respectively, and earned incomes of between R840 to R1000 per month. Since these harvesters were staying inside the commonages in Uitenhage, these income amounts were a combination of the income they earned from selling in bulk to other sellers in the market as well as hawking prickly pears.

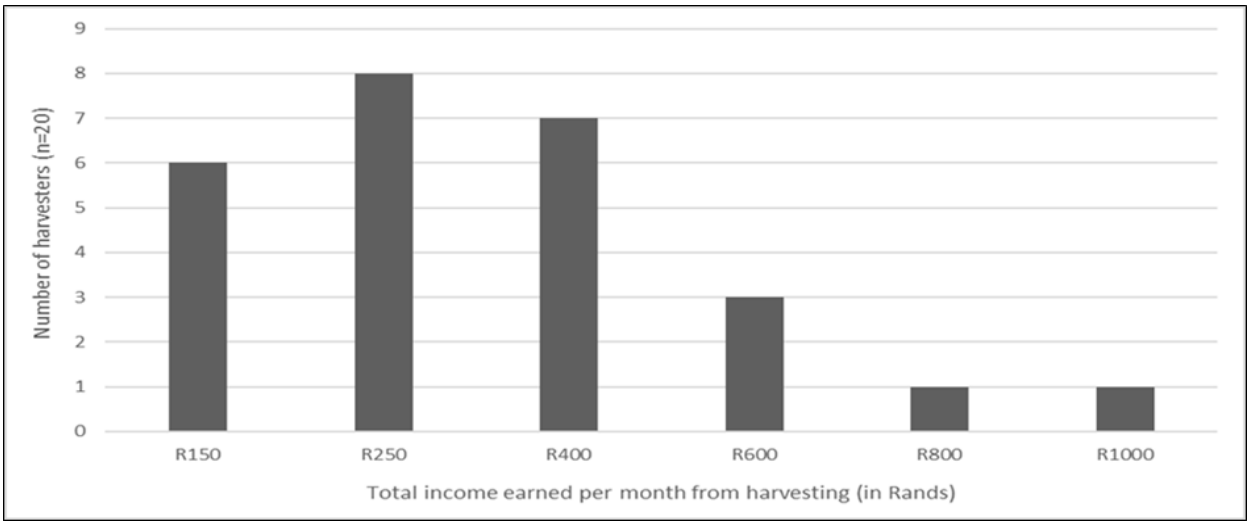

Figure 4.8: Distribution of harvesters' incomes earned monthly.

The costs of hiring transport ranged from R80 to R200 for a return trip (transporter's income graph, Figure 4.9). The main determinants of the amounts charged for transport services were the cost of petrol and distance. Transport from Motherwell to harvesting sites at Barkly Bridge was R80 per passenger for a return trip. Sellers who were interviewed in Daku mentioned that they paid R50 for a return trip to Veeplaas where they bought their stock of prickly pears. The average gross monthly income from transporting prickly pears was R320, which was almost half of the average income earned by each harvester. The highest earner among the transporters was a respondent who was transporting six people and made R480 daily per return trip by charging each person R80 (Figure 4.9). One of the two remaining transporters charged clients R100, R180 or R200 per return trip depending on the distance, while the other charged a flat rate of R100 on all trips. These transport costs were split amongst the clients, with each client only paying a small portion of the total amount.

Figure 4.9: Distribution of transporters' incomes earned daily

The prickly pear was sold for R10, R15, or R20 per plastic bag depending on where the prickly pear stalls were stationed in the study area. Each bag contained approximately 15 to 20 prickly pears fruits, although the size of the individual fruits determined how much was placed inside each bag. Some sellers revealed that they reduced their prices for prickly pear if a customer was short of cash and instead sold individual fruits for R1 or R2, or on some days the prickly pear prices were reduced to boost sales. Income from prickly pear sales ranged from as low as R60 to R1500 depending on the amounts that were sold (Figure 4.10). People whose main market activity was selling seemed to be earning slightly more than harvesters despite there being some overlap in market activities carried out by the two groups of market actors. Looking at Figure 4.8, harvesters' incomes were concentrated in the lower income side of the graph. One possible reason for this could be that people who did not have transport could only harvest what they would be able transport via headloads. Majority of the marketers were not from Uitenhage, they only harvested there since that is where they could harvest good quality prickly pears.

Therefore, how much prickly pear they could harvest per trip depended on whether they had reliable transport. The high variability in incomes was also attributed to some prickly pear marketers dedicating more hours to harvesting and selling, especially those staying inside the commonages in Uitenhage. Therefore, the incomes of marketers who were staying in Uitenhage were generally higher than those of other marketers whose access to the prickly pears was limited by distance and limited financial resources to hire transport. As a result of Uitenhage marketers having enough access to the fruit to participate in

both the harvesting and selling of the prickly pears, the sellers' gross average income was R754.67, which exceeded the average income from harvesting even though the sample size of sellers was less than that of harvesters. Three people earned daily incomes of R60 to R190 from selling prickly pears for either R10 or R20 for a plastic bag. Other sellers reported incomes of R200 to R450 per day and these were mainly sellers who sold more than one 20-litre of prickly pears per day and each container yielded approximately 15 small plastic bags of the prickly pears although the amounts of fruit that were placed in each plastic bag depended on the size of the individual fruits.

The income that each seller earned was also determined by where they were stationed. Sellers who stationed in the Central Business District outside Greenacres, William Moffett Drive, or 6th Avenue Mall in Walmer earned more income because they could charge a higher price compared to those who sold in the township or other low-income areas. The income from selling prickly pears was highly variable and ranged between R150 and R1500 (Figure 4.10), subject to the factors mentioned previously. In addition, these incomes depended on the number of hours each person committed to engaging in the market; the amounts harvested or bought if they did not do their own harvesting, and the prices charged in the informal market. The respondents all agreed that the incomes they were earning from engaging in the informal prickly pear market was making a significant to their households' livelihood portfolios and mentioned various expenditures that they managed to carry out with the income. Since the respondents mentioned that some of the income figures quoted were earned either daily, weekly or monthly, the total income earned for the whole season could potentially exceed the quoted figures. The income figures were aggregated to monthly amounts for simplicity of analysis and because marketers reported that these were average incomes that they were sure to get in a month despite sales being poor on some days.

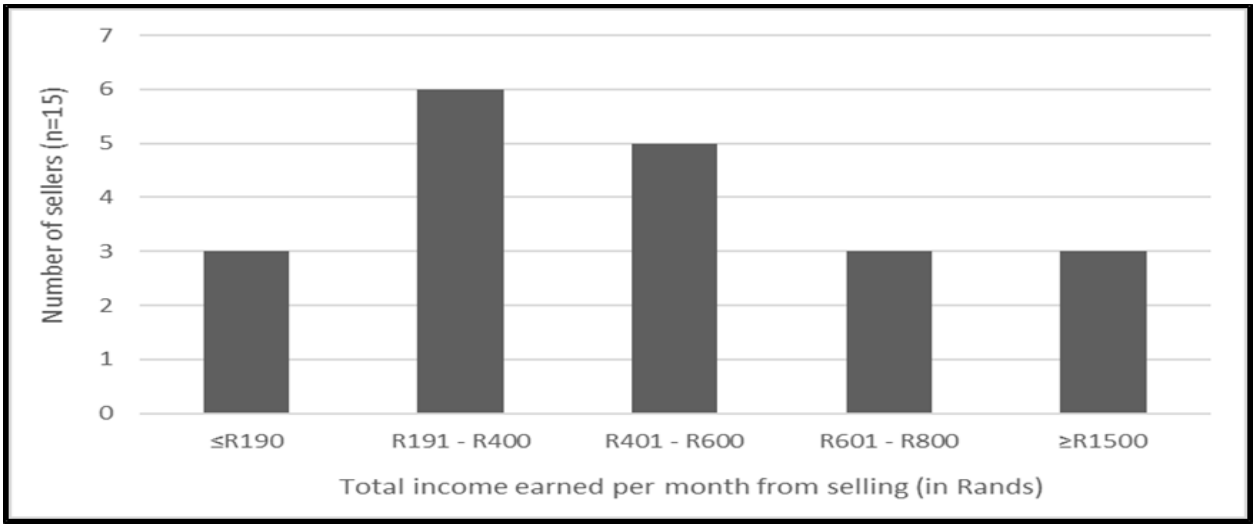

Figure 4.10: Distribution of sellers' incomes earned monthly

Since the fruiting season of the prickly pear lasts only three months each year (January to March), the market actors' monthly incomes (daily income for transporters) are multiplied by the number of months during which the income was earned to obtain the total estimated value of the Nelson Mandela Bay informal prickly pear market. The values used in the following calculations are the income amounts quoted in Figures 4.8 to 4.10, multiplied by the number of people in each income category as shown on the vertical axis, then multiplied by the three month-period of the prickly pear season:

Harvesters' incomes: R150 x 6 people x 3 months = R2 700
R250 x 8 people x 3 months = R6 000
R400 x 7 people x 3 months = R8 400
R600 x 3 people x 3 months = R5 400
R800 x 1 person x 3 months = R2 400
R1000 x 1 person x 3 months = R3 000

Therefore, the estimated total value of the NMB informal prickly pear market from adding harvesters' incomes is R27 900.

Transporters' incomes: R480 (6 people x R80 each) + R100 + R180 + R200 = R960

The average number of days per week that the transporters engaged in the market was 3 days. Therefore:

R960 x 3 days x 4 weeks = R11 520 x 3 months = R34 560 is the value of the market.

Sellers' incomes: R150 x 3 people x 3 months = R1 350
R300 x 6 people x 3 months = R5 400
R500 x 5 people x 3 months = R7 500
R700 x 3 people x 3 months = R6 300
R1 500 x 3 people x 3 months = R13 500

Therefore, the estimated total value of the NMB informal prickly pear market from adding the incomes of market participants in the sellers' category is R34 050.

