THE CONTRIBUTION OF SMALL-SCALE TIMBER FARMING IN ENHANCING SUSTAINABLE LIVELIHOOD AT SOKHULU

by

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Declaration by candidate

I hereby declare that the dissertation submitted for the Master's degree in Human Ecology at the College of Agriculture and Environmental Sciences, Department of Agriculture, Animal Health and Human Ecology, UNISA, is my own original work and has not previously been submitted to any other institution of higher education

Signed……
Date……

This thesis is dedicated to my mother, Tholakele Caslina "maNgcobo" Jele. You gave up your dreams so that we might realise ours. I respect you and look up to you for strength.

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ABSTRACT

Small-scale timber farming provides alternative income for growers selling to forestry, procurement companies and timber suppliers or agents. The research used focus groups and structured questionnaires in the Sokhulu area to determine the contribution of small-scale timber farming to enhance sustainable livelihood. The Sustainable Livelihood Framework measured livelihood levels of different grower types in terms of access to natural, human, financial, social and physical assets.

Findings show that timber suppliers had a higher asset composition, than growers selling to companies or growers selling to timber suppliers. Households lacking access to forestry resources sold timber to agents and households wanting to avoid harvesting and transport risks sold timber to suppliers.

Timber farming contributes income, employment and business opportunities towards alleviating poverty rather than providing a complete solution. Tree harvesting support households during financial hardship and reduce vulnerability through diversified livelihood strategies.

Disadvantages include: trees taking time to mature while immediate income is required, trees exposed to natural hazards, cheating by local harvesting and transport contractors and timber plot sales sometimes do not receive the agreed price. Despite disadvantages, timber farming provide economic benefits and further studies are needed to determine income level on mature trees, by-product sales and whether higher prices for more tonnage will sustain households that wait for tree maturity, thereby determining optimal break-even point for rural timber farmers.
Keywords: small-scale timber farming, sustainable livelihood, Sokhulu, capital assets

GLOSSARY OF TERMINOLOGY

Small-scale timber farming – Timber farming practised on household or communal land.

Growers – Households that participate in timber farming. They are the owners of the land.

Out-grower schemes – Company schemes, such as the Sappi Project Grow and the Mondi Khulanathi scheme. There is a contractual partnership between the grower and the company.

Forestry or procurement companies – Sappi (Project Grow), Khulanathi Forestry, Ikusasa Programmes, TWK (Transvaal Wattle kwekery) and NCT Forestry Co-operative Limited (previously known as Natal Co-operative Timber).

Timber agents/suppliers – Individuals who buy timber plots or logs from growers and sell them to a forestry company or timber procurement scheme.

Rotation period – The number of years a tree needs to grow to maturity before harvest.

Silviculture – Both an art and a science. The establishment, growth, composition, health and quality of the forest are controlled to cater for the different needs and values of landowners, societies and cultures.

Harvesting – The felling of timber for the purpose of selling it to the mill or depot.

Sustainable livelihood – A livelihood that can improve and preserve its assets for the future.

Capital assets – Assets required for sustaining a livelihood, and consisting of human, social, physical, natural and financial capital.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Employment opportunities in rural areas are limited and households depend on natural resources for income to meet their daily livelihood needs. The growing of trees by small-scale timber growers is aimed at making a profit which forms a portion of the household's average total income (Karumbidza, 2005:30). Community forestry is essential for sustaining the livelihood of households in rural areas, as it provides certain economic benefits. Households in the Sokhulu rural area, situated to the north of Richards Bay in the KwaZulu-Natal Province of South Africa, participate in timber farming. Research in other countries has shown that where households engaged in tree farming as opposed to producing alternative crops in partnership, small-scale tree farming proved to be the most profitable enterprise (Vermeulen, Nawir & Mayers, 2003:7).

Timber growers can gain access to the timber market through the agency of the Sappi and Mondi forestry companies, by becoming members of co-operatives, or through independent sales where the timber is sold by contractors, although the contractors sometimes do not offer fair prices (Cairns, 2000:1). The growers can enter timber farming through company schemes (out-grower schemes) or establish their own plot without receiving any assistance from forestry companies (mainly Sappi and Mondi). Growers can either sell their timber directly to forestry companies or via timber suppliers.

Timber suppliers (agents or buyers) are engaged in the business of buying timber from timber growers (commonly called growers). The timber suppliers then resell the timber to pulp and chipping mills. Timber growers are the owners of land and entitled to receive any proceeds from the sale of timber grown on that land. An out-grower scheme is a contractual partnership between growers or landholders and a company for the production of commercial forestry products.

The study uses the Sustainable Livelihood Framework to analyse and compare the livelihood of the three grower types, namely growers selling to forestry companies; growers selling to timber suppliers; and timber suppliers. The study was conducted in the rural coastal areas of Sokhulu to evaluate the livelihood of local households and the data was collected in May 2009. This chapter provides the rationale of the study, the research problem with the accompanying research questions and the research method followed.

1.2 Background and rationale of the study

The world's forests are important for the production of paper, cardboard, lumber, plywood and structural beams. In addition to this they provide medicines and fuel (Burton, 2000:4). Plantation forests cover about 1,37 million hectares of land in South Africa (Chamberlain, Essop, Hougaard, Malherbe & Walker, 2005:28). Chamberlain *et al.* (2005:28) and Karumbidza (2005:9) mention that 80% of the total area planted to exotic forestry is found in KwaZulu-Natal and Mpumalanga Provinces. Most of the wood produced by small-scale timber farmers in the KwaZulu-Natal Province is sold to pulping and chipping companies. The pulp and paper industry contributes 1.9% of the KwaZulu-Natal Gross Geographic product (Chamberlain *et al.*, 2005:55).

1.2.1 The emergence of the grower schemes

The natural resources of the Southern Hemisphere were destroyed when the Europeans colonised the area (Burgess & Wingfield, 2001:79). In South Africa forestry laws were introduced for the protection of the indigenous forest and a forestry department was developed. The development of the forestry department led to the introduction of exotic plantations in order to meet future timber needs (Burgess & Wingfield, 2001:79). The expansion of forestry was later restricted by lack of suitable land. The high cost of transporting timber to the mills due to the location of the planted areas also presented a problem, over and above the environmental requirements for tree growing (Louw, 2004a:79). This led to the formation of Sappi Project Grow and Khulanathi afforestation schemes (Louw, 2004a:79), comprising the planting of trees by smallholders in partnership with forestry companies. Out-grower schemes are highly advanced company and community partnerships in South Africa and Indonesia (Vermeulen *et al.*, 2003:5). Plantation forestry has been criticised for high water consumption rate of exotic trees (Wise, Dye & Mark, 2011:911), as well as for the damage that they are causing to the environment, such as soil and water pollution from chemicals used in the industry (Ojwang, 2000:14-15; Karumbidza, 2005:16).

Through the South African Bantu Trust (SABT) large areas in tribal areas at Sokhulu, Mthunzini and Mbazwana were planted with *eucalyptus* (Cairns, 2000:18). Cairns (2000:19) further mentions that by the mid-1960s the local tribal authority at Sokhulu encouraged the planting of *eucalyptus* in fear that companies would take the unutilised land from the community. In 1972 the Department of Agriculture and Forestry in KwaZulu started issuing *eucalyptus* seedlings in tribal areas (Cairns, 2000:18). Sappi introduced the first out-grower scheme called Project Grow in 1980, later to be followed by the Mondi scheme called Khulanathi (Mayson, 2003:4).

1.2.2 Small-scale timber farming

Many on-farm and off-farm (wages, remittance from migrants, informal economic activities income and state grants) activities provide a livelihood for many communal residents in South Africa (Andrew, Shackleton & Ainslie, 2003:1). Andrew *et al*. (2003:1) further mention that many non-monetary produce and services such as food security, earnings, water, fuel, medicine, shelter and transport are supplied by natural resources and land.

Rural production systems and a culture where small-scale agriculture makes a major contribution to the sustenance of livelihood are common in Southern African countries. For example, in Zimbabwe the communities own 40% of the total land and the government 12% (Harrison, Herbohn & Niskanen, 2002:7). Opportunities and challenges have arisen for households with forest resources, such as facilitating entrance to the market, money flow and technology (Vermeulen *et al*., 2003:2).

A study by Desmond and Race (n.d) where they conducted a global survey and designed an analytical framework for forestry, they distributed questionnaires to companies (Brazil, Colombia, Ghana, India, Indonesia, New Zealand, Portugal, Solomon Island, South Africa, Vanuatu and Zimbabwe) that participate in these out-growers schemes. They recommended that it should be considered to expand the study to include the growers' participation in out-grower schemes.

Small grower schemes make a substantial contribution to the income of rural communities (Chamberlain *et al*., 2005:45). Chamberlain *et al*. (2005:45-46) further state that small grower schemes are established in rural areas with a view to increasing and spreading household income where households are unemployed and the poverty level is high.

Mayers (2000:33) and Desmond and Race (n.d) state that there are various possible approaches for wood trading between companies and growers. Companies can source timber from growers through market agents with no direct relationship with growers, while other companies rent or lease land under contract. Planting in community areas has been viewed as a strategy used by forestry companies to increase timber areas in South Africa (Ojwang, 2000:1-5; Karumbidza, 2005:9). As a result of a decline in the land available for forestry, small-scale agroforestry has developed (Holding Anyonge & Roshetko, 2003:48).

Informal forestry arrangements between companies and communities such as social schemes, joint ventures (Mayson, 2003:3) and other contracts might be utilised to enable communities to gain access to the growing and globalising wood fibre industry, while forestry companies have a

secured forest product supply (Vermeulen *et al.*, 2003:3). Partnerships are instrumental to risk sharing between the company and the community; the company takes the marketing risks and the community carries the production risks (Vermeulen *et al.*, 2003:6; Cairns, 2000:31-32; Ojwang, 2000:1-5). Vermeulen *et al.* (2003:3) further state that this will enable companies to comply with the regulations for operating as environmentally and socially sustainable industries. The scale and impact of a company community scheme depend on the availability of land to households. Even though the risk is equally shared between the household and the company, companies have a large basis of growers; therefore the risks are also spread within the company itself. On the other hand, the landholders have limited means for reducing the risks related to manufacturing (Vermeulen *et al*., 2003:6). Desmond and Race (n.d) state that many growers in the KwaZulu-Natal schemes signed contracts without a full understanding of the implications and with unrealistic expectations.

To encourage the planting of *eucalyptus* trees, companies provide growers with interest free loans, technical assistance (Cairns, 2000:1-2) and decision making capacities (Ojwang, 2000:10; Mayson, 2003:3; Erasmus, 2004:46). As part of the arrangement, the small-scale farmers sell their timber to companies (Whiteman, 2003:4; Desmond & Race, n.d). The short rotation period makes *eucalyptus* an ideal species for paper making and woodchip export. The length of the rotation period is very important in small grower schemes; a shorter rotation period ensures a more regular cash flow for the grower (Chamberlain, 2005:28).

Out-grower schemes are advantageous, more especially for new growers who receive quality planting material, financial assistance and technical expertise. Where growers are not trapped (by companies) in unfavourable contracts, these schemes are useful as a foundation for increased market involvement (Vermeulen *et al*., 2003:7). Whiteman (2003:4) asserts that on land which is less functional, farmers are encouraged to utilise household labour and reduced input levels to plant trees. Even the poorest landholders have been able to enter into out-grower schemes, because of the funds and labour input provided by the schemes (Vermeulen *et al.*, 2003:8).

Morajele (2005 in Chamberlain *et al*., 2005:46) asserts that the costs associated with small grower schemes include the locking up of land for a long period of time and the increased water usage. Financial, technical and labour inputs have been the major factors attracting many small-scale farmers to out-grower schemes (Vermeulen *et al*., 2003:7). Farmers who live far from the point of sale, and whose land is located further from the roads, have not benefited from out-grower schemes. These schemes also exclude landless households altogether (Vermeulen *et al.*, 2003:80). The success of out-grower schemes can be hampered by an unfavourable market

(Vermeulen *et al.*, 2003:6). The task of establishing out-grower schemes is an easy one where land is abundant and the growing conditions are favourable for tree growth.

Due to the high cost of maintaining tree plots, some farmers have reduced the maintenance level, relying on natural regeneration, rather than replanting their land using improved seedlings. This has negatively impacted on the productivity level and produced a poor quality yield. This practice has further reduced the amount received by growers for their product (Desmond & Race, n.d). Productivity of small-scale timber farming can be enhanced by the use of improved quality plants, improved provenance and the use of clonal material (Holding Anyonge & Roshetko, 2003:49-50).

A study conducted by Tornish *et al.* (2001 in Holding Anyonge & Rotshetko, 2003:49) found the economic profitability of a small-scale agroforestry system to be similar to that of large scale plantation forestry. The small-scale systems provided increased economic benefit, as they employed a larger number of people and were socially more stable (Holding Anyonge & Rotshetko, 2003:49) when compared with plantation forestry.

There have been improvements in the physical assets of communities as a result of company-community deals. In South Africa access to water has been improved where local communities are permitted to use water supplies on depots, for example to collect water for household uses (Vermeulen *et al.*, 2003:10). In Japan forestry owners receive a financial subsidy of up to 68% on planting and thinning costs, which has ensured successful small-scale forestry in Japan. In addition, large sums of money for the improvement of road systems and machinery are provided by the Japanese government to enhance rural forestry (Ota, 2001:38).

A study conducted in South Africa revealed that important monetary returns are provided to landholders who participate in out-grower schemes and to those who generate income by working as contract labourers (Vermeulen *et al.*, 2003:14). Vermeulen *et al.* (2003:14) further state that on their own the schemes do not supply adequate revenues to lift household income above the poverty line. The processing stage in the wood fibre industry is more profitable than the production stage. Local residents are self-employed individually as chainsaw operators, transport contractors or small co-operatives (Vermeulen *et al.*, 2003:9).

Opportunities for doing business or for growth in forestry contracting is hampered by the fact that there is a lack of cheaper institutions where contractors can borrow money, as well as a lack of financial skills, management expertise and a reduced workers' efficiency caused by ill health and malnutrition (Clarke & Isaacs, 2004:3-16). Their study also revealed that income in plantation and small-scale forestry contracting is insecure and insufficient, and cannot relieve poverty

among the workers. The most vulnerable are women and workers who run the risk of sustaining permanent injuries (Clarke & Isaacs, 2004:4) due to the physically demanding nature of forestry work.

Vermeulen *et al.* (2003:8) state that out-grower schemes present an excellent opportunity for saving among low income households. The larger cash incentive that growers received at harvest has been the motivation for households to join out-grower schemes. Tree growing is not seen as the main income, but an additional source of money for household livelihood (Vermeulen *et al*., 2003:8). The majority of households cannot access large land for tree growing; therefore the schemes will contribute to the household income, but it will not put an end to a household's poverty (Cairns, 2000:35). Karumbidza (2005:9-10) in his study found that people's livelihood was not improved by plantation forestry, as the empowerment deals and contracting opportunities were not spread out in the community. A study by Cairns (2000:57) reports that households have different livelihood strategies and that timber will be a significant safety net for households who have access to adequate land. There is a need to evaluate the significance or contribution of small-scale timber farming in improving the lives of people at Sokhulu, specifically with regard to the three different grower types.

It was observed that certain households do not know the financial value of their timber and they lack the skills and expertise to harvest, transport and sell their product directly to the mill or depot. Growers sell their plots or timber to timber agents, who will in turn sell the product on the growers' behalf, or buy it from the grower. This reduces the income that the household receives for the product. Other households are assisted by company, as extension foresters take it on themselves to co-ordinate the harvesting, transport and selling of their timber to the mill or depot. These households are paid by the company, which in turn pays for the harvesting and the transport contractors for the services rendered. Some households that are in the business of timber farming buy timber from other households and they sell it to the mill or depot.

Households in the Sokhulu area have participated in timber farming since the 1970s (Personal communication: T Mfekayi, August 2007). The researcher aims to determine if households in the Sokhulu area have benefited by taking part in small-scale timber farming, and whether their livelihood has been sustainably enhanced. A comparison between the three different grower types has not been done and the perception of farmers needs to be tested. Therefore, the researcher proposes to compare the livelihood level of those who sell to forestry companies (GC) or timber agents (GT), and the timber suppliers themselves (T). If timber farming has indeed contributed to improving households' lives, there is a need to pay closer attention to this type of farming to ensure that it is continued. Where this income method has failed to improve

households' lives, its existence should be questioned, problem areas highlighted and attention paid to the questions at hand.

1.3 Research problem

Because of the entry of small-scale farmers into the forestry industry, and specifically the establishment of the grower schemes, the contribution that this has made towards the livelihood of each grower type (small-scale farmers) has not been measured. This has given rise to the research question that needs to be addressed, namely:

To what extent has small-scale timber farming contributed to enhancing sustainable livelihood at Sokhulu?

The research therefore aims to determine whether households in the Sokhulu area have in fact benefited by participating in small-scale timber farming and whether their livelihood has been sustainably enhanced. The research further compares the livelihood level of those that sell to forestry companies, those that sell to timber agents, and those making a livelihood as timber suppliers.