These figures only serve to give an estimate of the value of the Nelson Mandela Bay informal prickly pear market based on the income amounts that were quoted by the sample of 38 market participants that were interviewed. Since the sample size was subject to Elliott and Timulak's (2005) saturation principle, it was not possible to interview every prickly pear market actor the researcher was referred to by other interviewees who had been interviewed prior. Therefore, the total value of the market could be significantly larger than the aggregate income figures from the calculations.

The estimated value of the Nelson Mandela Bay informal prickly pear market derived from the calculations is plausible considering the sizes of the commonages in Uitenhage where most of the prickly pears were harvested. Although they were not all completely taken over by prickly pear infestations, the presence of the species across large hectares of land in the Springs Resort and Amanzi Farm was significant enough to warrant it supporting a market of the size estimated by the above calculations. In addition, since the prickly pear spreads easily (Beinart and Wotshela, 2011), some of the places the respondents were harvesting from were harvesting from were relatively smaller patches compared to those in Uitenhage.

Figure 4.11 illustrates the range of income sources that formed the livelihood portfolios of the prickly pear marketers' households. Informal jobs undertaken by the respondents included selling firewood, working seasonal jobs on the farms in Addo as a fruit harvester, working at a construction site, domestic work, gardening, working as a taxi conductor, and hawking fruit, vegetables and other items. Fruit hawkers sold what was in season and incorporated a variety of fruits at their stalls according to customer demands. Since the availability of the fruits they were selling alternated seasonally throughout the year and the other income sources were available all year round, their contribution to household incomes was more stable compared to that of prickly pear which is only available for three months. Their livelihood contribution was more significant despite the costs incurred in procuring them such as purchasing the fruits they sold. The prickly pears were procured at no financial cost to the marketers, except in the case where sellers hired someone to do their prickly pear harvesting for them, which they paid R70 or R80 for a 20 litre container of prickly pears.

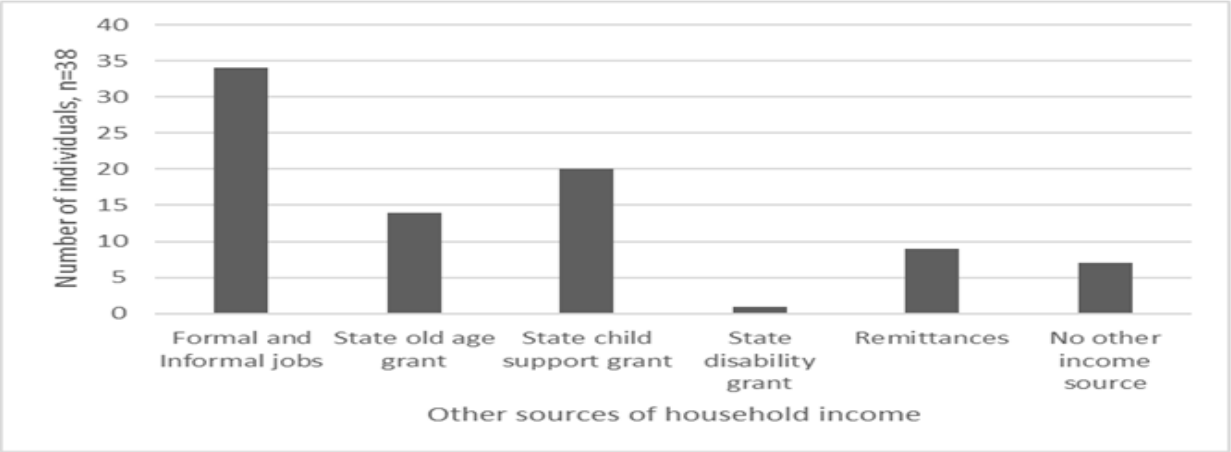

Figure 4.11: Other alternative income sources making up each prickly pear marketer's household income portfolio

4.8.1 Household expenses covered by the income from the informal prickly pear market

There were similarities in the different actors' responses regarding their expenditure of the income that they earned from participating in the informal prickly pear market. The household expenditure items that were mentioned included groceries, buying energy (electricity, candles, petrol to power generators, and paraffin), buying toiletries, paying off debts, financing household maintenance, contributing towards stokvels, and purchasing basic household furniture. According to 35 respondents, the major household expense for which the income from prickly pear was used was to buy groceries. However, one interviewee revealed that she used some of income from prickly pear to buy food saving stamps, which she redeemed in December to buy Christmas groceries.

Perhaps the most significant contribution made by the income from prickly pear was towards the purchasing of school uniforms and buying school stationery. This was mentioned by all the respondents with children of school-going age across all three groups of market actors (see Table 4.1). This finding is similar Shackleton *et al*.'s (2011) on two accounts; firstly, the importance of the prickly pear's contribution was amplified by the season beginning soon after the end of the festive season, which to some is a period where financial resources are scarce. Secondly, the season starts at a time where schools re-open for the New Year so the income from prickly was used towards the financing schooling expenses (Shackleton *et al*., 2011). However, contrary to their findings, the children of the respondents that were interviewed for this study were attending government no-fee schools for which there was no payment for school fees, so the income was used for other schooling expenses and the rest was channelled towards other household

expenditures. Overall, those who were unemployed saw the importance of the income from the prickly pear market. Households with multiple sources of income such as government grants and income from informal or formal jobs (see Table 4.1), mentioned that the income from the prickly pear market was significant in helping them stay afloat during the month when the other income sources, like the state grant, had run out. This was the case in households that were large and in which the majority were unemployed or employed informally, thus making their incomes irregular and unreliable.

The following section discusses these research findings in the context of the Sustainable Livelihoods Framework as well as linking them to the findings in the literature. Similarities with and differences from the findings of other authors who have done research on the *Opuntia ficus-indica* species in the past are unpacked to give a thorough analysis as well as highlight the uniqueness of the Nelson Mandela Bay informal prickly pear market case study.

4.9 Analysis of findings in the context of the Sustainable Livelihoods Framework

The main aim of conducting a livelihoods analysis is to understand how the poor combine resources in the process of pursuing their desired livelihood outcomes and understanding this is often the first step in planning development projects (GLOPP, 2008). In some cases, a livelihoods analysis is conducted to monitor and review the success of existing projects or activities in terms of their impact on livelihoods (DFID, 1999; GLOPP, 2008). In approaching a livelihood analysis, the Sustainable Livelihoods Approach is used as a checklist for all the factors that should be considered when attempting to understand poverty in a particular context (GLOPP. 2008). To offer an understanding of what comprises a livelihood Chambers and Conway (1991: 10) define a livelihood as "the combination of people's capabilities, the strategies that they undertake in pursuit of their livelihoods, and the incomes and capital assets at their disposal".

The Framework (Figure 4.12) introduces and shows the influence of institutions and policies on the ability for an individual, household, or community to achieve their livelihood goals. Employing the previous livelihoods definition, Scoones (1998) goes on to explain that in the face of institutional, policy pressures, and the vulnerability context within which all households operate, the sustainability of a livelihood is determined by its ability to show resilience and maintain its current livelihood standard. This resilience is demonstrated when a livelihood is able to cope and recover from shocks and stresses while continuing to enhance the capabilities of the people concerned as well as improving their access to livelihood assets, all while not compromising the natural resource base (Chambers and Conway, 1991; Scoones, 1998).

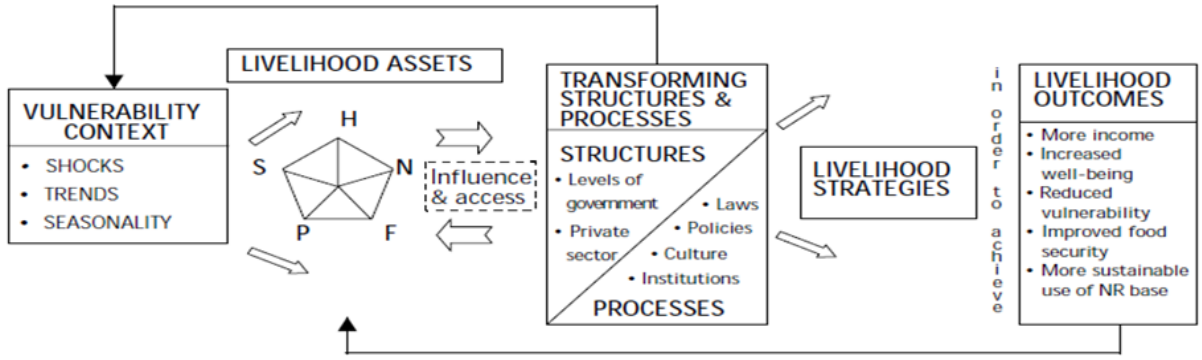

Figure 4.12: The Sustainable Livelihoods Framework *(DFID, 1999)*

The asset pentagon was used to classify the livelihood assets of the prickly pear marketers according to each of the category of assets specified in the framework. Following this, an analysis of the individual and household level factors that were limiting their ability to have adequate access to some of the livelihood assets was conducted. In doing so, the goal was to highlight the role of the income from prickly pear in alleviating some of the financial pressure by weighing its contribution based on what the income was used for. The following section discusses the different aspects of human, social, physical, financial, and natural capital, which characterised the informal prickly pear market participants' livelihoods. The different asset types refer to either resources that they could access to improve their livelihoods or the innate capabilities of each person, which allowed them to access those resources (Sen, 1985; DFID, 1999).

Human capital is an all-encompassing term for the knowledge, skills, good health, and ability to perform labour-intensive activities all of which give people the ability to achieve their livelihood objectives through following various livelihood strategies (Carney, 1998; DFID, 1999; Njagi, 2005). These skills are often quantified at the individual level but when considering a household's livelihood, each member's health status, education and skills are taken as a unit, which represents the potential of a household to achieve certain livelihood outcomes.