1.3.1 Objectives

The research aim has been addressed by applying the following research objectives:

(i) To compare the livelihood levels of growers selling to forestry companies, growers selling to timber agents, and timber agents themselves.

(ii) To determine the benefits that timber suppliers and growers receive for participating in small-scale timber farming.

(iii) To determine households' perception towards small-scale timber farming.

The research design and methods that have been proposed to address the research aims are briefly outlined below, but discussed in further detail in Chapter Three.

1.4 Research design and methods

In order to compare the livelihood levels of the various grower types the DFID (Department for International Development) Sustainable Livelihood Framework has been used to establish the

livelihood levels of the three groups that are compared. The methodological framework in Figure 1.1 provides a summary of the research process undertaken to establish the comparative findings.

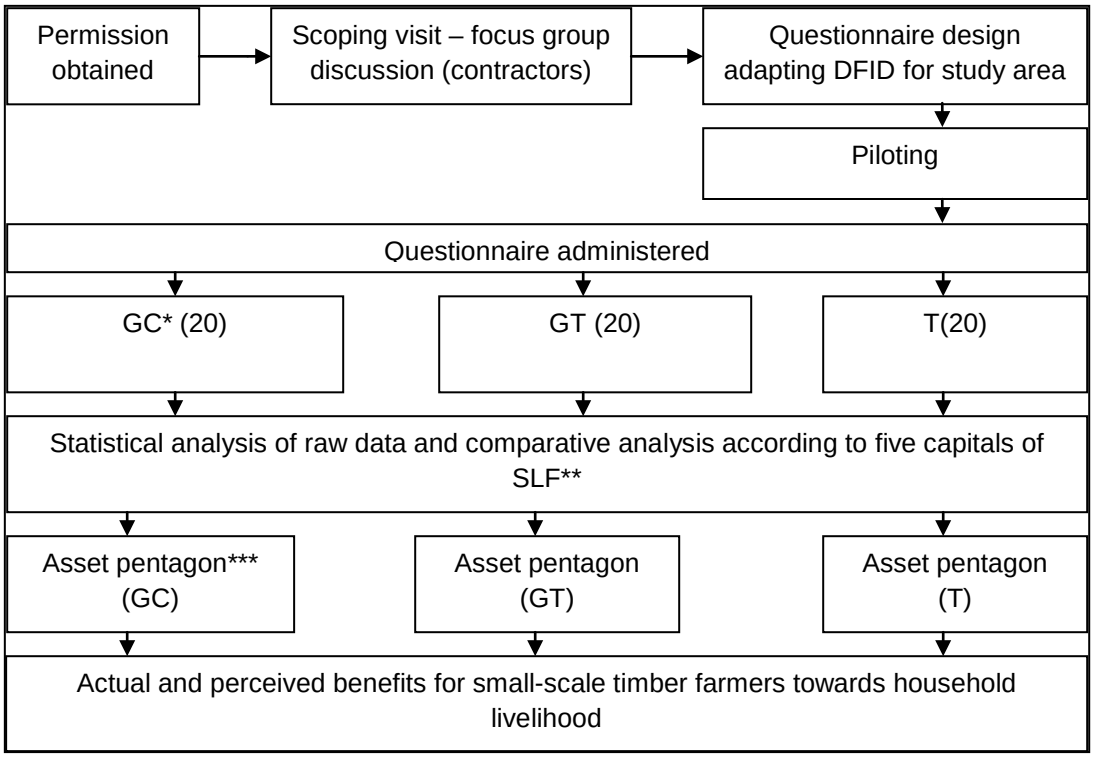

Figure 1.1 Research methodology framework

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers
*The out-grower schemes have been outlined in paragraph 1.2, but are discussed in detail in paragraph 2.3.1
**The sustainable livelihoods framework (SLF) is explained in detail in paragraph 3.3.1
***The asset pentagons are discussed as part of the Sustainable Livelihood Framework in paragraph 3.3.1

An appointment was made to meet with the Sokhulu chief and his council. The aim of the meeting was to explain briefly what the study entailed, who would be requested to take part in the study, and what kind of participation would be required. A letter of introduction from the university that introduces the study and from the researcher (Appendix A) was also issued to the local leadership. The researcher then asked permission to work with growers, contractors and timber agents under the chief's authority. On approval by the local leadership, a focus group discussion was held by following a schedule (Appendix B) that served as a facilitation tool.

Prior to conducting the focus groups and interviews permission was asked from each individual selected to take part in the study and the study was explained to them. No names of participants were written on questionnaires and this was pointed out to participants before and after the interview. Therefore, research was conducted on a confidential basis, offering anonymity to the

respondents. There would be an honest feedback of findings and a letter of informed consent was signed by the participants prior to the interview.

Both qualitative and quantitative research methods were used. The focus group discussion was conducted and chaired by the researcher in order to steer the research in the intended direction. A focus group discussion was held with 12 contractors. These contractors were selected for the focus group on the basis of their involvement with small-scale timber farming for more than 12 months. Two sampling methods were used to sample the given population, i.e. the snowball sampling method and the simple random selection method. The household livelihood questionnaire (Appendix C) was completed by the researcher during a personal interview with each participant. All the questionnaires were completed by the researcher during a face-to-face interview. The interviews were conducted with twenty growers selling to forestry companies, twenty selling to timber suppliers and twenty timber suppliers. There was only one questionnaire, which was used to establish household livelihood. The DFID Sustainable Livelihood Framework was used to determine the livelihood status of growers selling to the forestry or procurement companies, as well as that of growers selling to timber agents and timber agents themselves.

Statistical analysis of the data was done with the help of a consultant. The rest of the data was analysed by studying the responses to each question individually, and by recording the number of participants who had selected a particular category in each question. The data was presented in a descriptive and numerical form. An asset pentagon was drawn showing the distribution of capitals for each grower type, after which the actual and perceived benefits of small-scale timber farming for household livelihood was determined.

1.5 Structure of the dissertation

The literature review is covered in Chapter 2. Attention was paid to the global forestry industry, the forestry industry in South Africa and the sustainable livelihood in South Africa and KwaZulu-Natal. Chapter 3 illustrates the methodology applied in the study, while the Sustainable Livelihood Framework is also discussed. The results of the study based on the five capital assets are discussed in Chapter 4. Chapter 5 compares the livelihood level of growers selling to a company, growers selling to a timber supplier and the timber suppliers themselves. The benefits of small-scale timber farming and the households' perception of small-scale timber farming were also compared. The assets pentagon and the calculations are shown at the end of each capital. The synthesis, recommendations and conclusion made with regard to the research and the way in which it addressed the study aims and objectives are covered by Chapter 6.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter provides background information about the forestry industry within both the global and South African contexts, while the industry's contribution to rural livelihood is also discussed. The conceptualisation with regard to the literature review is shown in Figure 2.1. Factors that led to the introduction of plantation forestry are mentioned in this chapter. The challenges and benefits of exotic plantations are critically examined in brief, in terms of what the world and South Africa as a country are faced with.

Trends in the sustainable livelihood of rural people are examined, with special reference to out-grower schemes. A close look is taken at poverty in South Africa and KwaZulu-Natal, as poverty has a marked effect on households' livelihoods. Small-scale timber farming types are presented and discussed, referring to those employed at Sokhulu, South Africa and in the world, as well as to their contribution to sustainable livelihood.

Global forestry industry	**Forests, plantation forestry and sustainable forest management**	**Forestry industry in South Africa**	**Plantation forestry in South Africa**	**Changing trends in commercial forestry – community forestry in South Africa**	**Sustainable livelihoods in SA and KZN**	**Summary**
	Challenges and benefits of forestry			**South Africa's small-scale grower schemes**		
	Forest product utilisation			**Financial returns from small-scale forestry**		
	International small-scale timber farming					

Figure 2.1 Conceptual framework for the literature review

2.2 Global forestry industry

The global forestry industry remains an important resource for sustaining people's livelihood. Forestry has always served the basic needs of human beings, even in earlier centuries, in terms of providing shelter, medicine, fuels, protection, shade and tools, and meeting various other needs (Shrivastava, 1996:81; Ali, Ahmad & Suler, 2007:592). Shrivastana (1996:81) further

states that the utilisation of forests is acknowledged on a global scale. Forestry has the potential of boosting the livelihood standards of local people and contributing to rural development (Le, Smith, Herbohn & Harrison, 2012:5). On the contrary, forestry can impact negatively on local inhabitants where forestry displaces people from their land, destroying both the landscape that they value and the relationships within a community (Higman, Bass, Judd, Mayers & Nussbaum,1999:49). There are about 3870 million hectares of forest in the world and five percent of this area is plantation forest (Food and Agricultural Organisation, 2001:2).

2.2.1 Forests, plantation forestry and sustainable forest management

A forest is defined as a living, multifaceted, unified group of trees and associated plants and animals (Holland & Rolfe, 1997:1), or an area set aside for producing timber and other forest products (Shrivastava, 1996:82). Forest stands are defined by Shrivastava (1996:82) as "an aggregation of trees or other growth processing sufficient uniformity in composition, constitution, age arrangement or condition, to be distinguished from adjacent crops and forming a silvicultural unit". Forest stands make up a plantation and a plantation is defined as a forest crop or stand grown artificially by sowing or planting (Evans, 1982:10). Forestry refers to the skills and science of managing forests so that they produce maximum quality and quantity yields and services (Holland & Rolfe, 1997:2). Hollard and Rolfe (1997:2) further state that forestry comprises the management of forest land to satisfy the needs of human beings.

When forestry is utilised openly or privately to fulfill the aims of its owner, this is referred to as forest management (Mendoza, 2005:239). When forestry contributes to sustainable development, this practice is often referred to as sustainable forest management. The development is done in such a way that future generations will benefit in the same way as the present generation. This type of development is described as being economically viable, socially acceptable and environmentally sustainable (Higman, Mayers, Bass, Judd & Nussbaum, 2005:4). Government, companies and environmental groups are aware of the fact that consumer demand and the market may have an influence on how natural resources or forests are managed and utilised (Scotcher, 2000:511). Certification programmes (forest management certification, forest product certification and management system certification) have been initiated by companies to ensure that they comply with sustainable management (Scotcher, 2000:511; Muhammed, Koike & Haque, 2008:202-203; Amacher, Merry & Bowman, 2009:1795; Zhao, Xie, Wang & Deng, 2011:2). Sustainable forest management can be challenging as it sometimes incorporates diverse and contradictory management goals, such as recreation, conservation and timber production (Berninger, Adamowicz, Kneeshaw & Messier 2010:117). In developing countries the

areas under forest cover and owned by the poor are small, making it difficult for these small land owners to pursue certification (Vogt & Fanzeres, 2000:77).

When trees are grown on public or communal land, the practice is referred to as community forestry, which is in contrast to growing trees on privately owned land. The objective of community forestry is to ensure that everyone in the community benefits, including the landless (Shrivastava, 1996:85). Individuals can grow trees independently on their land, in which case it is also referred to as community forestry (this is covered in detail under section 2.2.4 and 2.3.1). Small-scale industrial forestry (community forestry) is seen as forestry focused on economic benefit (McIlveen & Bradshaw, 2009:203). During the past decades the planting of trees in rural areas has received considerable attention from foresters and conservationists alike, and has been required to meet the needs of the growing rural population (Von dem Bussche, 1993:801).

The focus of recent policies is on sustainable forestry management and the conservation of biodiversity (Herbohn, Harrison & Herbohn, 2000:227-228; Ni Dhubhain, Flechard, Moloney & O'Connor, 2009:695-696). Sustainable forestry management presents a challenge to small-scale forestry policy, because it means that all three criteria of sustainable management, namely those relating to the social, economical and environmental aspects, must be met (Herbohn *et al.,* 2000:227-228). Small-scale forestry faces a further challenge, as it is also affected by economic pressure such as fluctuations in the global wood market (Herbohn *et al*., 2000:227-228). Ramakrishnan (2007:93-98) states that if the environment can be seen as a socio-ecological landscape system, then conservation can be linked to sustainable forestry. In the United States the thinking around economically viable, socially responsible and environmentally acceptable forestry is one that will live for a long time to come (Moffat, Cubbage, Holmes & O'Sullivan, 2001:316-317). Richards (2000:1013-1014) asserts that people are more likely to favour the destruction of forest resources, as it provides them with a higher income when compared with sustainable forestry. Sustainable forest management, being the goal of forestry practices, is something that households find difficult to achieve (Dubois & Lowore, 2000:5-6). Ngubane (2005:72) mentions that the ideal of implementing sustainable forest management among growers in South Africa holds a number of challenges. These include insufficient capacity and management plans to comply with sustainable forest management, as well as reduced access to information, lack of support from the state and lack of funds to meet the requirements of sustainable forest management.

Sikor (2006: 339) mentions that community-based forestry has gained credit as a development tool and is not limited to test developments only. Sikor (2006:339) further states that because community-based forestry has been successful, it has been incorporated into government policies

and programmes in a number of countries. Politics existing between the government and communities influence social forestry in terms of the access to and management of forests (Sikor, 2006:342-343). Community forestry plays a significant role in allowing economic gains for the community, but forestry is faced with a number of challenges.

2.2.2 Challenges and benefits of forestry

The growing of trees by private landowners (small-scale forestry) was established because of the challenges that plantation forestry was facing in terms of expanding their planted land (Herbohn *et al*., 2000:229). The rate at which trees grow presents a challenge, as trees normally require five to ten years to provide significant returns. This is sometimes in conflict with the needs of low-income households (Aoudji, Adegbidi, Agbo, Atindogbe, Toyi, Yevide, Ganglo & Lebailly, 2012:105) that would require cash immediately (Ascher, 1995:51-54). Conflict over the use of land has hampered the implementation of communal forestry projects. The planting of trees on unused common lands can affect other land use practices (for example grazing), which may sometimes worsen the situation of some members of the community, and the poor in particular (Food and Agricultural Organisation, 1986:61; Landry & Chirwa, 2011:546). Ascher (1995:3-11) states that people's reliance on forests and forestry products to provide them with job opportunities presents huge risks. When not properly managed, natural resources are at risk of becoming depleted. The livelihood of the people will be affected as the quality and quantity of wood and other products decline (Ascher, 1995:3-11).

Alexandra and Hall, 1997 (in Herbohn *et al*., 2000:229) name the following factors as limiting the expansion of farm forestry in Australia:

- Unjust timber markets
- Sales agreements and log costs are not discussed openly
- Inadequate road infrastructure
- Small growers are not able to negotiate with log buyers
- There is no confidence in future supply
- No instrument has been created allowing for public plantations with ecological and monetary benefits.

These listed factors are not unique to Australia, for South Africa experiences similar factors, as discussed in paragraph 2.3.1.

Some of the risks related to tree farming are that people do not know what they will require in future, and that they are not guaranteed physical achievement (for example due to fires) in their

investment. People cannot be certain that the project they embark on will provide monetary success, as prices fluctuate and markets might collapse (Ascher, 1995:54-80). The solution to these problems lies in planting faster growing species such as *eucalyptus*; these are short rotation crops that have the ability to reproduce themselves (coppice) (Savill, Evans, Auclair & Falck, 1997:221). Short rotation crops also allow more than one harvest from a single planting (Savill *et al*., 1997:221-223). Another possible solution is the harvesting of timber before it reaches maturity (Ascher, 1995:54-80).

Growing trees presents certain challenges. The trees are at risk of being damaged by animals or fire, while marketing the product might also be a problem for poor farmers who have only small quantities to sell (Food and Agricultural Organisation, 1989:93). Where there is poor forestry management, including poor road construction, timber extraction and site preparation, forestry can have a negative impact on the water quality where large quantities of suspended sediments result in clogged river systems (Department of Water Affairs and Forestry, 2005b:7-8). Deforestation has increased and is reported to be increasing even further due to population growth. In addition, one needs to look at deforestation in relation to agricultural development, markets, government policies, settlement patterns, changes in technology, past patterns of trees (how trees were planted and used), resource exploitation and alterations in the socio-economic structure of rural societies (Food and Agricultural Organisation, 1986:23). Considering that many of the challenges facing forestry can be managed, the benefits of forestry still remain abundant.

Trees have an advantage in that they require very little capital investment; under favourable conditions their value appreciates and they are not easily influenced by inflation. They can be harvested at any time, in accordance to the quantity needed. As some trees have the ability to reproduce themselves (they coppice), the investment will re-establish itself (Food and Agricultural Organisation, 1989:93). Forestry has been said to improve the quality of water (Herbohn *et al*., 2000:230) by reducing surface run-off, evaporation and loss of topsoil (Thoms, 2008:1452-1465). Nevertheless, concern has been raised about the impact of exotic plantations on the water supply in water poor countries such as South Africa. This concern is being addressed through South Africa's Working for Water Programme.

Wood is the dominant fuel for cooking and heating purposes among rural people in developing countries (Food and Agricultural Organisation, 1989:71). In South Africa about 20% of households still depend on firewood as an energy source for cooking (Lewis, Adie, Howard, Mitchell, Berriesford, Ham, Delofse, Brown & Mander, 2005:29). Food and Agricultural Organisation (1986:23-24) reports that the collection of fuel wood is one of the main causes of the diminishing wood resources.

The shortage of fuel wood has an effect on the amount of food cooked, with fewer meals being cooked during times of fuel wood shortages, which in turn impacts on household nutrition (Falconer & Arnold, 1991:7). Falconer and Arnold (1991:30-33) further state that the quality of food consumed will also be affected by a lack of fuel wood. Forestry is able to overcome this challenge through the provision of firewood. In addition, forestry provides households with a safety net (income or insurance) (Aoudji *et al*., 2012:98) in situations of death in the family, job loss, drought, flood, crop failure, livestock losses and any other unanticipated expenditure that might occur (Shackleton, Shackleton, Buiten & Bird, 2007:565-566; Saha & Sundriyal, 2012:32-37). Through their involvement in forestry some rural households are able to escape poverty (Shackleton *et al*., 2007:573; Saastamoinen & Vaara, 2009:426; Velge & Harrison, 2009:422; Torres-Lezama, Vilanova & Ramirez-Angula, 2010:282; Landry & Chirwa, 2011:547), as forestry provides forest foods and income through the sale of forest products.

2.2.3 Forest product utilisation

The increased pressure on natural resources remains a global problem. In response to the over-exploitation of natural resources for reasons such as more people requiring firewood (Wilde & Vainio-Mattila, 1995:26; Bhatt & Sachan, 2004:1), the planting of commercial *eucalyptus* trees was introduced. Commercial eucalyptus planted in plantations (refer to section 2.2.1 for a definition of plantation) has an increased growth rate when compared to indigenous forests; and when more wood is produced on a smaller piece of land (Wise, Dye & Gush, 2011:913), it reduces harvesting pressure on natural forests (Siry, Cubbage & Ahmed, 2005:557). However, Agarwal (2001:1625-1626) reported that such projects have not been successful everywhere.

Indigenous, plantation and savanna forests are an important resource, serving as the basis of economic activity for some people in the rural areas, and thereby helping to reduce and alleviate poverty. Trees planted in woodlots provide timber and non-timber resources, and ensure the conservation of small wildlife for households (Ascher, 1995:8). When rural people have no other sources of income, they usually turn to the forest for their survival, so that forests often provide a safety net for the poorest South Africans (Department of Water Affairs and Forestry, 2008:3). However, people need to be living close to the forest to be able to access such benefits. For those households who cannot access credit, trees and forests offer a significant way of obtaining income. The advantage of trees over seasonal agricultural produce is that felling can be postponed and aligned with improved market situations (Schmidt, Berry & Gordon, 1999:16-22). However, this will result in delayed revenues for households that require an immediate income.

Even though forest resources, like other activities that rural people engage in, cannot remove millions of rural people from a situation of poverty, they can help in reducing the intensity of poverty for some (Shackleton, 2004:35-36). Forestry is seen as the main potential role player in alleviating or reducing poverty in rural areas, where it in most cases constitutes a significant economic activity (Shackleton *et al*., 2007:558-574). The sustainable management of forest resources is crucial, due to the reliance of rural households on these natural resources (Adhikari, Di Falco & Lovett, 2004:245). Agarwal (2001:1625) argues that for a number of years forests have played a vital role in sustaining the livelihood of rural people. Forestry is located in underdeveloped rural areas, with poor road networks, government services, markets and jobs (Shackleton *et al*., 2007:588-559). This limits households' opportunities for making a living.

The livelihood of low income people can be improved by community forestry (Ascher, 1995:11). Fuel wood is in short supply in most countries and the supply of wood is less than the amount required. Farmers in some countries cannot afford to buy fertilisers to improve soil fertility; hence this increases deforestation and food insecurity (Otsyina *et al.,* 2000:79). Rotational woodlots are required to reduce some of these problems (Otsyina *et al.,* 2000:79).

Forestry allows farmers to maintain the productivity of their land, as they cannot afford the fertilisers, herbicides, irrigation and labour costs related to agriculture production. Trees serve as a form of insurance and can be harvested during times of emergencies (Falconer & Arnold, 1991:5). Falconer and Arnold (1991:5) mention that the income that people receive from embarking on forestry activities is usually used to purchase livestock or land. Forests allow the poor a method of investment for the future, offering them a means to escape the poverty cycle (Falconer & Arnold, 1991:5).

As natural forest cover continues to deteriorate globally, an increased growth rate can make plantation forestry a tool in ensuring the continuation of the carbon cycle (Siry *et al.*, 2005:557) or sequestration, water-shed and biodiversity conservation (Le, Smith, Herbon & Harrison, 2012:11). Plantation forestry is a net sink of greenhouse gas. Greenhouse gas net present value was found to increase in plantation and decrease in agricultural land use (grazing and cultivation) (Maraseni & Cockfield, 2011:286). The growing of trees by small-scale farmers contributes to climate protection, while providing livelihood strategies to households (Boyd, Gutierrez & Chang, 2007:252-257). Whether a forest can be utilised or not is determined by its age, magnitude and condition (Agarwal, 2009:2302-2303). Johansson (1991:15-31) states that people in the Babati district in Tanzania grow trees for much needed tree products and services, timber and building poles, cash crops (commercial), economic security (trees as savings), fuel wood production,

better home environment, wind shelter for other crops, shade for coffee, water erosion control, land reclamation, climatic improvement, fertility management and catchment management.

A fuel wood tree and a timber tree take up the same space and time, but a mature timber tree is worth more than one producing fuel wood. Fuel wood is therefore seen as of lower importance in relation to timber trees and those trees harvested for poles. When referring to fuel wood, reference is made to the pruned branches and off-cuts from timber trees (Johansson, 1991:25). Traditionally the collection of firewood has been the responsibility of women and children (Phiri, Chintu, Chirwa & Bhanda, 2000:81). Rural women have to travel long distances to collect firewood as a result of deforestation, which leaves these women with an increased workload (Bhatt & Sachan, 2004:4). Das (2011:67-68) states that women in West Bengal (India) are responsible for collecting forest resources. Small-scale timber farming has helped to reduce the burden for women who collect firewood.

Trees provide a wide range of products which include ornamental flowers and medicinal oil, over and above timber, poles, firewood and charcoal. *Eucalyptus* is one of the best honey plants globally (Miti, 2009:8). Most *eucalyptus* species are able to coppice, which allows for a number of harvests in one planting (Miti, 2009:8). The variety of uses offered by forestry has served as an incentive for households to embark on small-scale forestry, enabling them to cater for some of their needs.

2.2.4 International small-scale timber farming

Sunderlin (2006:393-394) questions whether poverty alleviation is the fundamental goal of introducing community forestry in Cambodia, Laos and Vietman, and also questions the contribution the state is making towards the attainment of this goal. Elsewhere in the world the most common pooled resources are managed collectively within the community (Sekher, 2001:137-154; Varughese & Ostrom, 2001:747-765; Adhikar, Williams & Lovett, 2007:464). This is known as community-based natural resource management (CBNRM), and this right is granted by the state (McDermott, 2009:249; Adhikari *et al*, 2004:246). This type of resource management is classified as organised participatory resource management and is said to be more efficient due to the use of local poverty maps and ecosystem accessibility for the users (Kumar, 2002:763). The managed resources are often inadequate in terms of supply, but accessible for the community to utilise (Sekher, 2001:137-154).

In Indonesia a five-year interim *Hutan Kemasyarakatan* (HKm), a local kind of lease contract, is issued to growers who plant coffee, and classified as community-based forestry management

(Arifin, Swallow, Suyanto & Coe, 2009:2042). Arifin *et al.* (2009:2042) set out the conditions of the *Hutan Kemasyarakatan* contracts used in Sumber Jaya as follows:

- Land is to be used for five years initially, but has the potential to be extended to twenty five years, if the farmers meet the standard of *Hutan Kemasyarakatan*.
- When farmers are issued with *Hutan Kemasyarakatan* contracts they must plant trees on the forest land to protect it. The stocking of each piece of land varies from 400-1000 trees per hectare.
- Thirty percent of the trees that are grown must be timber trees.
- Farmers are prevented from felling and selling the trees that they grow.
- No annual fees are payable by growers.

Farmers in Sumber Jaya were more in favour of *Hutan Kemasyarakatan* contracts that enabled them to fell trees from their plots. Current regulations in Sumber Jaya do not allow farmers to harvest trees from their land (Arifin *et al*., 2009:2049-2050). Although timber trees are grown, it cannot be utilised as a natural resource to generate income.

A study conducted in Bangladesh to determine factors influencing sustained participation showed that 36% of the participants were not happy with the species grown on their plots. Logistic regression analysis revealed that sustained participation in forestry can be drastically influenced by the species planted on the plot (Salam, Noguchi & Koike, 2005:47-49).

Two types of plantation joint venture schemes are used in Australia. The first scheme is only implemented on fertile soils where the rainfall is 900 mm and above per annum; the slope of the land must be less than twenty degrees and the minimum land ten hectares per landowner. The land must be situated 200 kilometres from the selected city. For the second scheme the landowner must have at least 20 hectares that can be planted; the rainfall in the areas must not be less than 900 mm and the slope not more than 18 degrees (Herbohn *et al*., 2000:233-234). The authors (Herbohn *et al.* 2000:234) mention that in both schemes the growers are required to look after the plots in terms of weeding, fertilising, thinning and pruning. Where they cannot perform these activities themselves they can hire paid contractors (Herbohn *et al*., 2000:234).

Farmers have to wait long before they can benefit from the results of their investment, but since trees are not a perishable commodity they do not have the problems presented by other crops (Foley & Barnard, 1984:89). Foley and Barnard (1984:91-92) further state that farmers sell their timber to those who pay the highest price; therefore timber is sold to big industries in the cities. Only waste and trimmings from preparing the timber are sold locally for fuel wood, building purposes and fences, providing households with ad hoc income.

For many families forestry offers a source of income and employment. Many poor people, especially women in rural areas, depend on the income obtained from selling forest products to purchase food and other requirements. Trees raised on farms are seen as savings and are harvested and sold to meet emergency cash needs (Food and Agricultural Organisation, 1989:6; Thoms, 2008:1453-1454). Foley and Barnard (1984:92) assert that farm forestry provides few direct benefits to local wood consumers who are not able to plant trees, or are too poor to purchase the wood. Subsistence farming by households in developing countries is not a viable household strategy for those without land, or for the large category of rural poor classified as marginal farmers. The latter households depend upon wage labour and other income generating activities as their primary survival strategy (Raintree, 1991:27). Elsewhere in the world countries depend on their natural forests to provide for their forest needs, but the South African forestry industry is dependent on the introduced exotic species.

2.3 Forestry industry in South Africa

Due to a limited amount of indigenous timber in South Africa, exploitation of the country's natural forests follows. In the 18th century countries in the Southern Hemisphere that were poorly endowed with natural resources started with exotic plantations (Zwolinski, 1990:33). Zwolinski (1990:33) argues that these man-made plantations have proved to be ecologically stable and successfully produced the required timber. These exotic plantations have, however, been criticised for their impact on the environment.

The European Colonists became increasingly dependent on timber after settling at the Cape in 1652 (Department of Water Affairs and Forestry, n.d:3; Compton, 1953:5). They utilised indigenous forests for building houses and other structures, furniture and wagons (Keet, 1984:1). Between the years 1652 and 1683, twenty seven placaats were delivered. Zwolinski (1998:36) states that in the "Cape placaaten" compulsory legislative procedures were presented. These placaaten paid attention to: 1) the protection of the soil, trees and gardens, preventing them from being destroyed, 2) monitoring the felling of trees for timber and fuel wood, 3) the prevention of grass fires, 4) ensuring that water for consumption was not polluted and 5) safeguarding of wildlife (Zwolinski, 1998:36-37).

Placaats were issued to prevent the Dutch Indian Company from further destruction of the forests, but this was not successful (King, 1938:15). Even when the forests were under the control of the Landdrosts or Civil commissioners its protection did not succeed, as licences were issued to woodcutters, but there was no supervision in terms of where the cutting was taking place and the quantities being harvested (King, 1938:5). Those genuses with high timber

demands and areas of private forestation were the most heavily exploited (Director of Forestry, 1949:1). The demand for timber further increased as mining timber was required following the discovery of the Kimberly diamond mine in 1869 and the gold mine in the Eastern Transvaal Drakensberg in 1873, followed by the Witwatersrand gold mine in 1886 (Laughton, 1937:20; Keet, 1984:2).

Control of the felling of forests was absent and as a result many remnants of the forests were lost (Keet, 1984:1). Following the situation with regard to the Cape forests, those in the Eastern Cape were also heavily exploited in the subsequent years. Local tribes depleted the Transkei forests by cutting young trees to build kraals and houses (Laughton, 1937:19; Keet, 1984:1). In Zululand and Natal local inhabitants (Laughton, 1937:19) had already done great damage to the coastal forest, even before the influx of the first settlers and Voortrekkers at Port Natal (Keet, 1984:1).

The San people, the original inhabitants of the Cape, did not exploit the forests. This group's main interests were hunting and the sustainable gathering of veld food. These inhabitants seemed to have been residing in caves rather than in the forests (Laughton, 1937:19). The Hottentots were a pastoral community and are reported to have burned the veld (to keep plant growth young and succulent) in an attempt to obtain grazing for their cattle (Laughton, 1937:19). Both the Europeans and the Bantu are to be blamed for the destruction of the forests (Laughton, 1937:19). The most severe exploitation of land was caused by Europeans removing the forests along the Natal coast to plant sugar cane (Laughton, 1937:19-20).

Minimal control was exercised over the forests in the 17th and 18th centuries (Keet, 1984:3). The protection of the government forests was introduced through the legislation of 1795 and 1801. For a long time there had been a strong focus on environmental laws and regulations, but these laws were meant to discriminate against certain groups of people, barring them from using certain resources and reserving these resources for the privileged few (Zwolinski, 1998:36). In the 19th century it was appreciated that the objective of conservation of the natural forests could be realised by the introduction of exotic plantations to supply the required timber resources (Zwolinski, 1998:37).

In the 18th and 19th century conservationists and forest guards were employed following the declaration of the forest as crown forests for their preservation (Department of Water Affairs and Forestry, n.d:3). In the 19th century a trained forester from Europe was employed and in 1903 the School of Forestry was established. The Union of South Africa was formed in 1910, uniting all forestry services of former colonies (Department of Water Affairs and Forestry, n.d:3).

Exotic plantations were established as it became apparent that indigenous forests could not be restored to full productivity and that these trees had limited economic value (Keet, 1984:3). The introduction of exotic species was motivated by the fact that the incremental growth of the forests was very low, and most of the trees were hardwood with a reduced suitability for industrial needs when compared to coniferous trees (Director of Forestry, 1949:3-4). The natural forests made a significant contribution to building the country's economy when other sources were not available, even though this led to the exploitation of such forests (Director of Forestry, 1949:3).

Different trials were conducted and different species were introduced from different parts of the world. A decision to utilise exotic trees in South Africa was taken (Director of Forestry, 1949:4; King, 1938:5). *Eucalyptus* from Australia and pines from Europe and North America performed well in South Africa, exceeding even the growth in their countries of origin (Compton, 1953:5).

In 1876 the first exotic plantation consisting of *eucalyptus* species was established near Worcester (Keet, 1984:4) to provide fuel for railway locomotives (King, 1938:6). Of the introduced exotic species, those coming from countries where the climatic conditions were similar to those in South Africa excelled in their growth (Keet, 1984:5) and these plantations supplied timber for the country (Department of Water Affairs and Forestry, n.d:3). Over and above the abiotic and biotic factors, transport played a crucial role in determining where afforestation would take place (Louw, 2004a:79). Louw (2004a:80) states that the local industry was threatened by high transport costs. In the 1960s the concept of multiple-use sustainable forest management was initiated (Department of Water Affairs and Forestry, n.d:3).

At the time when forestry companies in South Africa started their forestry activities, the timber production was small and largely directed at the mining industry (Warkotsch, 1987:39). Axes and bow saws were used to fell the timber and small timber was carted to the roadside by hand or by mules, while the bigger poles were carted by oxen (Warkotsch, 1987:39). In recent years South Africa has mechanised most of its forestry operations (Warkotsch, 1990:55). This means that mechanised tools are presently being used for most of the operations. .

Privatisation of Government plantations, certification, outsourcing, globalisation, a shift in Government and the publication of a variety of new Government policies and Acts, particularly those on water consumed by trees, took place during the period from 1991 to 2002 (Louw, 2004b:65). Privatisation of government property started in 1975 when the state combined its enterprises with those of the Weza state sawmill and H.M. Holdings (Louw, 2004a:78). Following the first democratic elections in 1994, a new forest direction policy based on the principle of participatory forest management was implemented (Department of Water Affairs and Forestry,

n.d:3). During the period 1991 to 2002 smaller players became significant, as there was an increase in afforestation in rural areas in close proximity to processing plants (Louw, 2004b:67).