However, the effects of external factors such as the failure of institutional policies to provide the right socio-economic environment for people to exercise their skills in livelihood-enhancing ways may keep people in poverty. Therefore, since human capital is mainly concerned with people possessing the skills that will ensure the sustainability of their livelihood strategies, it then becomes a core requirement for the procurement of the other four types of capital as well as for their appropriate use (Carney, 1998; DFID, 1999; Krantz, 2001; Njagi, 2005; Serrat, 2008). The Millennium Development Goals (MDGs) list education as a primary tool in the fight against poverty as education is often the prerequisite to attaining economic

freedom, promoting gender equality since women are often the ones most susceptible to poverty, and attaining sustainable economic growth (UNDP, 2008).

In addition to the innate capabilities of each individual, social capital is also important in linking individuals with employment opportunities that will enable them to put their capabilities to use. Social capital refers to relationships of mutual trust and reciprocity among members of a group, which can either be a household or community (DFID, 1999). The financial capital reserves of an individual or household consist of flows of income such as wages, salaries, remittances and cash transfers in the form of state social grants and savings from micro-finance schemes (*stokvels*) (DFID, 1999; Matuku and Kaseke, 2014). The DFID (1999) lists the diverse types of physical capital or infrastructure required to support livelihoods as affordable transport services, secure accommodation, access to affordable energy sources, clean water, and sanitation. Natural capital resources are the ecosystem services that are derived from the natural environment such as land and the wild plant resources that are used for various economic and non-economic benefits (DFID, 1999; Krantz, 2001). Based on the definition of each livelihood asset, the assets of the informal prickly pear marketers will be classified in a similar manner to identify the ones that are lacking and how the income from prickly pear may be contributing towards improving access through the income that it contributes to the households.

In the following section on the livelihood strategies of the Nelson Mandela Bay informal prickly pear marketers, the effects of shocks, trends and seasonality are discussed in the context of each asset type to show how they reinforce internal factors such as the lack of appropriate capabilities and thus compromise access to livelihood assets (DFID, 1999; Serrat, 2008). Some 'trends' that were identified in the prickly pear market data include unemployment and changes in the abundance of the prickly pears over time. The 'shocks' that were observed were mainly small scale in nature and 'specialized' as they affected each household differently depending on each household's level of vulnerability to the shock. Shocks included the death of a spouse or the sudden loss of a job by a household member who was the breadwinner. In terms of 'seasonality', the respondents expressed that the prickly pear season was too short, so income derived from participating in the prickly pear market could only be enjoyed for a limited amount of time in the year. Although this was the usual progression each season, the prickly pear marketers' concern stemmed from the presence of the cochineal insect (*Dactylopius coccus*), which they claimed had shortened the fruiting season to late February instead of the usual January to March period.

The cochineal, which is biological control agent specifically targeting the *Opuntia ficus-indica* species, was more prominent in the harvesting sites located in Uitenhage which meant that the decrease in supply was experienced by majority of the respondents since most of the other harvesting areas outside Uitenhage were only known by a few harvesters. This had a negative impact especially on the livelihoods of those for whom the income earned from engaging in the market was contributing a significant portion to the overall portfolio of household income sources.

The vulnerability context illustrates the interactions between factors that characterise the environment within which communities, households, and individuals exist which either can increase or decrease people's vulnerability to poverty (Chambers and Conway, 1991; DFID, 1999; Serrat, 2008). However, even when external factors move in a favourable direction, the poor are sometimes unable to benefit from any positive changes to the factors characterizing the vulnerability context. This is often due to what the DFID (1999) terms as the 'inherent fragility' of poor people's livelihoods, which are often characterized by survival strategies more than the freedom to choose their livelihood strategies and thus the outcomes of those strategies. The inability to take advantage of opportunities to improve one's livelihood prospects introduces another dimension to poverty, which goes beyond conceptualizing it as merely being a result of low income, but includes the effects of illiteracy, poor health, and lack of infrastructure (Krantz, 2001). Therefore, to mitigate the impacts of the vulnerability context, an individual will pursue multiple income earning activities or different individuals will each contribute differently to the household livelihood portfolio to achieve desirable outcomes that will benefit the household unit.

4.9.1 Livelihoods analysis of Nelson Mandela Bay prickly pear marketers

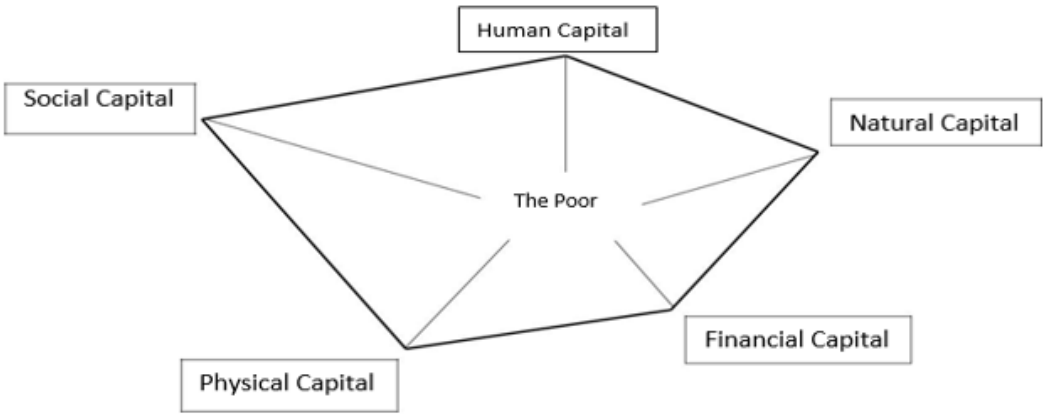

Figure 4.13: Asset pentagon for Nelson Mandela Bay informal prickly pear marketers

The diagram above illustrates the asset pentagon for the Nelson Mandela Bay informal prickly pear marketers' households. The shape shows the effects of unemployment, old age, poor health, having a large number of children in the household, and low levels of education and skills on the people's ability to access the different types of assets. The section below unpacks how each of the mentioned factors have contributed to the skewed shape of the asset pentagon.

Gautam and Andersen (2016) state that the pursuit of multiple livelihood activities is a common strategy among poor people for navigating their way through environmental shocks and economic hardship. However, the livelihood strategies that an individual or household can pursue depends on the capabilities of the individuals in the household (Niehof, 2004; Gautam and Andersen, 2016). Therefore, the level of diversification that can be carried out by individuals and households differs depending on each person's unique capabilities (Sen, 2005; Niehof and Price, 2001; Niehof, 2004). In the Nelson Mandela Bay prickly pear market, human capital was low as 47 percent of respondents cited being unemployed as the main reason they were engaging in the market. The reason for the high unemployment was low education, old age, and low levels of marketable skills. In Figure 4.13 above this is shown by the flattened top part of the diagram compared to the usual balanced shape of the pentagon (Figure 4:12). The type of unemployment that was observed in the market was structural, as 23 respondents reported having no education or only having a primary school education. The structural unemployment trend that was observed in the informal prickly pear market is synonymous with national trends, which reflect jobless economic growth which is unfavourable especially for the low-skilled and unskilled members of society (Mahadea and Simson, 2010). This is attributed to the structural changes in the economy that have been occurring since the advent of democracy, where there has been a steady decline in demand for unskilled labour due to a relatively higher demand for highly skilled occupations (Yu *et al*., 2016).

This results in a mismatch between the skill requirements of the labour market and those possessed by the labour force (Mafiri, 2002). Moreover, matriculants, whose high school qualification was adequate enough in the past to secure them a job, are also affected by the structural unemployment. For instance, four people reported having obtained at least a matric qualification but due to being unable to find a job, they were engaged in the prickly pear market to sustain themselves during this time of financial hardship.

Other livelihood activities that were mentioned by respondents could largely be grouped under hawking, working casual jobs, and domestic work. Majority of these income streams were informal and incomes from them were unreliable. Some respondents also reported that either they or someone in the

household was a recipient of one of the state social grants. Thirty-five respondents whose household income portfolio was supplemented by either the state old age grant, the child support grant, or the disability grant mentioned this.

Woller *et al*. (2013) state that age plays a significant role in a household's choice of livelihood activities. In the Nelson Mandela Bay prickly pear market, 28 respondents were between the ages of 41 and above 60 years (Table 4.1). The age group typified by the marketers included those that were still at an age where they could be competing in the labour market but were hindered by the lack of education and skills. Respondents who had reached their retirement age were mainly dependent on the state old age grant to sustain themselves. In addition to the income from the old age grant, the respondents reported that the income from prickly pear sustained them during the month when the grant income ran out. This finding resonates with Horn's (2011) argument that due to insufficient state resources and limited job opportunities in most developing countries, poor people often turn to informal street trading to supplement their household incomes. In the case of low-skilled elderly people who do not have financial savings like those who had previously held jobs in the formal market, the R1 510 monthly cash transfers from the state social grant are often insufficient to support a large family. Therefore, the income from informal market activities like the prickly pear market serve as supplementary income sources. Likewise, respondents who were receiving child support grants, which at the time the interviews were conducted was R380 per child, mentioned that the financial contribution of the social grant to household income was made significant by the fact that they were unemployed. Moreover, the other sources of household income were insufficient to cover all the household expenses, so the social grants alleviated some of the financial pressure as they were used to finance school expenses. The prickly pear income eased financial pressure on other household income sources as respondents who had children who were still in school reported that the cash from other income sources that would have been used to finance school-related expenses was then used to buy groceries.