2.3.1 Plantation forestry in South Africa

To meet its timber requirements and produce timber for commercial processing, South Africa relies on exotic plantations, as the country is poorly endowed with indigenous forests (Dye & Versfeld, 2007:121). Forests in South Africa provide a wide array of products and services. Savannas or woodland forests of South Africa are home to approximately 9.2 million rural people and these forests cover about one third of South Africa (Shackleton, 2000:19-27; Shackleton, Shackleton, Geach, Crookes, De Wit, Evans, Von Maltitz, Willis, Kelatwang & Havenmann, 2001:43). Most of the indigenous forests and plantations in South Africa occur in Mpumalanga which has a demographic population of seven percent of the total population, Eastern Cape with a population of fourteen percent and KwaZulu-Natal with a population of twenty one percent of the total population (Lewis *et al*, 2005:21-22). The Mpumalanga, Eastern Cape and KwaZulu-Natal provinces typify the highest poverty level in South Africa (Lewis *et al.*, 2005:21-22). Forestry plantations contribute two percent of the South Africa's gross domestic product and in 2002 more than 100 000 people depended on it for employment (Le Maitre, Van Wilgen, Gelderblom, Bailey, Chapman & Nel, 2002:144).

In the Republic of South Africa, out of the total 1119,3 million hectares, 1,274,869 hectares are used as forestry areas, comprising 1,1 percent of South Africa's total surface (Forestry South Africa, 2010:1), while 37 percent of the forestry areas are planted to *eucalyptus* species (Boreham & Pallet, 2009:85). Furthermore, Boreham and Pallet (2009:85) state that most of the area planted to *eucalyptus* is for the production of pulpwood and small amounts for mining timber, saw timber and other purposes. *Eucalyptus* wood is in demand in South Africa, due to its fast growth rate and competitive production costs (Morris, 2008:119). Pallet and Machaka (2009:95) state that about 10-15 percent of the *eucalyptus* hardwood production consists of clonal material. Zululand's coastal sand has the biggest area comprising clonal production (Pallet & Machaka, 2009:95). Forestry South Africa (2010:1) shows that from 1999 to 2009 there was a decline of 127 000 hectares in forest areas, which is equal to 9,1% of the forested area. The reduction in forested land has mostly been due to areas being removed from timber production and implementation of strict environmental principles (Boreham & Pallett, 2009:85). Of the total forest area in South Africa 39,6% (504 393 ha) is in KwaZulu-Natal, 141 691 hectares of which are planted to softwood (mainly for sawlog production), and 362 702 hectares to hardwood, which is mainly used for pulpwood production (Forestry Economic Services, 2007:11; Forestry South Africa, 2010:2).

Though the forestry industry makes a large contribution to the country's economy, these forests have positive and negative impacts on the ecosystem, especially with South Africa being a semi-arid country (Hassan, 1999:1). In 2007 the forestry industry (including processed products) had a total turnover of R18.5 billion (Anon, 2010:105). Tewari (2001:334-335) states that commercial forestry is being questioned in South Africa, the concern being the impact of forests on the environment where stream flow (Hassan, 1999:1) is reduced and natural habitat is lost. In spite of the contribution made by the industry, there is concern about the invasive rate of these introduced exotic trees. Hence strict management is emphasised to minimise the impact of these trees on water resources (Le Maitre *et al*., 2002:144-145).

Dye and Versfeld (2007:121-128) assert that exotic plantation forestry in South Africa has an impact on the availability of water resources. Forest plantations indirectly compete with down-stream water users, as plantations are mostly established in the higher lying catchment regions (Olbrich, Christie, Evans, Everard, Olbrich & Scholes, 1997:53). This is due to the plantations causing extreme abstraction of rainfall water and thereby reducing runoff (Hassan, 1999:5). Pott (1997:47) mentions that the water consumption of plantations decline as the amount of soil available water decreases, therefore trees do not require irrigation water sourced from rivers. Afforestation falls within the definition of water use, constituting a decrease in stream flow activity (Hassan, Olbrich & Crafford, 2002:5), and rendering it subject to water charges (Gildenhuys, 1998:43). Through the introduction of afforestation permits, afforestation is controlled (Hassan, 1999:5). In the past, small woodlots of less than ten hectares did not require planting permits, but an agreement was made that all plantings would take place at a certain distance away from streams and wetlands. This was not successful, with some planting still occurring too close to the streams and wetlands. The Forestry Act of 1997 required that small growers also obtain permits for their planting (Cairns, 2000:16). Water licences are subject to constant review and issued for a period of not more than forty years (Gildenhuys, 1998:42).

Forest businesses have to change their operational approach by moving from a sustained yield approach to a sustainable forest management principle (Sadanandan, 1999:45). The goal of forest policies in South Africa is extensive, with the aim of benefiting the nation as a whole; formulated and directed in such a way that the environment is conserved (Kruger & Everard, 1997:39-44). Sustainability is a dynamic process that changes with values and needs, including the social objective, environmental revolution, management involvement, the change in markets and political guidelines (Sudanandan Nambiar, 1999:58).

The diminishing supply of wood can only be overcome by a vested interest in plantation forests, the latter being important for the protection of biodiversity, the prevention of land degradation and climate change (CO_2 absorption) (Sudanandan Nambiar, 1999:46). Furthermore, Sudanandan Nambiar (1999:46) asserts that plantation forests are also critical for economical growth and for creating employment.

There has been a bigger focus on community forestry over the recent years due to the shift in policy by the Department of Water Affairs and Forestry, from commercial forestry in the direction of people-centered forestry (Ham & Theron, 1999:71). The goods and services produced by forestry differ; therefore the potential of forestry to contribute to poverty reduction also differs in the varying geographical regions of the country (Department of Water Affairs and Forestry, 2005a:1).

(i) Changing trends in commercial forestry – Community forestry in South Africa

The establishment of wood lots started at King Williams Town in 1893. The purpose of woodlot establishment by the state was directed at the production of building timber and fuel wood for black rural households (Ngubane, 2009:9). South Africa's rural areas have a legacy of inadequate resources, forced settlements, deprived education and a lack of participatory development (Gugushe, Grundy, Theron & Chirwa, 2008:252). In the 1980s and 1990s there was an increase in the number of small-scale timber growers which was driven by the forestry industries, mainly to supply them with raw material for pulp production (Ngubane, 2009:9).

There is a high potential for forestry in many communal areas along the coastal areas of KwaZulu-Natal, where the mean annual growth increment of trees is 25 to 30 (Cairns, 2000:17). The mean annual increment (MAI) is the production capacity of a site; it refers to the average annual increment over the life of a tree, and is measured in tons per hectares or meter cubes per hectare (Schonau & Stubbings, 1993:115). In many of these coastal areas the planting was started by households collecting *eucalyptus* seedlings under mature trees in nearby plantations. The households used this timber for firewood, building purposes, fencing, shading and other domestic purposes (Cairns, 2000:18).

Thomson and Freudenberger (1997:45-50) specify the community's key characteristics that are useful for identifying incentives to good resource management: 1) historical factors – past experiences influence community behaviour, 2) social factors – as the community wants solutions to their resource management problems, there are a number of issues that determine the structure in the community, including how members of the community relate to one another and the different interests of individuals, 3) economic factors – these are useful in determining

differing interests relating to the management of resources, and 4) cultural factors – in exploiting and protecting their trees and forest resources, a number of cultural factors are considered. Gerden and Mtallo (1990:8) mention that certain traditional beliefs (example when a tree or forest is protected because it holds significant value to the tradition of the people) encourage certain forms of social behaviour, while discouraging others. This behaviour is important for directing communities in the utilisation of the natural environment.

Forestry is seen as playing a major role in poverty alleviation or mitigating poverty in the rural areas, as it is an important economic activity for some rural occupants (Shackleton *et al*., 2007:558-559). The South African forestry industry provides a livelihood for more than 10 000 small-scale growers who supply timber to this industry (Shackleton *et al*., 2007:569-570). The planting of exotic trees in KwaZulu-Natal is encouraged by the fact that many households live in poverty, while there are favourable growing conditions for monoculture planting, cheap land and reduced costs for the workforce (Karumbidza, n.d:21).

The aim of the new Government (1994) was to put democratisation policies into legislation, with these new policies allowing for the appreciation of marginalised people who live in forestry areas (Van der Zel, 2000:13). According to Van der Zel (2000:13) forest policies should encourage social forestry at the community level, accommodating woodlands and not only looking at plantation and closed canopy forests. This participatory methodology with regard to forestry (and the management of woodlands) appreciates the contribution of a wide range of stakeholders in the management of forests (Vermeulen, 2000:610). Participatory Forest Management is similar to community-based natural resource management, as both activities encourage the inclusion of communities in the management of natural resources.

Participatory Forest Management adds to poverty alleviation in the following ways:

- Decreasing poor people's susceptibility by giving them access to a significant livelihood and goods, while enhancing their natural environment
- Reducing food insecurity
- Creating employment opportunities
- Buffering the market for creation and organisation of natural goods and services
- Improving eco-tourism
- Authority is improved at community level
- Encouraging the development of skills for the underprivileged
- Empowering deprived individuals
- Creating revenue for poor households (Department of Water Affairs and Forestry, 2005c:7-8; Watt & Holme-Watts, 2006:299).

Products that can be supplied by community forestry projects are firewood, cattle feed, food and building material (Ham & Theron, 1999:75). Fuel wood is still a major source of energy in many African countries (Brouwer & Falcao, 2004:233; Landry & Chirwa, 2011:547; Saha & Sundriyal, 2012:31). Through firewood production rural people are able to generate an income, often in conjunction with agriculture or as an option to engage in crop growing (Brouwer & Falcao, 2004:234). Brouwer and Falcao (2004:234) further state that the use of wood as a means of generating energy is often aligned with being poor. *Acacia mearnsii* (Black wattle) and *Acacia dealbata* (Silver wattle) are used by rural people in the Drakensberg escarpment for fuel wood and construction material (De Neergaard, Saarnak, Hill, Khanyile, Berzosa & Birch-Thomsen, 2005:217). *Eucalyptus* is one of the most grown species on farming land in Kenya, due to its rapid growth and its ability to supply construction wood for households (Kituyi, Marufu, Wandinga, Jumba, Andreae & Helas, 2001:74).

To cover food and other household needs, to increase household income or as a response to poverty or loss of income, households turn to selling non-timber forest products. This is revealed in a study done by Paumgarten and Schackleton (2009:2957) in two villages (Dixie and Dxala) in South Africa. This sale of non-timber forest products can be done on a temporary basis or as an initial means of producing cash earnings (Shackleton & Shackleton, 2006:313-316).

In community forestry projects people's skills can be improved and this type of forestry can assist with the development of small businesses, both of which help to enhance the local market (Ham & Theron, 1999:75). With the recent trend in the land reform initiative by the South African government, there are possibilities of growth in small-scale timber farming. More or less 60% of the total forest land is being claimed by communities (Ngubane, 2009:10).

In the past the major part of community forestry was geared towards firewood production for the surrounding community, mainly with the purpose of conserving South Africa's indigenous forests. Many of these projects were not successful and resulted in a lack of confidence in community forestry in South Africa (Ham & Theron, 1999:71). A study carried out in the Ciskei region of the Eastern Cape Province showed the following as limitations to the full use of woodlots:

- The tribal authority was short of insight on the management of woodlots and this affected the project in the whole community, as it was rolled out from the tribal authority to individuals in the community.
- The roles of each role player were not clearly distinguished; it was not clear who was responsible for the management and use of the woodlots.

- Insufficient funds were available to carry out silviculture operations (Bembridge, 1990:42-50).

When woodlots were started, they were initially meant to generate profit for the local community. However, woodlots located very far from processing plants have very little monetary value (Ham & Theron, 1999:71). Deals have been entered upon between local communities and forestry companies in South Africa, termed small-scale grower schemes. The amount of land available for forestry has been decreasing over recent years (Boreham & Pallett, 2009:85; Forestry South Africa, 2010:1), while the demand for timber is increasing. Communities have to explore new livelihood opportunities to improve their living standard and to ensure that they receive the maximum benefit from their land. Therefore, community partnerships with commercial entities allow benefits to both parties, as in the case of small-scale grower schemes.

(ii) South Africa's small-scale grower schemes

One of the objectives of the National Forest Act of 1998 is to encourage community forestry (Department of Water Affairs and Forestry, 2005b:5). A number of small growers have entered into timber contracts with forestry companies. Small growers see timber farming as an alternative to practising viable farming (Gandar & Forster, 1994:26). The large commercial forestry companies have introduced schemes that encourage tree planting by small-scale farmers; therefore plantation forestry has been regarded as one of the livelihood options for small-growers (Department of Water Affairs and Forestry, 2005b:4). Underwood (1999:2) mentions that the most common community initiative in South Africa is the agreements between communities and forestry companies.

According to Karumbidza (n.d:9) woodlots were established in the 1980s and companies were very active during this establishment phase. In the early 1980s forestry companies embarked on a partnership with communities, allowing growers to supply timber to these companies. The idea of this partnership was that each farmer within a particular district would grow their own private *eucalyptus* woodlot which was to be managed with the assistance of a company extension forester or officer (Ham & Theron, 1999:76).

By the end of 1999 the number of growers involved in the different schemes had increased to 12 300 and they were raising trees in KwaZulu-Natal and Eastern Cape on 24 200 hectares (Lewis *et al.*, 2005:33). The schemes are said to contribute from 12% to 45% of the income needed for a household to remain above the poverty line (Cairns, 2000:41). Schemes will contribute additional income where households rely on pensions (Lewis *et al.*, 2005:33). All households can

participate in the schemes, including the poor and those that have insufficient labour, as advanced payments are made by companies to use planting and weeding contractors (Lewis *et al.*, 2003 in Lewis *et al*, 2005:33).

Andrew, Fabricius & Timmer (2000:13) list the following as characteristics of out-grower schemes in KwaZulu-Natal:

- The schemes developed from exposure to nearby commercial forestry
- Schemes started in areas close to processing centres
- Permission is obtained from the tribal authority for individuals to embark on the schemes
- Other growers embarked out of fear of being removed from their land
- Women used the schemes to secure land rights after their husbands had passed away.

It has been observed that a large number of women participate in the out-grower schemes. The right to use natural resources such as water, land and forest have a big impact on the survival of women, and therefore on the household as a whole (Atmis, Dasdermir, Lise & Yildiran, 2007:787-788). Furthermore, Atmis *et al.* (2007:788) mention that women are often not consulted in decision making, which is made worse by the low level of education that women in their position usually have. International agreements have been developed to encourage women's participation in forestry (Atmis *et al*., 2007:788).

Reed (2003:376-379) mentions that the increase in the number of jobs available in silviculture (planting and tending of trees), planning and inventory created opportunities for women to gain access to the forestry workforce. In South Africa it has been observed that women in the rural areas do participate in timber farming, and that this participation aligns with their responsibilities such as taking care of the household. Women are directly involved with the collection of firewood in most cultures (Ham & Theron, 1998:47). According to Ham and Theron (1998:47) women are the most dependable party for handling their families' money, thus making women the ideal candidates for community forestry.

In existing contracts between growers or farmers and the forestry company, the farmers agree to make their land and labour available to forestry. The company will then provide the farmers with advance payments and technical assistance the farmer in turn sells their timber to the forestry company (Andrew *et al*., 2000:31-33; Cairns, 2000:1-2). Costs incurred during the tree establishment and growing phase are charged to the growers' accounts. These moneys will accumulate simple interest at half the current prime rate in South Africa at the time, and the loan will be paid at harvest (Ham & Theron, 1999:76).

The following schemes and programmes have contributed to the increase in small-scale timber farming: 1) Sappi Project Grow, 2) Khulanathi Forestry (formed by Mondi, but now managed as a separate enterprise), 3) Siyathuthuka, which is connected to NTE (Natal Tanning Extract) and UCL (Union Cooperative Limited), 4) NCT Forestry Co-operative Limited (previously known as Natal Co-operative Timber), 5) Transvaal Wattle Kwekery (TWK) and 6) Ikusasa programmes (Ngubane, 2009:9). Sappi Project Grow, Khulanathi Forestry, NCT Forestry Co-operative Limited, TWK and Ikusasa operate in the Zululand area. The Sappi Project Grow scheme is a community-based project, established in 1983 (Gandar & Forster, 1994:26) and the Mondi Khulanathi scheme was started in 1988 (Cairns, 2000:11).

Co-operatives are also formed when individuals form partnerships (by pooling their resources) where they can negotiate the best prices and access to the market (Andrew *et al.*, 2000:16). Growers can sell their timber directly either to forestry companies or to timber suppliers. Many growers (including Sappi growers) sell their timber at the Mondi (Sokhulu and Mbonambi) weigh bridges, as they are closer to the growers' geographical location (Karumbidza, n.d:11).

The Sappi Project Grow targets small-scale farmers who are farming between two to seven hectares in the KwaZulu-Natal tribal area (Gandar & Forster, 1994:26). Project Grow helps emerging rural people to gain access to the formal market as farmers and contractors on a sustainable basis (Sappi, 2008:5). One of the aims of Project Grow is to eliminate the dependence of rural populations on the natural forests for firewood and building (Sappi, 2008:5). To help farmers during the growing period Project Grow pays a compliance premium on a yearly basis (Sappi, 2008:5). The Mondi Khulanathi scheme was commercialised in 2007 and is now owned by three former Khulanathi employees and Mondi Zimele (Chapman, 2007:12). The company provides timber procurement services (Chapman, 2007:12) and it has been noted that the company also provides free seedlings to growers who supply timber through their schemes, apart from offering technical support to their growers. Mondi built depots in the Sokhulu area (1990) and at Esikhaleni (1993), Mbonambi (1995) and Mfekayi (1998) for the purpose of bulking small deliveries, thereby cutting long haulage costs (Cairns, 2000:46-47).

The NCT Forestry Co-operative Limited scheme offers their members the benefit of access to the market, and through the project regeneration scheme growers can borrow money for purchasing *eucalyptus* cuttings (Thompson, 2010:8). It has been established that growers have two years to repay this loan, either as a cash payment or in tonnage sold to the scheme. Through the co-operative the grower is able to access information about timber farming and technical expertise (Shelembe, 2009:9). It was also observed that TWK and Ikusasa allow growers access to the timber market by providing timber procurement services.

Andrew *et al.* (2000:6-12) assert that partnerships between companies and communities emerged because companies wanted to accumulate raw material, and to a lesser extent, contribute to the social and economic development of rural areas. Contract documents do not include inputs from small-scale farmers (Andrew *et al*., 2000:6-12) and the terms are drawn up and decided upon by the companies, without any consultation with the growers. Timber prices are dictated to the growers by the companies and these prices are not negotiated with growers. The contracts are designed in such a way that growers are prevented from supplying other markets (Ojwang, 2000:2-6). The contract signed between the company and the grower prohibits the grower from selling to other timber markets, even if alternative markets offer the grower a better price. Secco, Pettenella and Gatto (2011:104-111) state that debates have been held on the shift to participatory management on a global level where choices are made collectively, replacing the command and control approach. Cairns (2000:40) argues that commercial woodlots do not provide multiple resources, in contrast with other social forestry projects. Cairns (2000:40) further states that *eucalyptus* does not produce good fuel wood and that the timber contract does not encourage farmers to use their trees for firewood.

Woodlot planting had a negative social impact, as income was not distributed proportionally (Underwood, 1999:2). The contracts between companies and growers are criticised for benefiting the companies, while the growers are disadvantaged (Karumbidza, n.d:8). At the time when woodlot planting was introduced, it was mostly those households with large areas of land who have been able to participate in timber farming (Underwood, 1999:2). Growers are also cheated by contractors who function outside the standard norms. These contractors charge high prices and net profits are reduced (Cairns, 2000:36-38).

Independent growers join the schemes to secure their position in the market, rather than to obtain loans. This shows that the survival of the schemes is not dependent on the financial benefits provided by the companies (Cairns, 2000:25). Furthermore, Cairns (2000:35) asserts that many households do not have access to large areas of land, meaning that trees can contribute to the household income, but will probably not alleviate poverty. The success of the programme depends on the attitude of the grower towards the programme. The time it takes for trees to reach maturity has been one of the factors to hamper the success of the programme. This problem has been overcome by the introduction of the fast growing *eucalyptus* hybrids and by employing intensive silviculture, resulting in a reduced rotation (Ham & Theron, 1999:76). Ham and Theron (1999:76) estimate that trees take six to seven years to reach full maturity in northern Zululand.

The partnership between company and grower has proved to have a positive impact on communities, providing poor communities with a source of regular income. Studies in other countries have shown that when households participated in tree farming as opposed to growing alternative crops under partnership, small-scale tree farming is the most profitable (Vermeulen *et al.*, 2003:7). It is estimated that an additional job is created for every eight hectares planted by small growers, while the forestry companies employ an additional person for every 1000 hectares planted in the scheme (Forestry South Africa, 2004a in Lewis *et al.*, 2005:33).

The introduction of small-scale timber farming has created various economic activities in communities, ranging from the growers and communities gaining economic benefits to individuals from these communities finding jobs in the form of small-scale contracting businesses (Ham & Theron, 1999:76). Ham and Theron (1999:77) indicate that the slash produced during the timber harvesting stage can be used as firewood and thus serve as a source of energy. By embarking on small-scale timber farming, households have been able to receive financial benefits enabling them to create better livelihoods.

(iii) Financial returns from small-scale forestry

Karumbidza (n.d:6) reports that rural communities have different opinions about the schemes; some believe that the schemes can improve their livelihood level, while others disagree. Karumbidza (n.d:6-7) states that many households who embarked on timber farming were motivated by the financial gain that they expected to receive from the schemes. There has been some unhappiness about the schemes as they have social and environmental impacts, and the promised financial benefits are not seen. The latter statement is supported by agricultural economists and academics who criticise the schemes for not being able to support rural livelihood (Mayers *et al*., 2001:90-91; Karumbidza, n.d:6-7).

Timber harvesting and timber transportation produce the highest return on timber farming (Karumbidza, n.d:17). Most of the money raised from this source is used for children's education (Karumbidza, n.d:17). Timber income can also be used for purchasing livestock, building houses, or purchasing tractors or trucks if individuals have other regular sources of income (Karumbidza, n.d:17). Lindenberg (2002:301-315) points out that only when the monetary and social plans of families and society offer real rewards in terms of their well-being over time, can long term sustainable development occur.

Some of the economic benefits arising from small-scale forestry include the establishment of small enterprises in contracting and haulage, and the employment of local people in road building

(Gandar & Forster, 1994:27). Some growers have invested in entrepreneurial activities such as contract labour and in providing transport to the mills and weighbridge to reap the benefits of timber farming (Ojwang, 2000:15). One of the factors that have hindered growth in small-grower schemes among emerging farming communities is the fact that forestry is sometimes seen as being culturally alien (Gandar & Forster, 1994:27).

Nevertheless, forestry does provide income for households, and more than 10 000 small-scale timber growers earn a net revenue of R1 000 to R5 000 per annum. These growers employ small contractors to do the silviculture and clear felling, or to provide transport (Cairns, 2000:82). There is potential for growth in small-scale timber farming in South Africa, but for this to occur small-scale forestry has to comply with the standards of Sustainable Forest Management. Efforts to help small-scale farmers to align to Sustainable Forest Management have not been successful, as all impediments have not been removed (Ngubane, 2005:15). Although small-scale timber farming might not have provided the full financial benefits for all households, it has provided households with a source of income. For the full benefits to be realised and to combat poverty this farming method has to create sustainable livelihoods.

2.4 Sustainable livelihoods in South Africa and KwaZulu-Natal

Poverty is seen as one of the most significant economic and social factors that need to be addressed in South Africa (Frye, 2005:2). As one of the eight Millennium Development Goals (Statistics South Africa, 2007:1), South Africa has committed to reduce poverty by half by the year 2015 (Shackleton, Campbell, Lotz-Sisitka & Shackleton, 2008:505). A large percentage of South Africans are faced with poverty, despite the fact that the country is rich in natural resources (Shackleton *et al*., 2007:561). The country is facing the challenge of rectifying a situation of unprecedented unemployment (Klasen & Woolard, 2008:2). Even workers holding jobs in South Africa are faced with the challenge of overcoming poverty (Frye, 2005:11-13). Pauw (2005:8-11) indicates that rural poverty in South Africa stands at approximately 78.2% and urban poverty at 28.9%. This shows that poverty is predominant in rural areas. Africans and Coloureds living in rural areas are mostly associated with poverty (Aliber, 2003:480). Women are the most likely to fall victim to poverty in South Africa (Department of Water Affairs and Forestry, 2005a:2). Table 1 shows the socio-economic indicators for South Africa, with an unemployment rate of 23.5% and 4.8 million people living below the minimum living standards.

Pauw (2005:1) reports that KwaZulu-Natal is the largest province in South Africa in terms of population size, hosting 21% of the country's total population, based on 2001 census data (Adato, Lund & Mhlongo, 2007:248). KwaZulu-Natal is one of the poorest provinces in South Africa (Zakwe, 2001:207), along with Limpompo and the Eastern Cape Province (Aliber, 2003:475).

The average number of members in agricultural households in KwaZulu-Natal is 4.8 (strict) and 5.6 (broad). This is reported to be higher than in the other provinces where the average amounts tot 4.4 members per household (Pauw, 2005:4-7).

Table 2.1 Socio-economic indicators for South Africa (South African Development Community, 2009:6)

Natural Indicators	**Measurements**
Unemployment	23.5 % (48.7 million population)
HIV/Aids	5.5 million affected people (2005)
People living below minimum living standards	4.8 million people
Vulnerability to food insecurity	972 000 households (6.5 million individuals)
GDP	Decline of 6.4% in 1st quarter of 2009 (sector: 3.3% manufacturing, 1.7% mining and quarry business 0.5%)
Crude mortality rate	22.7% (2008)
CPI	CPI – May 2009 = 8.0 % (0.4% lower than annual rate of 8.4% in April 2009)

Poverty is one of the challenges of development (Kamanga, Vedeld & Sjaastad, 2009:613). Aliber (2003:473-474) highlights that when dealing with poverty, one needs to understand the type of poverty that is experienced. He distinguishes between chronic and non-chronic poverty. Those households that will probably remain in poverty unless outside help is received are chronically poor, and it is a big challenge to help this group out of poverty (Aliber 2003:473-474).

Statistics South Africa (2007:3) defines the poverty line as one of the means of determining poverty, to gain a better insight into poverty and to devise means to eradicate poverty (Frye, 2005:7-10). Govender, Kambaran, Patchett, Ruddle, Torr and van Zyl (2007:124) define the poverty line as a parameter that can be used to determine the wealth status of people and by means of which certain people can therefore be classified as poor. Whether households are able to access a sufficient consumption bundle cannot be determined by the poverty line; the line shows what households require to maintain a basic livelihood, including food and other necessary non-food material (Statistics South Africa, 2007:9). About half of the South African population utilise less than R353 per adult per month, which means that they are income poor (Schreiner &

Van Koppen, 2002:969-970). Ardington, Lam, Leibbrandt and Welch (2006:829) report a poverty line of R124 and R340 per capita.

Aliber (2003:476) defines chronic poverty as a deficiency that is passed down from one generation to another. He further states that families in this group are mostly headed by females and the size of the family is bigger. These households have a reduced right to arable land per capita. Chronically poor households, when compared to others, tend to spend less money on food (Aliber, 2003:477-488).

The Human Science Research Council (2004:1) reports that data display no positive change in the number of people living in poverty from 1996 to 2001 (Govender *et al.*, 2007:120). Instead, those households have fallen deeper into poverty. There was an increase in the poverty gap of R56 billion in 1996 to R81 billion in 2001 (Human Science Research Council, 2004:2). KwaZulu-Natal is reported to be having the biggest poverty gap of R18 billion. This is caused by the high population of poor people in the province (Human Science Research Council, 2004:2). Thurlow, George and Gow (2009:1) highlights that poverty is reported to become worse in KwaZulu-Natal, as 26.4% of the population who are of working age is HIV positive.

South Africa has the highest incidence of HIV in the world and the worst affected province in South Africa is KwaZulu-Natal (Thurlow *et al*., 2009:1; Dorrington & Johnson, 2002:4). Giarelli and Jacobs (2001:52-67) mention that the dominance of HIV/Aids determines people's options, social and historical pressures and environmental and economic factors.

HIV/Aids can result in poverty where individuals are unable to work due to their weak physical condition. One of the ways in which the South African government is addressing poverty is through social security systems (Inter-Regional Inequality Facility, 2006:1). There are five types of social grants in South Africa, namely the State Old Age Grant (Posel, Fairburn & Lund, 2006:839; Klasen & Woolard, 2008:16-17), Disability Grant, Child support Grant, Foster Child Grant and Care Dependency Grant (Inter-Regional Inequality Facility, 2006:2). Posel *et al.* (2006:837-838) state that social grants encourage households to be economically dependent, because labour is reported to decline in households receiving a pension. The statement by Posel *et al.* (2006) on the view that even younger people might not look for employment where a member of the household has an income from a social grant, in this particular case refers to a pension.

On the other hand (Samson, Lee, Ndlebe, Quence, Van Niekerk, Gandhi, Harigaya & Abrahams, 2004:1) state that social grants play a significant role in poverty reduction and encourage social

development. Labour force participation and employment rates have been reported to increase in households that receive social grants, as opposed to those not receiving this form of income (Samson *et al*., 2004:134). Using different means to assess the impact of social grants on people's livelihood, South Africa's social security system demonstrates how to reduce poverty successfully (Samson *et al*., 2004:133). In households receiving social grants, the children will probably attend school; therefore the necessary human capital can be accumulated to escape poverty (Samson *et al*., 2004:134). Households receiving grants have a better chance of accessing basic services (such as water, sanitation and refuse removal) than households who do not receive such grants (Statistics South Africa, 2009:28). In South Africa's current economic situation the social profits received from social security are far more important than the challenges (The AIDS Consortium Company, 2008:10).

Kingdon and Knight (2004:391) report a high number and a further increase in the number of individuals without jobs in South Africa. Unemployment and job losses are a cause of concern as they affect the stability in the social context as well as the welfare and production of the economy, removing human capital and causing an increase crime. The majority of people living in the rural areas are poor and prone to the loss of income (Lewis *et al.*, 2005:28). Rural areas in South Africa are underdeveloped in terms of infrastructure, government services and jobs. About 44% of the South African population live in these areas (Lewis *et al.*, 2005:28) where livelihood opportunities are restricted and levels of poverty are high (Lewis *et al.*, 2005:28).

Apartheid has been seen as the cause of poverty in South Africa (Carter & May, 1999:1; Zakwe, 2001:207; Alastair, 2006:247), because a certain part of the population was excluded from access to the market and from receiving government services. Moreover, they were not granted ownership or possessions and land. A survey conducted in 1991 showed that 74% of poor households reside in rural areas where they have no access to land to cultivate for agricultural production (Department of Water Affairs and Forestry, 2005b:1).

Land is an important asset for rural dwellers, because these households embark on agricultural activities (Rigg, 2006:180; Tesfaye, Ross, Campbell & Bohlin, 2011:263). Incorporating trees into the farming system might be an option for poor farmers because of the low input costs, easy entry and open market access. These forests provide many other benefits to rural people, such as employment opportunities which are vital for poor people with limited options (Falconer & Arnold, 1991:4). Those who include tree farming in their agriculture practices enjoy the following benefits: 1) improvement in household earnings, 2) rehabilitation of land that has been destroyed and 3) improvement in agricultural production (Ford Foundation, 1998:25-26).

2.5 Summary

From the literature reviewed there appears to be little doubt that forestry contributes to the livelihood of rural people. Forests provide many potential benefits to rural people, and for these benefits to be realised in the long term, plantation forestry needs to be introduced at household level. Nonetheless, the introduction of these plantation forests has presented its own problems. The problems experienced in South Africa are similar to those experienced elsewhere in the world.

The study continues to look at small-scale timber farming, while also referring to out-grower schemes. The focus is on people who make a living by engaging in timber farming and the study investigates how small-scale timber farming supports sustainable livelihood. The study tests which of the three groups, namely growers selling to company, growers selling to timber suppliers and timber suppliers, manages to attain an enhanced and sustainable livelihood as small-scale timber farmers. In the following chapter the research methods applied for measuring these phenomena are discussed.

CHAPTER 3: RESEARCH DESIGN AND METHODS

3.1 Introduction

The research methodology followed is outlined in this chapter. The chapter illustrates and rationalises the methods and approaches followed by the researcher in gathering data for the study, focusing on the preparation for the data collection process, data collection and analysis. The way in which the DFID (Department for International Development, 1999) Sustainable Livelihood Framework has been used to measure household livelihood to determine the impact of small-scale timber farming on household livelihood is discussed in detail.

3.2 Research design

The study seeks to understand small-scale timber farming from the experiences and perceptions of small-scale timber growers. Phenomenology is characterised as focusing on the subjective experience and on people's awareness of the world they reside in (Banyard, 1996:482), as well as on the reasons for human actions (Layder, 1994:75-90). The perception of the external object is partial and does not reflect the truth (Willis, 2007:172). Certain social researchers therefore choose to explain their research in terms of phenomenology paradigm, as it is based on household (or individual) experiences (Banyard, 1996:482).

Phenomenology fits into this research, because timber farmers whose livelihoods are affected by timber farming were interviewed. The study had to ensure that those participants who participated in timber farming were the ones who would form part of the study, excluding those who are mere observers. The views, experiences and the consciousness of households taking part in timber farming form the basis of this research. Accordingly, and to address the research objectives, the characteristic that was needed in the sampled population was the households' participation in small-scale timber farming.

Through the manner in which the research was approached, the researcher was able to determine the attitude of the respondents. Information on household observation and experience was gathered through inductive methods of focus group discussions, interviews and observations. The information has therefore been presented from the perspectives of the research participants.