There has been a persistent gender difference between male and female school enrolment especially in most traditional African societies. This is often the result of cultural practices such as early marriage and other household responsibilities assigned to females taking precedence over schooling (Tuwor and Sossou, 2008). Therefore, in this type of household setting, the role of the breadwinner in the household is automatically assumed by the male spouse as dictated by patriarchal systems of social organization (Makgetla, 2004; Tuwor and Sossou, 2008). As a result, when the male household head passes away or abandons the family, as sometimes is the case, the women are left to assume the role of headship. This

was reflected in the Nelson Mandela Bay informal prickly pear market data where 21 out of the 27 female respondents interviewed reported that they were the heads of their households (Table 4.1). Females were also in the majority in terms of the overall number of people participating in the prickly pear market. They expressed that since they were in the position of household headship, the burden of household responsibilities fell on them.

Due to education levels being low especially among the female informal marketers, the socioeconomic circumstances of these households were similar to those described in the literature where female-headed households are defined as being more susceptible to poverty, compared to those with a male in the position of headship (Muleta and Deressa, 2014; Rogan, 2014). The type of poverty that is often observed in female-headed households is usually income poverty since majority of women who find themselves thrust into the position of household headship due to a spouse either migrating to an urban area to find work; as a result of divorce; or as a result of widowhood are usually uneducated, unskilled and in some cases too old to compete in the labour market (Muleta and Deressa, 2014; Zheng, 2015).

Similar to literature findings that poor households are usually large in comparison to smaller households that are not living under the poverty line (Orbeta, 2005), the average household size of the prickly pear marketers was 5.68, meaning that there were approximately six people in each household. This average was much higher than the municipal average, which was 3.4 in 2016 (Stats SA, 2016). The positive correlation between a large average household size and the incidence of poverty was consistent with Orbeta's (2005) study, which showed that the more a household's size increased through having more children, the more expenditure on the children's education fell as well as expenditure on healthcare. Perhaps the most relatable aspect to the Orbeta (2005) study is that the more children a household had, the higher the number of school dropouts as older children were expected to leave school and find a job to contribute to supporting the family. This fact was not only mentioned by prickly pear marketers who were older, but also by younger participants who had dropped out of secondary education or did not study further after obtaining their Grade 12 qualification as they had to find a job and contribute to the household.

However, due to a low demand for unskilled and low-skilled labour, participating in informal market activities that do not require specialized skills was their only way to make an income and thus contribute to their respective households. To shield themselves from the socio-economic impacts of unemployment

during the year once the prickly pear market has passed, various informal income-earning activities are pursued.

Perhaps contrary to the commonly held view that having a large household increases one's susceptibility to poverty, a large household consisting of mainly adults could reduce the effects of poverty on the household concerned. A household with able-bodied adults may experience less poverty if all of them contribute financially to the household livelihood portfolio either through formal or informal means. This was the case in most of the respondents' households as they mentioned that some household members were contributing to the financial resources of the household through domestic work jobs, working as fruit harvesters in Addo, hawking, construction work, or through also engaging in the prickly pear market. Other household members were contributing through remittances. This household dynamic indicates sufficient access to social capital.

Another indicator of high levels of social capital was information sharing in the market. Harvesters who did not use transport when going to harvest prickly pear mentioned that they often walked in groups and went to harvesting areas, which some members may have not known about. This was important especially since the respondents mentioned that the prickly pears were declining in the main harvesting sites in Uitenhage. These individual and household dynamics relating to human capital translated into low financial capital endowments for the Nelson Mandela Bay informal prickly pear marketers. For instance, the unemployment that was cited by 47 percent of marketers, the low levels of education that were observed across all three groups of market actors, and the old age of the majority of marketers represented a lack of innate capabilities and were all hindrances to their ability to emancipate themselves from poverty.

In terms of physical capital such as housing, respondents who were staying in New Brighton, Veeplaas, and KwaNobuhle had adequate housing, some of which were government built through the RDP programme, and there was proper sanitation and adequate access to public transport. In contrast, majority of people who were staying either inside the commonages or in proximity were staying in shacks with poor sanitation and with no electricity connection. This highlighted the extent of their poverty, as majority of them were also unemployed, with some depending solely on government social grants as the main source of household income. However, in relation to the prickly pear market, since they were in proximity to the prickly pears they did not require transport or need to walk long distances to access the prickly pear fruits. This worked to their advantage as, compared to harvesters and sellers who were

staying far, prickly pear marketers in Uitenhage could harvest more frequently and thus sell more prickly pears per day. This increased their incomes; hence, there was a significant difference in the incomes between the harvesters and sellers even though there was an overlap in the market activities that each of them was performing in the market (Figures 4.8 and 4.9). Therefore, those who needed transport or to walk to and from the harvesting sites missed the opportunity to benefit from economies of scale which they would benefit from if they harvested and sold more. The economies of scale theory assumes that the more one produces, in this case harvest and sell, production costs per unit (transport costs and the prices of plastic bags in this case) would gradually decrease relative to the income that the marketers would be earning (Mishra, 2014). The respondents did not mention experiencing any significant problems with accessing buses or taxis, although some respondents stated that sometimes taxi drivers refused to let them on their vehicles with the containers carrying prickly pears. Overall, access to physical capital was adequate.

In terms of natural capital, the respondents did not mention any issues regarding access to the prickly pears. The harvesting sites were commonages, which were owned by government. However, farmers who kept their livestock in the commonages expressed that the prickly pear trees were affecting their daily activities, which involved herding goats and sheep. Nonetheless, since they were aware of the plight of those who stayed on the farms and others who benefited from it, they tolerated it and allowed the people to continue benefiting from it. However, as an invasive alien plant, the presence of the prickly pear conflicts with the National Environmental Management Biodiversity Act No. 10 of 2004, which classifies the prickly pear species as a Category 1b invader that needs to be controlled to protect the biodiversity of native plants (Government Gazette, 2004). The legislation does not list the prickly pear fruit if it used for human consumption. Even so, cochineal releases are being continued to biologically control the spread of all the cacti species and this has a negative impact on the species fruit yield and potential as a livelihood resource. Therefore, on some days, people staying in the commonages tried to restrict access by other harvesters. Although they did not give them reasons why they could not harvest, it can be assumed that it was probably due to the dwindling supply of the prickly pear, which was caused by the cochineal strains.

The biological control of the prickly pear is justified in light of its documented impacts as an invasive alien plant (Annecke and Moran, 1978; Henderson, 2007). When respondents were asked how it would affect them if the prickly pear trees were completely eradicated, majority expressed that it would severely affect their livelihoods. For many, the prickly pear's contribution was more significant than that of other income-earning activities that they engaged in as the prickly pear's popularity and demand guaranteed that they

always went home with some income at the end of each business day. Moreover, they expressed that they would prefer higher densities of the prickly pear species, so they could continue to benefit from it. Their response resonated with Shackleton *et al*.'s (2007) findings that rural communities in the Kat River Valley expressed that they would prefer high densities of the prickly pear, as they did not see its presence as undermining their livelihoods.

The complex relationships between the vulnerability context, livelihood assets and institutions ultimately affect the livelihood strategies and outcomes of the poor. For instance, the low levels of education limited the marketers' options to switch to different strategies that would ensure the security of their livelihoods (Carney, 1998; DFID, 1999). Likewise, the practical implications of the NEMBA policy on the prickly pear's ability to continue being a livelihood resource were negative when looked at from the perspective of the prickly pear marketers.

Lack of education seemed to be the major contributor to the socio-economic circumstances of the people. Some of the older generation of prickly pear marketers indicated that their parents, who were also uneducated, had also sold the wild fruit to survive. This shows that some aspects of the vulnerability context are historically determined, and those same values are often instilled in the next generations (Chambers and Conway, 1991). Therefore, merely using flows of cash, as a measure of poverty does not paint the whole picture of poverty, hence livelihoods analyses are required to conduct a deeper analysis.

Therefore, having explored the various factors that were contributing to poverty in the households of the Nelson Mandela Bay informal prickly pear marketers, Figure 4.13 shows the asset pentagon for the people that were interviewed and their households. The asset pentagon lies at the core of the Sustainable Livelihoods Approach and highlights the important relationship between the different types of assets and the links between the assets with the institutional and policy structures (DFID, 1999). The shape of the asset pentagon indicates the varying levels of access to the different livelihood assets. As already discussed, the level of access to each of the asset types was affected by factors at the individual and household level.

4.9.2 The informal prickly pear market value chain

As previously discussed, the market actors were established to be prickly pear harvesters, transporters, and sellers. The prickly pears were mainly gathered from state-owned farms in Uitenhage although there

were other places outside Uitenhage, which were mentioned by those who harvested the fruit. These other places were often visited depending on where those who also sold the fruit intended to sell on a particular day and also on time constraints. However, since the prickly pears were more abundant in Uitenhage, many harvested there so that they would not waste time searching for fruit that was ripe enough for harvesting.

The group of prickly pear sellers consisted of mobile vendors who operated along busy roads in Greenacres, William Moffett, and shopping malls in Daku Road, 6th Avenue Walmer, KwaNobuhle, and Despatch selling prickly pears to motorists and pedestrians. Mobile vendors were sellers who had their stalls by the side of the road and walked up to motorists at the traffic lights with the bags of prickly pears to sell. Others had their market stalls outside the commonages in Uitenhage, which were also by the side of the road. These sellers bought their prickly pear stock from Uitenhage harvesters to sell in other parts of the Nelson Mandela Bay. The only value addition that was observed in the market was the packaging of the fruits in plastic bags and the costs of transport, both of which had to be accounted for in the prices that the sellers charged. For harvesters, the only value addition that was observed was the washing of the prickly pears to remove the thorns after it was harvested. One harvester who also sold the fruit reported making syrup from left over prickly pears to avoid having to throw it away the next day due to spoilage.

The diagram below (Figure 4.14) shows the movement of the Prickly Pears from where they were harvested to where they were sold. Harvesters who made use of transport services were mainly those who were harvesting in Uitenhage as other harvesting sites were usually not far from where they lived. Likewise, sellers who harvested and sold the prickly pears required transport to take them to Uitenhage and thereafter to their selling spots in the CBD where they would package and sell the prickly pears.

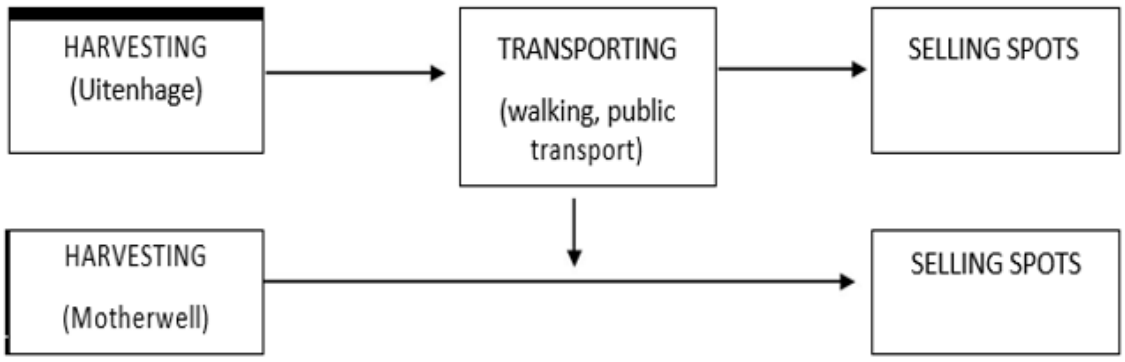

Figure 4.14: A diagram of the Nelson Mandela Bay informal prickly pear market chain

The Nelson Mandela Bay informal prickly pear market was highly competitive as marketers sold a homogeneous good to many buyers who were well informed about the product on offer (Besanko *et al*., 2010). Furthermore, there was also competition among the different groups of market actors. For instance, in addition to the many sellers in the market, there was also competition among the harvesters for the prickly pears since the supply was decreasing due to the cochineal.

Therefore, typical of highly competitive markets, the profit margins were low (Besanko *et al*., 2010). The competition in the market meant that since there were many sellers, buyers had the bargaining power and could negotiate prices or easily switch from one seller to another if they deemed one seller's prickly pear prices to be too high (Wilkinson, 2013). The buyers' bargaining power was most probably not because they could backward integrate by deciding to harvest their own prickly pear, but due to their price sensitivity concerning a product that they saw as something that the sellers 'acquired for free from the bushes'. The buyers' attitude contributed to low profit margins as some sellers reported sometimes lowering their prices for some buyers to boost sales, although this was done without the knowledge of other sellers in the same area. Moreover, the buyers were aware of the sellers' financial position, that for some prickly pear sellers the income was an important livelihood source, so they would adjust the price even if that meant reduced income at the end of the day.

Although the sellers stayed within the price range of R10, R15 or R20 for a plastic bag of prickly pears to retain old customers and attract new ones, the prices charged depended on whether they were selling in the CBD area or in the township and thus prices were adjusted accordingly. In the CBD, prices charged for the prickly pear were higher than those that were charged to customers in low-income areas such as the townships. In addition to this, the going price for prickly pears in each area also had an influence on how much they charged for their own produce. This common price setting mechanism functioned as a form of price control above which sellers could not go if they did not want to risk losing customers.

The free access to the commonages where majority of the prickly pears were being harvested, however did not mean that there were no restrictions on who could harvest on certain days. For instance, the people who stayed inside the commonages who also harvested and sold prickly pears felt a sense of ownership over the prickly pear stocks on the land. This reflected a certain level of property rights on the part of the commonage dwellers enforced rules on which side of the commonage they could harvest, if they allowed them access at all. These rules sometimes prevented those who were new to the market from harvesting on the commonages or regular harvesters were also denied access on some days to prevent the fruit from running out before the farm dwellers could do their harvesting. However, even

considering the difficulties they encountered, the prickly pear informal marketers persevered in the market. One reason for this could be that the income they earned daily from the activities they performed in the prickly pear market sometimes exceeded the hourly rate they earned or would have earned from being employed as a domestic worker or gardener. This is evidenced by the minimum wage hourly rate of R12.42, which came into effect on 1st December 2016 (Department of Labour, 2017; Stone, 2017). The newly negotiated hourly rate of R20, which will come into effect in December of this year (Stone, 2017), would still be exceeded by how much the informal marketers earned per hour since the prickly pears were being sold for R10, R15, or R20 for one plastic bag and more than one bag was sold per hour. The prickly pear sellers mentioned that they started selling in the morning and went home in the evening around 18h00. Therefore, accounting for the time effort that was required in trading, the minimum wage rate exceeds the hourly income from prickly pear. However, the advantage of the informal trade is that the income is received instantly compared to the hourly wages which are accumulated and paid at the end of each month as a salary.

The prickly pear marketers viewed the income earned from engaging in the prickly pear market as a supplementary source of income. However, this did not diminish its importance as informal marketers who were recipients of the old age social grant, or other grants, stated that the prickly pear income carried them through during the month while they waited to receive social grants. Moreover, for those who worked in casual jobs that did not offer a stable income, the income contributed by harvesting and selling prickly pears was more stable in comparison for the prickly pear season. Since the income earned from engaging in the market was largely dependent on the number of hours that each of them devoted to their respective activities in the market, all the respondents mentioned that they made sure they sold at least half of their stock at the end of each day, even if that meant moving to a different selling spot. This was so they could be able to cover the day's household expenses like buying electricity, candles, paraffin, and small grocery items.

4.10 Conclusion

This chapter has provided an analysis and discussion of the results within the context of the Sustainable Livelihoods Framework. Unemployment was the main reason that some people were in the prickly pear market and the livelihood portfolios of most of the respondents' households almost entirely consisted of informal income-earning activities that were sometimes pursued on an *ad hoc* basis. The income from prickly pear was thus significant as a contribution to the already scarce financial resources. Therefore,

although the income was largely supplementary due to it being available for only a period of 3 months, this in no way lessened the impact that it had on livelihoods. For instance, respondents with children who were still in school were using the prickly pear income to buy school uniforms. The market's reach throughout the Nelson Mandela Bay Municipality highlighted the importance of the income to the marketers who were willing to rotate between selling sites based on the income that could be potentially earned from selling in the CBD areas compared to relatively less affluent areas in the townships. The following chapter will give a summary of the study as well as the conclusions and recommendations for future research.

CHAPTER 5

Conclusion and recommendations

5.1 Introduction

This chapter gives a summary of the main research findings, the overview of the study objectives and theoretical concepts, the conclusion and recommendations.

5.2 Overview of the study objectives and conceptual reflections

The aim of this study was to find out the size of the contribution that the Nelson Mandela Bay informal prickly pear market was making to the livelihoods of the market participants. To reach this aim, a number of objectives were outlined. The first objective was identifying the research participants using snowball sampling and compiling their personal and household information into a socio-economic profile that would give an idea of how their livelihoods were structured. This information was also compiled as the starting point to understanding the reasons for their involvement in the informal prickly pear market, which was another objective of this study. Continuing from this objective, the other was to assess the prickly pear income's significance to household incomes by comparing it to other income sources that the households were receiving. Another objective of this study was to find out from the respondents the market activities that they were participating in and if there was more than one, their reasons for participating in more than one. Lastly, the difficulties that they encountered in the market were also assessed with a special focus on how those challenges affected the potential incomes that they could make from participating in the prickly pear market. These objectives informed the types of questions that were asked during the interviews.

A combination of methods was used to meet each of the research objectives. To locate and select participants for this study, a snowball and purposive sampling technique was used. Following this, statistical analysis was used to compile the socio-economic profiles of the informal marketers' households. Bar graphs were used to show the variation in the daily (transporters) and monthly (harvesters and sellers) incomes. The chain-referral method allowed for the identification of the different actors in the market. The other objectives were met through the analysis of the data using the

interpretivist approach (Willis and Jost, 2007) as well as analysis in the context of the Sustainable Livelihoods Approach.

The Sustainable Livelihoods Approach (SLA) provided the framework of analysis of the livelihoods of the informal market actors' households. As a people-centred approach to development, the approach prioritises local needs through recruiting local people to be part of development projects aimed at improving their livelihoods as they are the ones who know their needs best (Krantz, 2001; Serrat, 2008). This bottom-up strategy was introduced to replace utilitarian approaches. In the latter case, development practitioners would diagnose issues that may be contributing to poverty in a particular context, and then impose solutions that were tried and trusted and which they believed would work best without much consideration for the views and interests of those concerned (Serrat, 2008). Consideration of the livelihood strategies that are pursued in the local context allows development practitioners to understand the unique ways that people construct their livelihoods in a particular context. In the Nelson Mandela Bay informal prickly pear market, the main reason the high levels of unemployment, along with old age for some marketers, and low levels of education and lack of skills. This impeded them from securing jobs in the formal sector, which would reduce their levels of poverty.

The asset pentagon was used to classify respondents' livelihood assets into the five categories of human capital, social capital, physical capital, financial capital, and natural capital, which were discussed in Chapter 2. Financial capital resources that were mentioned included remittances from family members working in other provinces, income from hawking and from the other income earning activities that were being pursued within each household, including social grants. Overall, financial resources were low due to majority of income sources being informal. Social capital was illustrated through the sharing of information among the marketers about places where they could get the best quality prickly pears, places to sell to maximize profits, as well as the small harvester groups that they were part of. Physical capital included access to transportation services either by transporters in the market or using public transportation, and adequate access to housing and sanitation, which was to demonstrate the socio-economic circumstances of the respondents. Analysis of human capital showed low education levels across all three groups of market actors. Another factor that contributed to low human capital was old age. Access to natural capital was adequate in terms of the people's free access to the prickly pear and firewood, which is another natural resource from which they derived an income.