3.2.1 Mixed method

Mixed method research was used by combining two social science methods, namely qualitative and quantitative research, to understand households' livelihoods at Sokhulu. Both methods were selected because they correspond with the suggested livelihood analysis process. Livelihood analysis employs both qualitative and quantitative research methods (Department for International Development, 2000a:13). Department for International Development (2000a:13) further maintains that efforts to promote a successful livelihood would require a combination of qualitative and quantitative research methods. To describe and explain the phenomena of the research, rather than just exploring the matters at hand, the researcher conducted both explanatory and descriptive research.

In mixed method research data is produced in numerical form, which supports the qualitative description that presents data in wording (Hollard & Campbell, 2005:1-2). Quantitative research assigns data to a higher level of confidence through a process of enumeration and predicting relationships for a bigger population. By doing so, researchers are able to recognise longitudinal trends, while they can compare findings across the population using statistical methods (Hollard & Campbell, 2005:4-5). A quantitative research approach allows for easy interpretation and statistical analysis, as data is converted into figures (Dunn, 2010:42). Quantitative research tries to put realistic, solid and absolute levels or values on the phenomena examined (Department for International Development, 2000a:13). In this research the gathering of qualitative data is used to describe the phenomena that were observed and expressed quantitatively.

Qualitative research attaches importance to performance (Ray, 2006:27-28) and description. The raw data consists of what people have said or an unbiased explanation of the observations (Coolican, 2004:46). This method provides in-depth information and has the ability to offer detailed explanations. It does not standardise data, but explains the detail and describes the distinctions (Nieuwenhuis, 2007:50-51). The method breaks down the complex and numerous realities of households and communities in an attempt to understand the diversity within a community (Hollard & Campbell, 2005:5) and the subjective state of the individual being examined (Ray, 2006:27). Qualitative research does not try to determine the absolute value of what it is examining, but is focused on producing an exact analysis of what is being studied through triangulation of diverse expressive sources (Department for International Development, 2000a:13).

Since both qualitative and quantitative research methods were used, this allows for descriptive and explanatory research data to be obtained on the study. The research was conducted as a case study.

3.2.2 Case study

A case study uses different methods to investigate an individual instance, case or phenomenon (Goodwin, 2002:408) that has been brought to one's attention (McBurney & White, 2007:213-224). The method employs an intensive description (Gravetter & Forzano, 2006:343) and analysis of a person (Zechmeister & Shaughnessy, 1994:153-156) or group of people with the expectation of illuminating factors that are true for all (Jackson, 2006:74). One danger of the case study method is that the individual being studied might not represent the population as a whole and any generalisation will produce false data (Jackson, 2006:75). This is also the case with this study, as the findings were gathered to understand the phenomena of a particular study. What was learned there could however be applied in other relevant settings. The research methods that were followed in this study to collect and analyse data are explained in the following section on research methods.

3.3 Research methods

This section explains the research methods that were used to collect and analyse data. The Sustainable Livelihood Framework (Department for International Development, 1999) is discussed, as well as the questionnaire design, data collection methods and data analysis. The chapter also provides the reasoning for the selected research methodologies. The data was collected over a period of two months, namely May to June 2009. The aim of the data collection was to obtain data for evaluating the sustainable livelihoods of the selected small-scale timber farmer groups.

3.3.1 Sustainable Livelihood Framework

The Sustainable Livelihood Framework is a tool that was created to assist with the understanding and analysis of sustainable livelihood of people. By applying this framework it is possible to evaluate the effectiveness of methods implemented to help combat poverty (Department for International Development, 1999a:1; Department for International Development, 2000b:1; Department for International Development, 2001:5). Department for International Development (1999a:1) states that those factors that have an impact on households' livelihoods and the connection among them are presented by the Sustainable Livelihood Framework.

In the Sustainable Livelihood Framework people are seen as being in a vulnerability context and having rights to some assets. These assets are understood through institutional, societal and organisational settings. They determine the livelihood strategies followed, which will in turn determine the livelihood outcomes (Department for International Development, 1999c:1; Department for International Development , 2001:5). Department for International Development (1999:3) And Department for International Development (2001:7) listed six objectives of sustainable livelihoods that link with the livelihood framework:

- Better health, diet, education, knowledge, technology and skills
- A more supportive and cohesive social environment
- Access to natural reserves and conservation of these resources
- Improved right to infrastructure
- Security in terms of access to monetary resources
- Policies, laws and institutions that allow all individuals to have equal rights to competitive markets and also allows for a number of livelihood strategies.

The livelihood approach allows the households' livelihood objectives to be utilised for the support of their livelihood, and does not allow room for prejudice about any of these (Department for International Development, 1999b:9). Livelihood strategies and outcomes are not just dependent on access to capital assets, but they are subject to transformation by the external environment. The external environment, constituting the vulnerability context of the framework in which people live, is divided into trends, shocks and seasonality. Because of the external nature of the vulnerability context people do not have control over these factors, which could render them vulnerable to external trends, shocks and seasonality (Department for International Development , 1999a:3-4; De Sherbinini, Van Wey, McSweeney, Aggarwal, Barbieri, Henry, Hunter, Twine & Walker, 2008:39).

At the heart of the Sustainable Livelihood Framework is the asset pentagon; a combination of these assets are essential for people to obtain certain livelihood outcomes (Department for International Development, 1999a:5; Department for International Development, 2001:19). There are five livelihood assets in the Sustainable Livelihood Framework, namely human capital, social capital, natural capital, physical capital and financial capital (Department for International Development, 1999b:1; De Sherbinini *et al*., 2008:40; Cherni & Hill, 2009:647) that represent the asset-base where the six listed objectives of the sustainable livelihood can be measured. The five livelihood assets are listed in Figure 3.1 below.

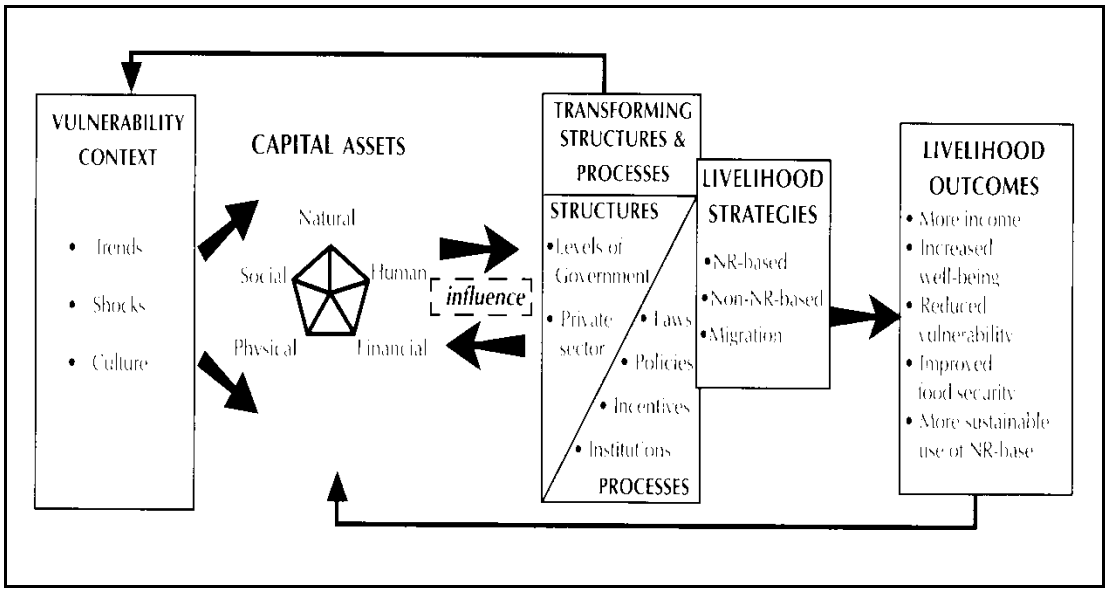

Figure 3.1 The Sustainable Livelihood Framework (Department for International Development, 1999a:1)

Human capital includes training, expertise, information and sound health (Cherni & Hill, 2009:647). This is the most essential asset, as it should be able to utilise all the other assets, but this asset on its own cannot result in positive livelihood outcomes (Department for International Development, 1999a:7; Department for International Development, 2001:22). Social capital refers to all the resources that people are able to access in order to achieve their livelihood objectives. These are obtainable through connections, participating in organised groups and creating trust relationships (Department for International Development, 1999a:9; Department for International Development, 2001:24). Natural capital, which is closely related to the vulnerability context, refers to the natural resources that allow for the provision of services that are required for livelihoods (Department for International Development, 1999a:11; Department for International Development, 2001:26). Department for International Development (1999a:11) emphasises that this type of capital is very significant for those households that earn income from forestry, agriculture, fisheries and mining. Physical capital is made up of the goods, including the infrastructure, that are essential for the maintenance of livelihoods (Department for International Development, 1999a:13; Department for International Development, 2001:28). On the other hand, financial capital is essential for people to obtain their livelihood objectives (Ali, Ahmad, Shahbaz & Suleri, 2007:589) and this includes savings and income (Department for International Development, 1999a:15; Department for International Development, 2001:30).

Depending on how people access assets, the shape of the pentagon will vary, the centre representing zero access (Figure 3.2), while moving away from the centre represents maximum access to assets (Department for International Development, 1999a:5).

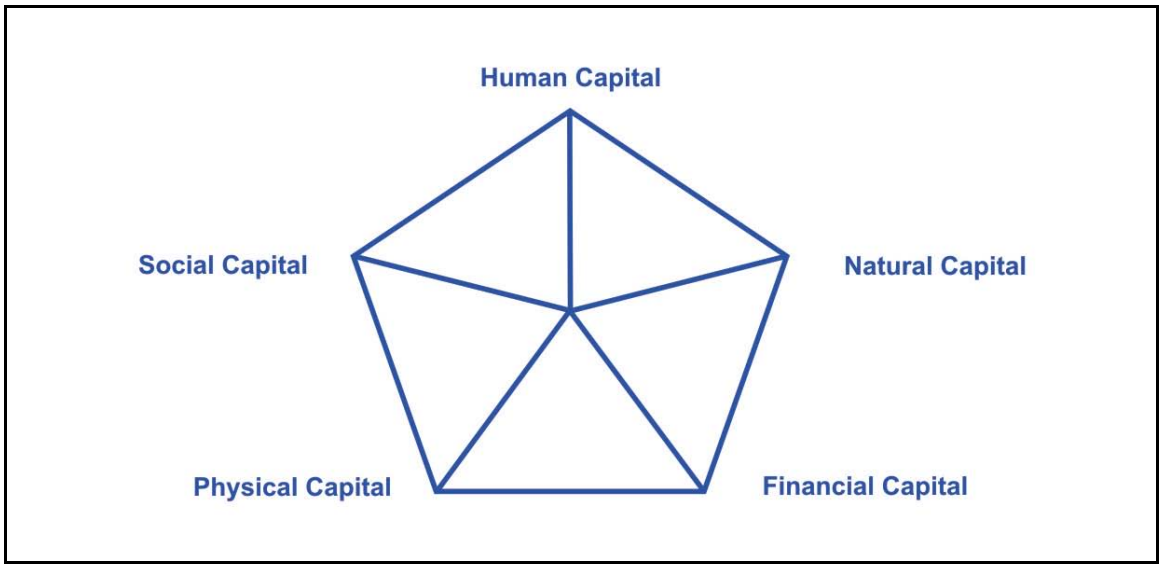

Figure 3.2 Asset Pentagon (Department for International Development, 1999a:5)

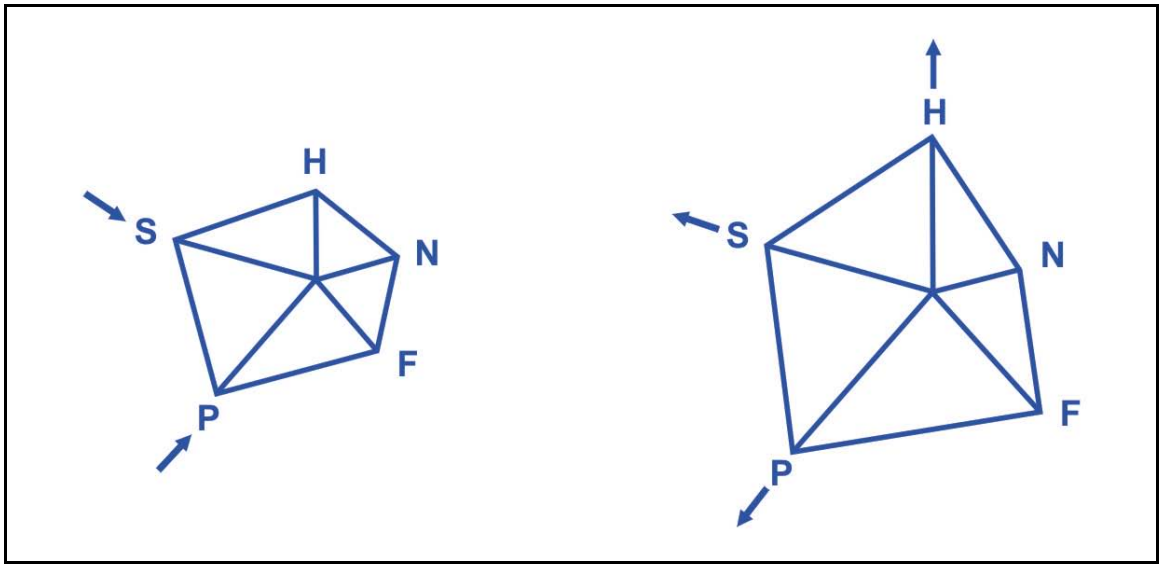

Figure 3.3 Differently shaped asset pentagons and changes in access to assets (Department for International Development, 1999a:6)

Figure 3.3 shows examples of differently shaped pentagons as a result of change in access to assets (Department for International Development, 1999a:5). Restricted access to natural capital is depicted by the first pentagon. A decline in access to social and physical capital is indicated by the same pentagon. Department for International Development (1999a:6) explains the cause of

the shape of the first pentagon as being a lack of finance or skills for preserving their infrastructure. The formation of social groups is hampered by the reduction in social capital. The second pentagon shows a change in assets when financial capital is improved by access to financial schemes. Access to financial capital also helps to improve social and human capital, which in turn assist households to increase their physical capital. The natural capital remains constant (Department for International Development, 1999a:6).

Transforming structures and processes have an effect on people's right to assets (Department for International Development, 2001:32), whilst the vulnerability context (shocks, trends and seasonality) is responsible for the creation or destruction of assets (as they are outside people's control and there is little that can be done to alter it directly) (Department for International Development, 1999a:6). The number of assets that people have determines the number of livelihood strategies they employ, for example, those who have access to a variety of assets will have more livelihood strategies (Department for International Development, 1999a:6). Department for International Development (1999a:6) and Babulo *et al*. (2008:148) state that the outcomes are also determined by the types or the number of assets people have access to. The assumption for this research might be that the growers selling to timber suppliers are be poorly endowed with assets in relation to those growers selling to companies or timber suppliers, as the assumption is that these growers' profit margin from timber sales is reduced, so that growers might be marginalised. The way in which the questionnaire has been designed allows for all five assets to be analysed and reported. Prior to questionnaire design and analysis, permission, scoping of the study area and sampling had to be completed.

3.3.2 Research process followed to gather data

Before data could be gathered in the study area, permissions had to be obtained. Once permissions were granted, scoping of the area took place and only then could the research subjects be sampled. This part of the research was followed by designing and piloting the questionnaire, which in turn was followed by data collection and analysis. Each step in the process is detailed below.

(i) Permissions

Visits were made to meet with the tribal authority, for at Sokhulu, as in many rural areas in KwaZulu-Natal, access to the rural community has to be negotiated with traditional leaders. Access was requested through the traditional leadership and the local councillor. A letter of introduction from the university, introducing both the study and the researcher (Appendix A), was

issued at the first contact with the local leadership. After discussions with the tribal authority it was agreed that the researcher was to be accompanied by someone from the local community, for the purpose of safety rather than forming part of the survey.

(ii) Scoping visit using focus group discussion

Following approval by the local leadership, a focus group discussion was held. A schedule (Appendix B) was prepared that would serve as a facilitating tool for the focus group discussion. This discussion was held with twelve timber farming contractors to discover their perceptions on small-scale timber farming. The contractors selected for the focus group must have been in small-scale timber farming contracting for more than 12 months. The idea was to involve individuals with a similar level of understanding and knowledge of the subject (Litoselliti, 2003:32). This would serve as additional data to be added to the perceptions obtained during household interviews following on the focus group discussion. Participants in the focus group discussion did not form part of the group of respondents in the questionnaire interview. The findings of the focus group assisted in informing the specifics for the questionnaire design. Following the focus group discussions, a questionnaire survey was conducted with the sample that was drawn as discussed in the next section.

(iii) Sampling

The study was conducted amongst three types of timber growers, namely growers selling to forestry companies, growers selling to timber suppliers and timber suppliers themselves, as indicated in Chapter 1. The questionnaire was used to collect data on household demographics and livelihoods, and both random and snowball sampling methods were used.

(a) Sampling methods

Random sampling was used with regard to the selection of timber suppliers and also for the focus group discussion. In random sampling every element in the population has the same probability of being selected (Arney, 1990:164; Coolican, 2004:39; McBurney & White, 2007:247-253). For the focus group discussion contractors operating in the area were identified by members of the tribal council. From this group twelve people were randomly selected to participate in the focus group discussion. The timber suppliers were also identified by members of the tribal council along with community members, and these timber suppliers were randomly selected to take part in the study.

Growers selling to company and those that sell to timber suppliers were selected by being identified by the already identified respondents, therefore, snowball sampling was used in this case. Snowballing is a non-probability sampling method (Leary, 1995:128), because often a list of the population is not available. In practice it means that the researcher finds a person or people who will help to trace others, who in turn help locate others in a snowball style until the required number is obtained (Coolican, 2004:42-43; Ray, 2006:313-314).

(b) Sampling size

The sample was divided into three groups: the first being growers selling to forestry companies, the second being growers selling to timber agents, and the last group consisting of timber agents, as discussed in Chapter 1. In each group twenty households were sampled by means of snowball sampling. A total of sixty in-depth interviews were completed for analysis. The focus of the study was on households who had been participating in timber farming for more that six years. All respondents who participated in the study are members of the Sokhulu rural community. The Department for International Development (DFID) Sustainable Livelihood Framework recommends that a sample size of thirty be selected from a single group, depending on the purpose of the study (Department for International Development, 2000a:12). The purpose of the study was not to generalise the data to a larger sample, but to describe the phenomena observed in the sampled population. The study uses a qualitative approach design; therefore it was possible to capture an in-depth analysis of the livelihoods of the population practising timber farming from a small sample. Due to the limited scope of a dissertation it was decided that the sample of twenty households per group would suffice.

(iv) Semi-structured questionnaire development

The design of the questionnaire allowed respondents to provide the relevant data needed for the objectives of the study. These objectives were to determine whether households in the Sokhulu area have benefited from participating in small-scale timber farming and whether their livelihoods had been sustainable. In addition, the data collected had to allow for the livelihood level of the different small-scale timber farming types to be compared. The questionnaire was designed in such a way that all five capital assets of the Sustainable Livelihood Framework would be covered (as discussed in section 3.3.1).

A semi-structured questionnaire (Appendix C) was prepared to be administered in an interview setting. The questionnaire was first developed in English and then translated into isiZulu, as it is the most extensively used language in KwaZulu-Natal and at Sokhulu. To ensure that all

information required for the study was captured, the questionnaire was categorised into the following sections: 1) household information, 2) access to institutions and services, 3) household assets, 4) forestry and forestry information, 5) livelihood strategies, 6) access to natural resources, 7) household expenses, 8) credit and savings, 9) vulnerability and 10) health. The questionnaire for the case specific research was adapted from the DFID sustainable livelihoods index guidelines (Department for International Development, 2000a). The questionnaire consisted of closed and open-ended questions, it gathered information per household on land ownership, family dimensions, household characteristics (including the head of the household, family size, years of education of all household members), access to technical assistance and knowledge, socio-economic status, dominant activities conducted by household members and household assets.

(v) Piloting of the semi-structured questionnaire

The questionnaire was piloted in five households before the actual study began. This allowed for testing the clarity of the questions and other issues such as the time it would take to conduct a single interview. During piloting it was realised that a section on timber farming could be answered by using another section of household information; therefore it was decided that this section would not be asked during the interview and only completed at a later stage, thereby reducing the actual interview time. It was noted that households defined porridge differently under food types and this had to be clarified. Minor changes were made (such as the deletion of a section on women) to the questionnaire before the interviews were conducted with the research sample. The section on women was deleted because it was observed that women could not express themselves freely when their husbands were present. In some instances the male was the head of the household and it was difficult to ask certain questions while the section on women was being completed. Therefore, a decision was taken to omit this section, as it was apparent that the results would not be a true reflection of the situation in the household. The respondents from the pilot study were excluded from the research sample.

(vi) Data collection

The questionnaire was completed following a structured interview approach with the head of the household. During the completion of the questionnaire (administered in a face-to-face interview) information was obtained by observation, in addition to the answers supplied. Observations were made according to a schedule, regarding for instance the material that houses were constructed of and sanitation facilities at the houses. Information was collected on the basis of consensus with the individual, and from those individuals who agreed to full participation. An introduction

was given (using a letter of informed consent as shown in Appendix D) before each respondent was asked to provide information required in the questionnaire. It was made clear to each individual that if at any time during the interview they felt uncomfortable to continue, they were free to withdraw. All interviews were conducted face-to-face in isiZulu, the local language in which the researcher is fully conversant. This was done according to the recommendations by De Vos (2005:171), namely to conduct interviews in the language of the respondent. Due to the direct contact between the respondent and the researcher during the interview, the researcher was able to clarify some of the issues pertaining to the study where the need arose (such as further explanation of the purpose of the study).

(vii) Data analysis of semi-structured questionnaires

Statistical analysis was run on the quantifiable questions in the questionnaire, making use of statistical consultation services. The first stage of the data analysis was to ensure that all questionnaires had been completed in full. Some questions were coded or categorised. Raw data was arranged and processed using Microsoft Excel 2003, making it possible to be transferred into SPSS (Statistical Package for Social Sciences). Data was analysed using a process of coding and categorising the information. All data was grouped into the five capitals of the Sustainable Livelihood Framework, namely human, natural, social, financial and physical capital (Provention Consortium, 2007:1-2). By using this index one would be able to measure progress (Lindenberg, 2002: 301–318) within the study area in terms of timber farming. The outcomes of the questionnaire were scrutinised quantitatively by applying the descriptive method and statistical application. The Sustainable Livelihoods Framework, and specifically its asset pentagon, was used to analyse the livelihoods of the different grower types in relation to each others' livelihoods

(viii) Outcomes

The study was aimed at adding to the pool of knowledge on community forestry, which will be of value to the private forestry companies, government organisations and the community. The researcher was driven to determine the extent to which a community development project such as small-scale timber farming has impacted on the livelihoods of the participants. A further objective was to determine and highlight the impact of the different selling methods on the different household livelihoods, with a view to informing both the growers and other stakeholders. It is expected that the results of the study will illustrate which selling method is more sustainable, resulting in enhanced livelihoods for the participants involved in timber farming. The Sustainable Livelihood Framework refers to the vulnerability context. The vulnerability constitutes constraints

that prevent households from optimising their livelihood potential. Indicators of vulnerability are assessed in all five of the asset groups, namely capital, social, natural, physical and financial. Under human capital, aspects such as health, knowledge, skills, education level and type of employment are investigated. With regard to financial capital income, savings or investments are assessed. Housing structure, land ownership and means of transport are assessed under physical capital. Involvement and access to services and resources, sale of crops and source of credit are analysed under social capital. Lastly, access to natural resources such as trees, agricultural crops, land and the size of the plot utilised for timber farming is analysed under the natural capital category.

Qualitative data was processed by analysing the open-ended questions in the questionnaire. Where possible, the findings of this data were tabulated in percentages of responses for the total sample. Results are presented in tables and graphs.

(ix) Limitations of the research

Wherever possible, efforts were made to reduce restrictions on the study. Since the study is largely of a qualitative nature according to the guidelines of the Sustainable Livelihood Framework, the results of this study cannot be generalised to the larger population, but is descriptive and explanatory of this specific sample. The results of the research are not intended to be representative of the project impact in the population of Sokhulu, Zululand or KwaZulu-Natal as a whole. A different situation could be found in another area, due to the case study nature of the research. Another limitation is that the researcher had to rely on interpretations to guide findings, as the researcher had no control over certain variables, such as household behaviour.
A further limitation of this study is that some of the interviewed heads of the households were not sure of the amounts they were using for important household expenses, especially for those expenses not incurred regularly. Supporting documents, for example those referring to household income, were not available for verification. It is possible that subjects who wish to be viewed in a better light might report a higher income level than which is actually being received. On the other hand, subjects with a higher income might report an income lower than what they are actually earning, for various possible reasons.

(x) Ethics

Permission was obtained from the tribal authority to conduct research in the area. In order to maintain confidentiality, no names have been used in the data analysis process or discussion of the findings. Participation in the study was voluntary and this was explained at the beginning of

each interview and prior to the focus group discussion. Confidentiality and other ethical considerations were guaranteed to all the participants. A letter of informed consent was read to each participant and initialed at the bottom once consent was given. The researcher committed to provide feedback of findings to the tribal authority. To ensure strict confidentiality, no names of participants have been used.

(xi) Validity

Validity has to do with whether what is being evaluated is really what is intended to be assessed (Rose & Sullivan, 1993:19-20). All questionnaires were completed in full and there was therefore no need to discard incomplete questionnaires. Questions for triangulation were built into the questionnaire. Care was taken during the data collection process in the field, during coding and during analysis. To avoid problems associated with illiteracy, the questionnaire was administered by means of an interview. There were face-to-face engagements and this allowed for clarity to be afforded as necessary. Respondents were free to provide explanations on issues as and when necessary, or when they felt the need to do so.

3.4 Summary

This chapter outlined the research methodology applied in the study. The chapter made provisions for the research methods used, highlighting the research design which was adapted as a case study. The methods used for data collection, together with the analysis, have been explained. The next chapter presents results of the study on the evaluation of small-scale timber farming for enhancing sustainable livelihoods.

CHAPTER 4: RESULTS OF SUSTAINABLE LIVELIHOOD FRAMEWORK

4.1 Introduction

This chapter presents the findings of the research conducted at Sokhulu. Findings on five capital assets (human capital, physical capital, social capital, natural capital and financial capital) are presented for all the household groups that were studied. In order to present a clear view, these findings are presented in frequency tables and graphical format. This chapter firstly explains the statistical tests conducted on the findings. This is followed by a discussion of the manner in which the different sections of the questionnaire have been clustered under each of the five capital assets, followed by the findings of each capital asset.

4.2 Statistical tests conducted on findings

The Kruskal-Wallis test was used for all statistical testing. To test the difference between nominal and ordinal data, nonparametric statistics are commonly used in the social sciences (Morgan, Reichert & Harrison, 2002:35). The Kruskal-Wallis is a non-parametric test that is equal to the ANOVA (analysis of variances), designed for tests involving three or more mutually independent samples. The Kruskal-Wallis test is an extension of the Mann-Whitney test which is used for two samples (Gibbons, 1993:42; Minium, King & Bear, 1993:483). The Kruskal-Wallis test is suited to data that is not found on an ordinal scale or where the population is not distributed normally (Jackson, 2009:282-420). This differs from the one-way analysis of variances which assumes a normal distribution with equal variances, and where the data must have been measured at an interval scale (Gibbons, 1993:54; Minium *et al*., 1993:483).

An alpha level of 0.05 was used for all statistical analyses. When a significant level of 0.05 is used, it means that during the formulation of the null hypothesis and alternative hypotheses, the decision standard was at an alpha level of 0.05 (Minium *et al*., 1993:272). A significant level is the standard for determining whether the hypothesis will be accepted or rejected and is founded on probability (Keyton, 2011:196).

When the results are statistically significant (the obtained results are smaller than 0.05) it means that there is a low probability of the obtained results occurring by chance (Minium *et al*., 1993:273). When the statistical tests results are bigger than 0.05, the findings are not statistically significant (Keyton, 2011:197). Keyton (2011:197) states that in communicating research, a probability level of 0.05 is recognised. A probability level of 0.05 means that 5 out of 100 of the valid findings have occurred by chance (Keyton, 2011:197).

A measure of the difference between anticipated and observed frequencies can be obtained by the use of the chi-square statistic (Minium *et al*., 1993:455). When researchers want to test whether the variation between the categories is statistically significant, they use the chi-square test. The observed frequency is evaluated on the number of occurring instances against the expected frequency or number of times the category was anticipated to occur. The chi-square will be zero if the expected frequency is the same as the observed frequency. The bigger the variation between the expected and observed frequency distribution, the bigger the chi-square value will be, and the results are likely to be statistically significant (Keyton, 2011:206). The limitation of the chi-square is that the test examines the frequencies, and if the observed frequency is zero or less than five in any given cell, the test results might not be correct (Keyton, 2011:209).

The way in which the difference due to error is accounted for, is through the degrees of freedom that state the number of values that differ within a statistical test (Keyton, 2011:204). The degrees of freedom will be the number of categories for the variables less one (minus 1) (Keyton, 2011:204-205). Due to the fact that collecting data is subject to some error (data can vary or carry error), degrees of freedom are included in statistical computation (Keyton, 2011:204).

The arithmetic mean is commonly referred to as the mean; this is the sum total of all scores divided by the total number of scores in a distribution (Jackson, 2009:420; Minium *et al*., 1993:73). The mean is largely used as a measure of central tendency (Keyton, 2011:190). The median is another way of assessing the central tendency (Jackson, 2009:420; Keyton, 2011:190). A median is a point on a distribution scale where 50 percent of the scores will fall within a distribution; this is the value that cuts the distribution into two halves (Minium *et al*., 1993:72). For the median to be determined, all the data must (in one variable) be arranged from the smallest to the largest, and the center value (midpoint) becomes the median. If there are two central values the two numbers are combined and divided by two, and the obtained figure is the median (Keyton, 2011:190). Where there are scores or no scores at the end of the distribution, the mean becomes affected and the median is less sensitive (Minium *et al*., 1993:76).

The presented figures or tables in the section below show the mean or median percentage. The Chi-square, degrees of freedom and the significant level are shown on each table. Where the results were significant for a particular variable, they are shown in bold type. The different capital groups are presented in sections, namely human capital, physical, social capital, natural capital and financial capital.

4.3 Human capital

Human capital includes training, expertise, information and sound health. It is the most essential asset, as it is required to utilise all the other assets, but on its own this asset cannot result in positive livelihood outcomes (Department for International Development, 1999a:7; De Sherbinini *et al*., 2008:40). The majority of households see a lack of education and poor health as contributors to poverty, and their livelihood goal is to improve these conditions. Department for International Development (1999a:7) further states that human capital can be utilised to establish the type of labour that is available in a household.

4.3.1 Household demographics, education and employment

Household demographics are assessed in terms of age, male and female composition, education level and the employment status of households, which is compared for the three groups. The aim is to determine whether these factors have an impact on the quality or value of livelihood. Table 4.1 shows the mean value for household demographics, education and employment for the three households.

Although there was no significant difference in the household demographics (Table 4.1), there was a significant difference ($p=0.016$) in the average education of the households (Table 4.1). Timber suppliers (mean=3.99) had a significantly higher average education for members of the households. The results showed that on average households in the timber supplier category had a better education when compared to the other two household groups. There was no significant difference in the number of economically active members in the households.

As shown in Table 4.1, there was also a significant difference ($p=0.000$) in the number of households with permanent work. Timber suppliers exhibited a higher number of households with permanent work (mean=1.70), compared to growers selling to companies (mean=0.55) and those selling to timber suppliers (mean=0.65). There was no significant difference in the number of people with temporary work, those doing seasonal work and persons who were unemployed for all three household groups.

Table 4.1 Human capital: Household demographics, education and employment. *n* = 60

Household demographics

	Category					
	GC	**GT**	**T**	**Chi-**		
Age (years)	**n=20**	**n=20**	**n=20**	**square**	**Df**	**P**
Household total	7.05	6.60	7.50	0.545	2	0.761
Younger than 15	5.20	4.30	5.75	2.734	2	0.255
Older than 15	1.80	1.90	1.75	0.021	2	0.990
15-59	4.50	3.85	5.25	2.988	2	0.224
>60	0.70	0.45	0.50	2.228	2	0.328
Proportional male/female ration age						
Younger than 18 (females)	2.40	2.15	2.20	0.852	2	0.653
Older than 18 (males)	2.05	1.55	2.50	2.918	2	0.232
Younger than 19 (females)	2.40	2.15	2.20	0.852	2	0.653
Older than 19 (males)	2.05	1.55	2.50	2.918	2	0.232
Education						
Average education	3.27	3.18	3.99	**8.295**	**2**	**0.016**
Average education (economically active members)	4.11	4.12	4.50	1.626	2	0.444
Employment and unemployment						
permanent work	0.55	0.65	1.70	**17.382**	**2**	**0.000**
temporary work	1.10	0.70	0.35	5.559	2	0.062
seasonal work	0.00	0.00	0.00	0.000	2	1.000
unemployed	1.90	1.60	1.40	0.933	2	0.627

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Households in the timber supplier group had better average education and were more involvement in permanent work compared to the households of growers selling to company and timber supplier groups. Because households in the timber supplier group had a better education, it could imply that they would have more knowledge and skills and more access to permanent work. Due to their improved knowledge they might even have better access to other capitals, for example access to tickets for supplying timber to the mills.