The environment within which local people operate can either promote of constrain their ability to successfully carry out their livelihood strategies and thus achieve their desired livelihood outcomes. This environment, collectively known as the vulnerability context, dictates which livelihood strategies can be pursued as well as the livelihood outcomes from those strategies. This is done through institutional processes at the national level including policies, climate variability, fluctuations in population numbers, and economic systems at the national and provincial level (DFID, 1999).

In the Nelson Mandela Bay informal prickly pear market, the presence of the cochineal insects, which is mandated by the NEMBA legislation on alien plants, was viewed as a constraint to the amount of income that the prickly pear marketers could potentially earn. The individual and household aspect of the vulnerability context mainly refers to the lack of capabilities to take advantage of economic opportunities. In light of all these factors in the vulnerability context, livelihood strategies are affected by the availability of the natural resources needed to construct a livelihood, the availability of those resources which is determined by harvesting levels and supply in the case of the prickly pear, and their ability to access those resources. The Sustainable Livelihoods Approach allows for a thorough analysis of poor people's livelihoods through unpacking the underlying issues that contribute to poverty in people's lives, which contrasts with income-based economic analyses.

Generalizing the findings from this study to the socio-economic circumstances of the Eastern Cape as a whole, the research findings were synonymous with those of the Department of Economic Development, Environmental Affairs, and Tourism (2017) which reported high levels of unemployment in the province, high reliability on state social grants, inadequate access to housing, and high levels of poverty.

5.3 Summary of research findings

The main findings from this study were as follows:

- Almost half of the people that were interviewed for this study (47 percent) mentioned unemployment as the main reason they were engaging in the Nelson Mandela Bay informal prickly pear market.
- Many had migrated to the urban areas of the Bay in search of employment and having had no success in securing jobs, many of them ended up undertaking various informal income earning activities, including engaging in the informal prickly pear market.

- Other than migrating to find jobs, the other reasons mentioned were migrating to be closer to relatives, migrated in the past under the Group Areas Act, moved as a family when the breadwinner found employment in the urban area, migrated from country of birth in search of greener pastures, and 11 percent had moved temporarily to participate in the prickly pear market. The importance of the migration question was to highlight the disparities in development between rural and urban areas and how they contribute to unemployment. Due to the lack of marketable skills which would allow them to secure employment in one of the industries in Nelson Mandela Bay, many of the prickly pear marketers who were in the market due to lack of employment prospects were victims of structural unemployment.
- Majority of the female respondents that were interviewed were the heads of their households. Since females were the majority in the market (71 percent compared to only 29 percent of male market participants), the majority of respondents' households were female headed. In line with findings in other literature studies that female-headed households are more susceptible to poverty, the respondents were also living in poverty as evidenced by the participation in the informal prickly pear market.
- The three categories of market actors that were identified in the Nelson Mandela Bay informal prickly pear market were harvesters, transporters, sellers. Although the division of duties was not clear in the market, respondents identified some market activities as their main function despite occasionally participating in others as well. These were activities that they engaged in more than others. For instance, majority of the people that were interviewed inside the commonages in Uitenhage identified as harvesters because due to their proximity to the prickly pears, they could afford to harvest every day and then set up their stalls by the side of the road just outside the commonages to sell the prickly pears to motorists. Moreover, since they could access it easily, they were also able to harvest in bulk for other people, which added to the incomes they were making from selling.
- This was unlike marketers who were hindered by distance and transport costs from participating effectively in all three of the market activities. Harvesters who wanted to avoid paying for transport walked to the harvesting sites and since not having transport meant that they could not harvest as much they would have liked, they mostly harvested in bulk for other people. To supplement their incomes from bulk harvesting, they also harvested one or two 20 litre containers to package and sell elsewhere. The amounts of prickly pears to be sold were lesser because they could only harvest what they would be able to carry or transport through head loads. For these

marketers, the main market activity they identified with was as a harvester because on some days all the containers were sold to bulk buyers of prickly pears.

- Some market participants who identified more as sellers grouped together so that they would split the costs of transport. This group hired the services of someone with a bakkie to transport them when they go to do their harvests and to drop them off at their respective selling spots when they were done where they would package the prickly pears in plastic bags and sell them. For these marketers, the main market activity they identified with was selling since by harvesting the green prickly pears, they could still sell them throughout the week because they did not spoil quickly.
- The title of transporter was reserved for those who had vehicles to transport the harvested prickly pears at considerable distances to where they would eventually be sold. Only three transporters were identified in the market. The transporting role of harvesters who transported their harvests of prickly pears via headloads was also considered but it was their main role as harvesters that took priority. Two of the transporters also mentioned that they occasionally sold the prickly pears and they would buy in bulk from some of the harvesters they were transporting. One of these transporters mentioned that she did not charge transport costs on the harvester she hired to collect prickly pears for her.
- Using the terminology of the Sustainable Livelihoods Framework, there was low human capital across all three groups of informal marketers. This was signified by the old age of majority of the market participants and low education levels. Low education and skills results in high unemployment. The results also revealed the effects of youth unemployment as some of the respondents were within the age range of those considered as youth in the country.
- In terms of the income earned by the market participants from their respective market activities, the income from prickly pear was highly variable as it was determined by the number of hours that were committed to engaging in the market, the ease with which the marketers could access the prickly pears, the amounts harvested and sold, the prices charged for the prickly pears, where their stalls were stationed and the costs incurred.
- Compared to other sources of income in the household, the income earned from participating in the informal prickly pear market was supplementary due to it being only available for three months of the year (January to March). However, despite this, its contribution to household income was significant especially in households where the only stable source of income was state social grants. Elderly people who were recipients of the state social grant mentioned that the income from the prickly pear was useful in sustaining them during the month when the cash

income from the social grant finished. This was especially the case in large families where the grant was a major contributor to household income.

- Similar to Shackleton *et al*.'s (2011) findings, the importance of the prickly pear income was amplified by the time of year during which the fruiting season took place, which occurs at a time when schools re-open for the new year. As such, the income was used for financing school expenses. Another household expense that was mentioned by the respondents was buying groceries with the income earned from participating in the informal prickly pear market. Therefore, although the prickly pear income was supplementary due to being available for only a short period during the year, its contribution was noticeable.
- This study has also shown that a market for the species exists in Nelson Mandela Bay and that the prickly pear trade is carried out in the busiest areas of the municipality, including the Central Business District (CBD). Although the prickly pear market value chain was not advanced in terms of including the production of processed products from the prickly pear (Beinart and Wotshela, 2003; Saenz *et al*., 2013), transportation costs and packaging of the prickly pears before they were sold were a form of value addition since marketers had to account for the costs of transport and the plastic bags used for packaging when pricing the prickly pear.

5.4 Policy implications and recommendations

The use of wild plant species is rooted in the traditional and cultural beliefs of certain societies as both healing remedies and for food (Campbell and Luckert, 2002). Therefore, the policy recommendations of this study are that research needs to be conducted at the local level, the places where the species is found, to investigate the livelihood contributions of the species. This is more so the case for invasive alien plants many of which have overtime become integrated into the livelihoods of poor people and are counted as an important livelihood resource (Rogerson, 1996; Dold and Cocks, 2000; Beinart and Wotshela, 2003; Paumgarten, 2005; Shackleton *et al*., 2007; Beinart and Wotshela, 2011; Shackleton *et al*., 2011). The importance of considering all aspects pertaining to a species existence in a particular area is because in cases where only the pro-eradication perspective is considered, eradicating an alien plant resource that has livelihood benefits to local people could do more harm than good as it could leave them vulnerable to increased poverty. Therefore, links need to be forged between the micro and macro levels where the positive livelihood benefits of alien plants are included in cost-benefit analyses, which are often only conducted at the national scale before an alien species eradication programme is passed. Although the NEMBA legislation makes provision for the use of the fruit of the prickly pear species if it is used for human

consumption, the channels through which the species spreads such as the dispersal of the seeds could potentially come in conflict with the legislation. However, despite this being the main point of contention between local people's needs and national legislation which supports the eradication of the species, some of these species are under effective control by biological agents.

As one of the species whose populations are in gradual decline in the Uitenhage commonages due to the cochineal insects, *Opuntia ficus-indica* serves as a livelihood resource for the people of Nelson Mandela Bay who derive economic benefits through the different activities that they each perform in the informal prickly pear market. Based on the significance of the prickly pear's contribution to their livelihoods as signified by what the income was used for, some respondents who had been in the informal prickly pear market for longer than a decade were concerned that the presence of the biological control agent had reduced the length of the fruiting season as most of the fruits were infected with the cochineal and it was still spreading. This decline could also have been as a result of climatic factors. As a livelihood diversification strategy (Scoones, 1998), the prickly pear informal market was useful in shielding those in the market from falling into deeper levels of poverty since it allowed them to maintain food security in light of unemployment. This role is in line with the DFID's (1999) definition of livelihood sustainability as the ability for it to bounce back from shock or stress without compromising the natural resource base. Since the majority of the informal prickly pear marketers cited unemployment as a problem, the income from prickly pears was useful in maintaining their livelihoods until they could find something more stable.

Patriota (2012) states that for sustainable development to be successful there needs to be equal consideration of the three pillars namely economic, environmental, and social concerns because excluding the social aspect in favour of the other two due to the environmental impacts of alien plants and their high clearing costs could limit the success of livelihoods interventions especially in areas where local people rely on an alien plant species for their livelihoods. Therefore, acknowledging the informal markets for alien plants as one of the livelihood strategies by which poor people maintain their livelihoods and promoting the economic benefits of those invasive alien plant species as poverty-fighting tools could be one way through the sustainability of livelihoods could be promoted.

Beinart and Wotshela (2003) documented the different products that could be made from the prickly pear which included jam, bath soap, wine (which was known locally as *iQhilika*), and syrup. Moreover, Saenz *et al*. (2013) also compiled a report on similar products that were being manufactured in Mexico, where the species is indigenous, but theirs focused on agro-industrialization. These two studies provide the blueprint

for how the economic benefits of the prickly pear can be enhanced and promoted for the benefit of those involved in the informal market. Perhaps this could be achieved through the creation of a small agro-processing industry focusing on products that could potentially have a high demand in the markets. Those seeking to explore this option could consult the Beinart and Wotshela (2003) study. This would not only benefit those who are directly in the markets, but it would also benefit the province the Eastern Cape as a whole as the agro-processing industry would contribute to job creation, skills development, as well as increase the overall Gross Domestic Product (GDP) of the region as a percentage of GDP at the national level.

The findings of this study only represent one small area in relation to the rest of the province and the whole of South Africa. However, considering the proliferation of the prickly pear across the different provinces, similar studies could be conducted in the other provinces to find out whether the trade in prickly pear that was documented by the authors cited in this study actually constitute one part of an informal market that includes more than those who sell the fruit. Perhaps an aggregation of these studies could then be used to make a stronger case for the consideration of the prickly pear as a livelihood resource for poor people who depend on it, even if it is only for three months of the year. Also considering their negative impacts on the entire as a whole, perhaps the negative impacts could be weighed against their benefits on a case-by-case basis. Based on the extent of its contribution to livelihoods in different areas, the economic benefits of the prickly pear could in the future inspire the establishment of an agroprocessing industry similar to the one discussed in Saenz *et al*. (2013) and by Beinart and WOtshela (2003), although the latter study was conducted on a smaller scale.

5.5 Concluding remarks

This study explored the contribution that the prickly pear species makes to the household incomes from the perspectives of three groups of informal prickly pear marketers in the Nelson Mandela Bay. Based on the income figures that were stated by the informal marketers as well as the calculations of the aggregate incomes of each group of market actors, the conflict of interest between national legislation and local people's livelihood needs in the Nelson Mandela Bay case is even more apparent. Based on the analysis of the informal marketers' socio-economic circumstances and how the income from the informal prickly pear market contributes towards alleviating some of their financial pressure, it can be said that the *Opuntia ficus-indica* is an important livelihood resource for people in the Nelson Mandela Bay. As a result, majority of those who were interviewed for this research study expressed that they would prefer a high

abundance of the species, a request that is in direct conflict with the mandate of the NEMBA. To ensure a situation where both the micro and macro needs are met, an agroprocessing industry would not only improve the skills of the informal marketers through training the informal marketers to make value-added products from the prickly pear but would also improve the incomes they are currently making. Moreover, the industry would also create jobs while ensuring that the prickly pear populations in the Nelson Mandela Bay and elsewhere are kept under control. The creation of jobs in the agroprocessing industry would also feed into the national economy if such projects are carried out in all the provinces where the prickly pear is found.

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Appendix 1: HARVESTERS QUESTIONNARE

AN INVESTIGATION OF THE INFORMAL MARKET VALUE CHAIN FOR PRICKLY PEAR (*Opuntia ficus-indica*) IN THE NELSON MANDELA BAY, EASTERN CAPE.

(FEBRUARY 2017)

Interview with prickly pear harvesters

Introduction

My name is ……. I am a Masters student at Rhodes University conducting

a research project to try and understand how people earn money from prickly pear as well as to understand the activities carried out within the market. This information will be used to make recommendations to the government on how to best control the prickly pear so that people can continue to benefit from it now and in the future. The Plant Protection Unit, together with the Centre for Invasion Biology (CIB) in Stellenbosch, has been working with the Working for Water programme to find and implement ways to protect indigenous plants from the effects of invasions by those that are non-indigenous. One of the ways to do this has been through the promotion of the economic value of non-indigenous plants through the Working for Water's Value-Added Industries Programme which sell non-indigenous trees which have been cut down to the furniture industry. I will start off by asking you questions related to your harvesting of prickly pear, and then ask some questions about household income. This information will help the researcher to understand the opportunities and challenges involved in your business. The information will only be used for the purposes of this study and will not be used in anything else not related to this particular study. You have the option to remain anonymous if you do not wish to be referred to by name in the study and your participation in this study is voluntary. This interview will take about 45 minutes of your time, if you agree to be interviewed but at later stage change your mind or feel uncomfortable answering some of the questions, please let me know and we will stop the interview immediately. The results of this study will be reported back to the funders of this study who are based in Stellenbosch at CIB, the Plant Protection Unit here in Uitenhage, and respondents. Thank you for taking the time to complete this questionnaire. Your participation and contribution to this study is highly appreciated.

Interview No._____ Signature of respondent _____ Date _____

Personal information	

1. **Name** _____

2. **Gender**: Male ☐ Female ☐

3. **Age** _____

4. **Where were you born? Province_____ Town_____**

   Rural or urban area? _____

5. **When did you move to this area?** _____

6. **Why did you move to this area?** _____

Prickly pear harvesting

7. Do you harvest prickly pear every year during its season? _____

8. How did you start participating in the prickly pear market?

9. Do you need any skills to participate in this market?

10. How often do you harvest prickly pear?

(a.) Number of days per week	
(b.) Number of days per season	

11. How much prickly pear do you harvest in a day? (litres, bucket size, etc.)

12. How far do you have to travel to get to the place where you harvest prickly pear?

13. Do you have your own transport to bring you here or do you hire transport to bring you here?

14. Where do you sell the prickly pear you harvest and for how much?

Who buys from you?	Where do they collect from? i.e. Do you deliver it to them?, Are you stationed somewhere then they come collect?, etc.)	Rands per bundle? (i.e. bucket, plastic bag, etc.)	Rands per day? (good season)	Rands per day (bad season)

15. How do you set the prices you sell the prickly pear for?

16. Do other members of your family also harvest prickly pear?

Who? _____

How often? (i.e. 2 or 3 times a week)

Where else do you harvest besides this place?

17. How do you get the prickly pear?

18. Are there any costs associated with the harvesting of prickly pear?

Yes No ☐ ☐

What is the cost?	How much per day?	How many days per month?

19. Have ever had problems with the owners of the land when it comes to harvesting?

Yes No ☐ ☐

If yes, what sort of problems?

_____

_____

20. If no, why do you think there are no problems?

_____

_____

_____

_____

21. What main problems do you face when harvesting?

_____

_____

_____

22. Are there any laws that control prickly pear harvesting?

_____

_____

23. Do you ever experience problems with any authority when harvesting? Yes ☐ No ☐

If yes, what type of authority?

_____

How often?

_____

_____

What problems?

_____

_____

24. How would it affect your livelihood if government banned prickly pear because it is not originally from South Africa? Please explain in as much detail as you can

_____

_____

25. Do you experience differences in harvesting levels from beginning to the end of the season and from one season to another?

Yes ☐ No ☐

What is the difference between good and bad periods/years in harvesting?

_____

_____

26. Do you experience any problems when selling, or is it easy to sell the prickly pear you harvest? Please explain:

_____

_____

27. How many people live in your household permanently? (i.e. for the last 6 months)

_____

28. How many children? Please complete table below:

Gender	Age	Level of education

29. How much does prickly pear harvesting contribute to household income?

R200 – R500 ☐ R500 - R800 ☐ R800 – R1200 ☐ R1200 – R1500 ☐

30. What do you use the money for, that you earn from harvesting prickly pear?

_____

_____

31. Do you also participate in other market activities? i.e. transporting, selling, etc.

_____

_____

32. How much do you earn from participating in these other market activities?

_____

_____

33. What are some of the major incentives for being involved in this type of market?

_____

34. How many adults are in your home at the moment? Please list them in the table below and also fill out the other sections:

Male/Female	Education level	Age	Formal employment (secretary, teacher, etc.)	Informal employment (vendor, domestic work, etc.)	Income earned	How often is income earned? (weekly, monthly, occasionally)	Total income earned per month

35. Do any of the people listed in the table receive government social grants?

Yes ☐ No ☐

36. How many people in your family receive government social grants?

(a.) Old age grant: Number_____ Amount R……

(b.) Child social grant: Number_____ Amount R……

(c.) Disability grant: Number _____ Amount R……

37. Are there any other income sources? i.e. someone, a relative, working away from home who sends you money or brings when they visit you?

_____

_____

38. Compared to these other sources of income, how much does participating in the prickly pear market contribute to household income throughout the season?

_____

_____

_____

39. Are you able to cope with the remaining income sources at the end of the prickly pear season?

_____

_____

_____

40. Is there anything else that you would like to mention that you think will be beneficial to this study?

_____

_____

Thank you for taking the time to do this interview. Are there other market participants that you think I should also interview? Could you please refer me to them?

Appendix 2: TRANSPORTERS QUESTIONNARE

AN INVESTIGATION OF THE INFORMAL MARKET VALUE CHAIN FOR PRICKLY PEAR (*Opuntia ficus-indica*) IN THE NELSON MANDELA BAY, EASTERN CAPE.

(FEBRUARY 2017)

Interview with prickly pear transporters

Introduction

My name is ……. I am a Masters student at Rhodes University conducting

a research project to try and understand how people earn money from prickly pear as well as to understand the activities carried out within the market. This information will be used to make recommendations to the government on how to best control the prickly pear so that people can continue to benefit from it now and in the future. The Plant Protection Unit, together with the Centre for Invasion Biology (CIB) in Stellenbosch, has been working with the Working for Water programme to find and implement ways to protect indigenous plants from the effects of invasions by those that are non-indigenous. One of the ways to do this has been through the promotion of the economic value of non-indigenous plants through the Working for Water's Value-Added Industries Programme which sell non-indigenous trees which have been cut down to the furniture industry. I will start off by asking you questions related to the transporting of prickly pear, and then ask some questions about household income. This information will help the researcher to understand the opportunities and challenges involved in your business. The information will only be used for the purposes of this study and will not be used in anything else not related to this particular study. You have the option to remain anonymous if you do not wish to be referred to by name in the study and your participation in this study is voluntary. This interview will take about 45 minutes of your time, if you agree to be interviewed but at later stage change your mind or feel uncomfortable answering some of the questions, please let me know and we will stop the interview immediately. The results of this study will be reported back to the funders of this study who are based in Stellenbosch at CIB, the Plant Protection Unit here in Uitenhage, and respondents. Thank you for taking the time to complete this questionnaire. Your participation and contribution to this study is highly appreciated.

Interview No._____ Signature of respondent _____ Date _____

Personal information

41. **Name** _____

42. **Gender**: Male ☐ Female ☐

43. **Age** _____

44. **Where were you born? Province_____ Town_____**

Rural or urban area? _____

45. **When did you move to this area?** _____

46. **Why did you move to this area?** _____

_____

_____

Prickly pear transportation

47. How long have you been working as a prickly pear transporter? _____

_____

48. How much do you charge for the transport services you offer to other market participants? _____

49. What mode of transport do you use to transport prickly pear? (i.e. bakkie, taxi, donkey cart)

_____

50. How do you determine the transport costs you charge to your customers?

_____

_____

51. How many times in a day/per week are you available to offer transport services?

_____

52. If the price of prickly pear changes (either increases or decreases), how does it affect the amounts you charge for your transport services?

_____

_____

53. Who makes use of your transport services in the market?

Who makes use of your services?	Where do you collect them from?	Rands per bundle transported?	Rands per day? (good season)	Rands per day? (bad season)

Household income information

54. How many people live in your household permanently? (i.e. for the last 6 months)

_____

55. How many children? Please complete table below:

Gender	Age	Level of education

56. How much does participating in the prickly pear market as a transporter contribute to household income?

R500 – R800 ☐ R800 – R1 000 ☐ R1 000 – R1 500 ☐

57. How many trips do you usually have to make to make this much money?

_____

_____

58. What do you use the income earned from transporting prickly pear on?

_____

_____

_____

59. Do you also participate in other market activities? i.e. harvesting, selling, etc.

_____

_____

_____

How much do you earn from these other market activities?

_____

_____

60. What are some of the major incentives for participating in the prickly pear market?

_____

_____

_____

61. How many adults are in your home at the moment? Please list them in the table below and also fill out the other sections:

Male/Female	Education level	Age	Formal employment (secretary, teacher, etc.)	Informal employment (vendor, domestic work, etc.)	Income earned	How often is income earned? (weekly, monthly, occasionally)	Total income earned per month

63. Do any of the people listed in the table receive government social grants?

Yes ☐ No ☐

64. How many people in your family receive social grants?

(d.) Old age grant: Number_____ Amount R……

(e.) Child social grant: Number_____ Amount R……

(f.) Disability grant: Number _____ Amount R……

65. Are there any other income sources? i.e. someone, a relative, working away from home who sends you money or brings when they visit you? _____

66. Are you able to cope with the remaining income sources at the end of the prickly pear season?

_____

67. Is there anything else that you would like to mention that you think will be beneficial to this study?

_____

_____

_____

Thank you for taking the time to do this interview. Are there other market participants that you think I should talk to? Could you please refer me to them?

Appendix 3: SELLERS QUESTIONNAIRE

AN INVESTIGATION OF THE INFORMAL MARKET VALUE CHAIN FOR PRICKLY PEAR (*Opuntia ficus-indica*) IN THE NELSON MANDELA BAY, EASTERN CAPE.

(FEBRUARY 2017)

Interview with prickly pear sellers

Introduction

My name is ……. I am a Masters student at Rhodes University conducting

a research project to try and understand how people earn money from prickly pear as well as to understand the activities carried out within the market. This information will be used to make recommendations to the government on how to best control the prickly pear so that people can continue to benefit from it now and in the future. The Plant Protection Unit, together with the Centre for Invasion Biology (CIB) in Stellenbosch, has been working with the Working for Water programme to find and implement ways to protect indigenous plants from the effects of invasions by those that are non-indigenous. One of the ways to do this has been through the promotion of the economic value of non-indigenous plants through the Working for Water's Value-Added Industries Programme which sell non-indigenous trees which have been cut down to the furniture industry. I will start off by asking you questions related to the selling of prickly pear, and then ask some questions about household income. This information will help the researcher to understand the opportunities and challenges involved in your business. The information will only be used for the purposes of this study and will not be used in anything else not related to this particular study. You have the option to remain anonymous if you do not wish to be referred to by name in the study and your participation in this study is voluntary. This interview will take about 45 minutes of your time, if you agree to be interviewed but at later stage change your mind or feel uncomfortable answering some of the questions, please let me know and we will stop the interview immediately. The results of this study will be reported back to the funders of this study who are based in Stellenbosch at CIB, the Plant Protection Unit here in Uitenhage, and respondents. Thank you for taking the time to complete this questionnaire. Your participation and contribution to this study is highly appreciated.

Interview No._____ Signature of respondent _____ Date _____

Personal information

68. **Name** _____

69. **Gender**: Male ☐ Female ☐

70. **Age** _____

71. **Where were you born? Province**_____ **Town**_____

Rural or urban area? _____

72. **When did you move to this area?** _____

73. **Why did you move to this area?** _____

_____
_____

Prickly pear trading

74. Do you sell prickly pear every year during the season?

_____

_____

_____

75. How many years have you been selling prickly pear?

_____
_____

76. When and how did you start participating in the prickly pear market?

_____

_____

77. Do you need any skills to participate in this market activity that you are involved in?

_____

78. Where do you get the prickly pear you sell?

_____

79. Do you have to buy it? Yes ☐ No ____

If yes, from who? How much do you buy it for and how much prickly pear do you get for that price?

_____

_____

_____

80. How do you select prickly pear of 'good quality' to sell?

_____

_____

_____

81. (a.) What do buyers like in terms of quality?

_____

_____

82. (b.) What don't they like? How does this affect the prices you charge for prickly pear?

_____

_____

_____

83. How far do you have to travel to get to the place where you get the prickly pear?

_____

84. Do you have your own transport or does someone else transport it for you to the trading site?

_____

85. How do you bundle the prickly pear for selling? i.e. do you use buckets, plastic bags, sell in individual units, etc.

_____
_____

86. Where do you sell your prickly pear and for how much?

.

Who buys from you?	Where do you sell from? i.e. market stall, along the roadside, sell door to door, etc.)	Rands per bundle?	Rands per day? (good season)	Rands per day (bad season)

87. What do you do to earn more money from selling prickly pear? i.e. Do you sell washed and unwashed prickly pear fruit at different prices? Do you use special packaging and charge extra money, etc.)? How much do you charge for the extra service(s)?

_____

_____

88. How do you set the prices you sell the prickly pear for?

_____

_____

89. Do other members of your family also sell prickly pear?

Who? _____

How often? (i.e. as frequently as you do, to assist you)

_____

90. Are there any costs associated with the selling of prickly pear?

Yes ☐ No ☐

What is the cost?	How much per day?	How many days per month?

91. Do you ever experience problems with the supply of prickly pear?

☐ ☐

Yes No

If yes, what sort of problems?

_____

_____

If no, why do you think there are no problems with the supply of prickly pear?_____
_____

92. What is the difference between good and bad periods in selling prickly pear?

_____

_____

_____

Does the change in supply (increase or decrease during the season) affect household income? If so, how?

_____

_____

93. What problems do you face when selling prickly pear? i.e. customers negotiating for a lower price, quality of the prickly pear, effects of weather, etc.)

_____

_____

Household income information

94. How many people live in your household permanently? (i.e. for the last 6 months)

_____

95. How many children? Please complete the table below:

Gender	Age	Level of education

96. How much does selling prickly pear contribute to household income per season?

R200 – R500 ☐ R500 – R800 ☐ R800 – R1200 ☐ R1200 – R1500 ☐

97. What do you use the money for, that you earn from selling prickly pear?

_____

_____

98. Do you also participate in other market activities? i.e. harvesting, transporting, etc.

_____

_____

99. How much do you earn from participating in these other market activities?

_____

_____

_____

100. What are some of the major incentives for being involved in this type of market?

_____

_____

101. How many adults are in your home at the moment? Please list the in the table below and also fill out the other sections:

Male/Female	Education level	Age	Formal employment (Secretary, teacher, etc.)	Informal employment (vendor, domestic work, etc.)	Income earned	How often is income earned? (weekly, monthly, occasionally)	Total income earned per month

102. Do any of the people listed in the table receive government social grants?

☐ ☐

Yes No

103. How many people in your family receive government social grants?

(g.) Old age grant: Number_____ Amount R……

(h.) Child social grant: Number_____ Amount R……

(i.) Disability grant: Number _____ Amount R……

104. Are there any other income sources? i.e. someone, a relative, working away from home who sends you money or brings when they visit you?

_____

_____

105. Compared to these other income sources, how much does selling prickly pear market contribute to household income throughout the season? Would you say the contribution by prickly pear is more than the others?

_____

_____

106. Are you able to cope with the remaining income sources when the prickly pear

season ends?

_____

_____

107. Is there anything else that you would like to mention that you think will be beneficial to this study?

_____

_____

Thank you for taking the time to do this interview. Are there other market participants that you think I should also interview? Could you please refer me to them?