4.3.2 Income-earning activities

A comparison is made between the various types of households as to where they sourced their income and what activities they involved themselves in for earning money. If households are involved in different activities their income is diversified, which could mean a more sustainable income. Table 4.2 shows the frequency and percentage of households with at least one member participating in the stated activities, presented according to the household type.

Table 4.2 Human capital: Income earning activities. *n* = 60

	Category					
	GC	**GT**	**T**	**Chi-**		
Activity	**n=20**	**n=20**	**n=20**	**square**	**Df**	**P**
Timber farming	100%	100%	100%			
Timber harvesting	5%	0%	100%	**35.824**	**2**	**0.000**
Timber transport	15%	0%	50%	**15.516**	**2**	**0.000**
Forestry labour	5%	0%	0%	2.034	2	0.362
Other employment	5%	35%	0%	**12.404**	**2**	**0.002**
Agriculture farming (crop farming)	45%	25%	20%	3.333	2	0.189
Livestock farming (animal husbandry)	0%	0%	5%	2.034	2	0.362
Participate in farming (crop farming)	45%	25%	20%	3.333	2	0.189

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

All households in the three groups were involved in timber farming (Table 4.2). There was a significant difference (p=0.000) in the number of households that performed timber harvesting (Table 4.2). All respondents in the timber supplier group were harvesters (100%) and the other two groups reported very little involvement or no involvement at all. Table 4.2 indicates that there was a significant difference (p=0.000) in the number of households involved in the transport of timber. Timber suppliers reported a higher involvement (50%) in timber transport, with the growers selling to company reporting lesser involvement (15%) and growers selling to timber suppliers reporting no involvement in the transport of timber. There was no significant difference in the number of households involved in forestry labour for all three groups.

There was a significant difference (p=0.002) in the number of households involved in other employment, as shown in Table 4.2. A larger number of growers selling to timber suppliers were active in other employment. Table 4.2 shows no significant difference in the number of households taking part in agricultural and livestock farming for all three categories. Table 4.2

shows that there was no significant difference in the number of households involved in farming production.

Access to more income allows households to diversify their income, which could mean more sustainability in their livelihood. More households in the timber supplier group were involved in timber harvesting and timber transport; these households were able to receive income through their involvement in these activities. These two activities take up a great proportion of the costs that households incur at harvest, for by being involved they are able to reduce their costs when they harvest their timber. Thirty five percent of households from growers selling to timber supplier groups engaged in other employment, including being a taxi owner, working in a mine and working as a security guard.

4.3.3 Sale of timber in households

A comparison is made of who is responsible for the sale of timber in the household. When more people are involved in timber sales, it means that the skills are transferred to more household members. Table 4.3 shows the number and percentage of those responsible for the sale of timber in the household.

Table 4.3 Human capital: Sale of timber in the households. *n* = 60

	Category					
Responsible for sale	**GC**	**GT**	**T**	**Chi-square**	**Df**	**P**
Respondent (household head)	95%	85%	85%	10.151	10	0.427
Other	5%	15%	15%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.3 shows that there was no significant difference in the number of households responsible for selling timber for all the grower categories. Most of the growers selling to company (95%), growers selling to timber suppliers (85%) and timber suppliers (85%) reported that they were responsible for the timber sales. A respondent in the timber supplier group reported that he was assisted by his wife; another had the help of his sons and still another was assisted by his son and wife. A respondent from the group of growers selling to company was assisted by his wife. A respondent from the growers selling to timber suppliers had the assistance of her husband and the other two sold the timber together with their sons. In households where more than one household member is involved in the sale of timber, they will have a more sustainable livelihood, as the skills are not limited to one person only.

4.3.4 Health status of households

The health status of households in all three groups is compared. The health level of the household will determine the quality of labour available. Where there is a high incidence of disease, the available labour will diminish. The health status of households in all three groups is presented in Table 4.4. Respondents were asked how often people in their households suffered from malnutrition, flu, skin disease, bone disease, high blood pressure, diabetes and other diseases. Respondents had to indicate if the incidents occurred very often, often, sometimes, or never. Scores obtained for very often, often and sometimes were combined and they are presented in the table below.

Table 4.4 Human capital: Health status of households. *n* = 60

	Category					
Health condition	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Malnutrition	5%	0%	0%	2.034	2	0.362
Flu	95%	80%	100%	4.839	6	0.565
Skin disease	45%	40%	35%	5.03	6	0.54
Bone disease	45%	70%	50%	9.256	6	0.16
High blood pressure	65%	70%	75%	7.886	6	0.247
Diabetes	35%	25%	35%	**16.595**	**6**	**0.011**
Other	60%	60%	30%	5.547	6	0.476

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.4 shows that for all household types there was no significant difference in the incidence of malnutrition, flu, skin disease, high blood pressure, bone disease and other illnesses. As shown in Table 4.4, the occurrence of flu was higher in all three groups, which can be attributed to the nature of flu as a disease affecting growers selling to company (95%), growers selling to timber suppliers (80%) and timber suppliers (100%). High blood pressure was also higher, as its incidence was reported by more than 50% of the respondents in all three groups. There was a significant difference (p=0.011) in the number of households who experienced diabetes. The incidence of bone disease was higher in growers selling to timber supplier groups, which could have an impact on the availability of labour for forestry or agriculture. This matter would need further investigation as it falls beyond the scope of this research.

4.3.5 Expenditure patterns of households

The spending patterns of households in the three groups were compared. The assumption is that households that spend more, have more financial resources, and that way in which they spend

their earnings will determine their quality of life – at present and in the future. The expenditure pattern of households appears in Table 4.5.

Table 4.5 Human capital: Expenditure patterns of households. *n* = 60

	Category					
Household expenditure	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Clothes	95%	55%	40%	**13.923**	**2**	**0.001**
School uniform	75%	40%	40%	**6.541**	**2**	**0.038**
Other school expenses	75%	35%	40%	**7.600**	**2**	**0.022**
Doctors' fees	90%	25%	20%	**24.646**	**2**	**0.000**
School fees	50%	30%	50%	2.172	2	0.338
Medicines	50%	25%	15%	**6.190**	**2**	**0.045**
Fees for traditional healers	45%	15%	15%	6.400	2	0.410
Hospital	25%	15%	5%	3.137	2	0.208

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Df = degrees of freedom and P = significant level

There was a statistical significance (p=0.001) in households' spending on clothes (Table 4.5). Growers selling to company were spending more on clothes (95%), followed by growers selling to a timber supplier (55%) and lastly timber suppliers (40%). As shown in Table 4.5, there was also a significant difference (P=0.038) in households' expenditure on school uniforms. The majority of households (75%) in growers selling to a company group spent money on school uniforms. As shown in Table 4.5, there was a significant difference (P=0.022) as to how the three household types spent money on other school expenses. Once again, households in the growers selling to company group spent more (75%) on school expenses, compared to growers selling to timber suppliers (35%) and timber suppliers (40%). The growers selling to company group, because of their high investment in the education of their children, will ensure a better livelihood for themselves in the future, as their children will be able to access formal employment, thereby securing higher earnings.

Table 4.5 shows that there was a significant difference (P=0.000) on households' spending on doctors' fees. The majority of households (90%) in the growers selling to company group reported the spending on doctors' fees as being a major expense. There was no significant difference in household expenditure on school fees. Fifty percent of households in the growers selling to company and a timber supplier group were spending money on school fees, compared to 30% in the growers selling to a timber supplier group. As shown in Table 4.5, there was a statistical significance (P=0.045) in households' spending on medicines. Growers selling to company reported spending higher amounts (50%) on medicines when compared to the other two groups. There was no significant difference in household spending on fees for traditional

healers and hospitals, although growers selling to company reported higher spending figures (45%) on traditional healers compared to growers selling to timber suppliers (15%) and timber suppliers (15%).

Spending indicates that households have access to financial resources. This means that the households engaged activities that could provide them with income. When households spend on education, it helps to create a sustainable livelihood, because investing in children's education ensures a better livelihood through formal income for the future. The expenditure patterns of households will also determine their physical capital.

4.4 Physical capital

Physical capital refers to all the goods, including infrastructure, that are essential for the maintenance of livelihoods (Department for International Development, 1999a:13; De Sherbinini *et al*., 2008:40) and are an indicator of income, welfare and livelihood (Islam, Yew, Abdullan & Viswanathan, 2011:173-180). This comprises the physical environment or equipment that enables people to meet their basic needs and to be constructive.

4.4.1 Household infrastructure and access to drinking water

Household shelter, building and access to drinking water are compared. Access to the above-mentioned components is essential to attain a sustainable livelihood. Table 4.6 shows the percentages with regard to households' housing structure, the material used for building purposes, the sewage system used and access to safe and potable drinking water.

As shown in Table 4.6, there was no significant difference in the type of housing for the various household types. In each case the majority of houses are detached. There was a significant difference (P=0.033) in the type of material used for roofing. Even though there is a difference, one needs to exercise caution with the statistics, due to nine cells (60.0%) showing an expected count of less than five. There are very few responses mentioning plastic and combinations, which will result in unrealistic statistics. Metal sheets seemed to be popular among the growers selling to company (40%) and growers selling to timber suppliers (75%), while tiles were popular in the timber supplier group (45%).

Table 4.6 indicates that there was no significant difference in the material used by households for building the walls of their houses. The majority of respondents used cement blocks or bricks. There was no significant difference in the material used in the construction of floors (Table 4.6).

A bigger proportion of households used concrete for flooring purposes. Table 4.6 illustrates that there was no significant difference in the type of toilet system used by the respective household types. Almost all households reported that they used the ventilated improved pit latrine. Table 4.6, however, shows a statistical significance (P=0.027) in households' access to safe and potable drinking water. The majority of households experienced no problems in accessing this natural resource.

Table 4.6 Physical capital: Household infrastructure and access to drinking water *n* = 60

	Category					
	GC	**GT**	**T**	**Chi-**		
Type of house	**n=20**	**n=20**	**n=20**	**square**	**Df**	**P**
Traditional hut	25%	35%	5%	5.499	2	0.064
Detached house	75%	65%	95%			
What kind of building material is the roof made of?						
Metal sheet	40%	75%	30%	**16.703**	**8**	**0.033**
Asbestos	20%	15%	20%			
Tiles	25%	5%	45%			
Plastic	0%	5%	0%			
Combination	15%	0%	5%			
What kind of building material are the walls made of?						
Mud	5%	0%	0%	7.656	4	0.105
Bricks / Blocks	70%	65%	95%			
Mud and sticks	25%	35%	5%			
What kind of building material is the floor made of?						
Concrete	95%	100%	90%	6.105	6	0.412
Other	5%	0%	10%			
Type of toilet						
Piped to flush	0%	0%	5%	2.034	2	0.362
Ventilated improved pit latrine	100%	100%	95%			
Safe and potable drinking water						
	95.0%	95.0%	70.0%	**7.212**	**2**	**0.027**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Df = degrees of freedom and P = significant level

Poor access to infrastructure will have an impact on people's livelihood and building a house can be expensive, depending on the type of material used. Households with a higher income are likely to use bricks and tiles for building their houses. The higher the quality of the infrastructure, the better the livelihood of the household will be. When people do not have access to potable water, it results in the deterioration of their health.

4.4.2 Household expenditure

The amount spent on the respective households' maintenance, the running of their vehicles and public transport is compared. Access to physical capital such as vehicles could help to improve livelihoods when vehicles are used to generate income. Households owning vehicles can reach their destination quicker compared to those that have to rely on public transport, which could mean that households owning vehicles can spend more time on productive activities. Table 4.7 shows the frequency of the most important household expenses in a period of 12 months.

Table 4.7 Physical capital: Household expenditure. *n* = 60

	Category					
Expenses incurred	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Vehicle maintenance	40%	5%	45%	**9.048**	**2**	**0.011**
Petrol / diesel	40%	10%	65%	**12.832**	**2**	**0.002**
Public transport	90%	70%	60%	4.773	2	0.092
Other	20%	30%	35%	1.149	2	0.563

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

As shown in Table 4.7, timber suppliers (45%) and growers selling to company (40%) spent more on vehicle maintenance (p=0.011) compared to growers selling to timber suppliers (5%). Table 4.7 also shows a significant difference (P=0.002) for all three household types with regard to household expenditure on petrol or diesel. Households in the timber supplier category reported to be spending more (65%) on fuel. There was no significant difference in household expenditure on public transport for the three groups (Table 4.7). The majority of households in all three groups made use of public transport.

The timber supplier group was expected to spend more on the maintenance and running of their vehicles due to the nature of activities that households engage in. These households were involved in timber transport and timber harvesting, in which case the transport of timber and labour consumed fuel. Some members of the households still seemed to depend on public transport in spite of owning a vehicle, as vehicles are used for timber farming activities.

4.4.3 Land ownership by households

The ownership of land by different types of households is compared. Land ownership provides security to households. Land can be sold to obtain money, or used to generate income by

engaging in certain activities on the land. Land can also be used as security when borrowing money. Figure 4.1 shows the type and tenure of land ownership for the different household types.

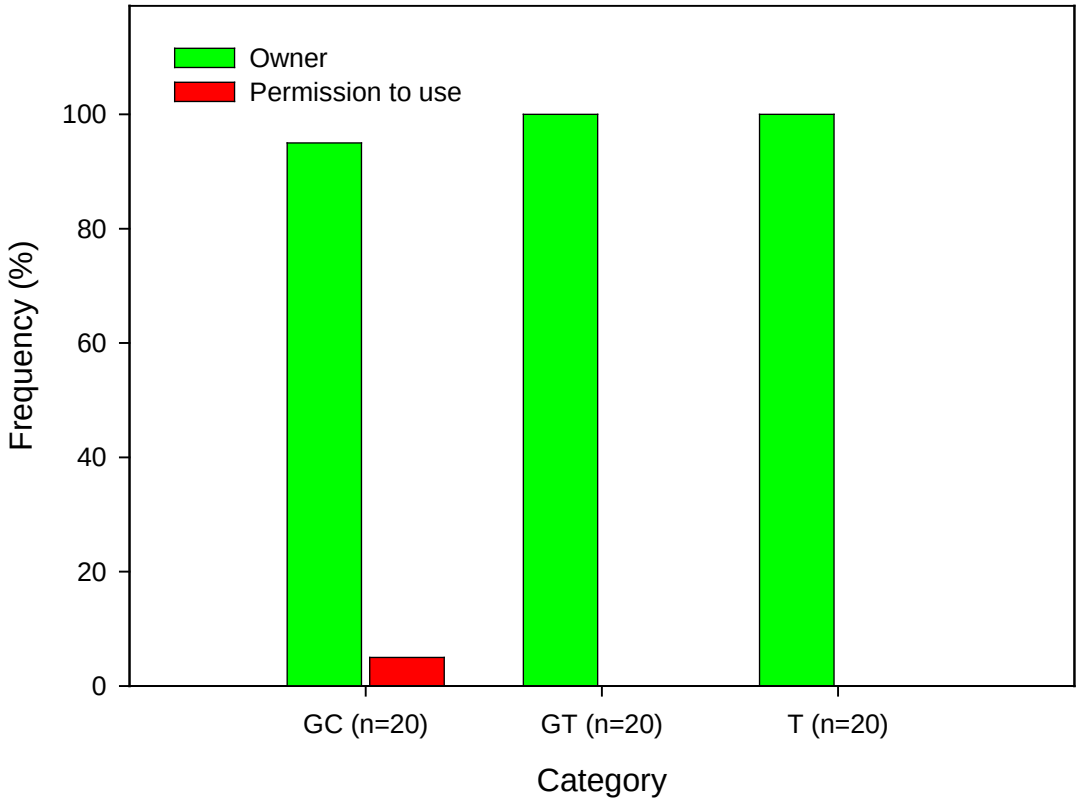

Figure 4.1 Physical capital: The type and tenure of land ownership in the household types
GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Figure 4.1 shows that there was little difference in the type and tenure of land for the respective household types. All households in the growers selling to timber supplier and timber supplier category reported having their own land, while only 5% in the growers selling to company reported having permission to use land.

Households holding ownership of the land enjoyed more stability in terms of the land, compared to those who were using other people's land. As the land belonged to them, they could decide what they wanted to do on their land, and for what length of time. How the land is used can be influenced by social capital, such as household participation in co-operatives.

4.5 Social capital

Social capital refers to all the resources that people are able to access in order to achieve their livelihood objectives. These are obtainable through connections, participating in organised groups and creating trust relationships (Department for International Development, 1999a:9; De Sherbinini *et al*., 2008:40). Social capital includes networks, connections or membership of formal groups. Social capital will allow even those households with few skills to access facilities that would otherwise not be possible due to their limited education (Department for International Development, 1999a:9).

4.5.1 Average number of years lived at Sokhulu

The average number of years that the head of the households had lived at Sokhulu is compared. The length of time that a household have lived in a particular area might allow them a better understanding of that particular local environment, compared to someone who has lived there for a shorter period. Having lived in the area for a long time, the head of the household might have learned strategies to adapt to difficult situations. Figure 4.2 shows the average number of years that the head of the household had lived at Sokhulu.

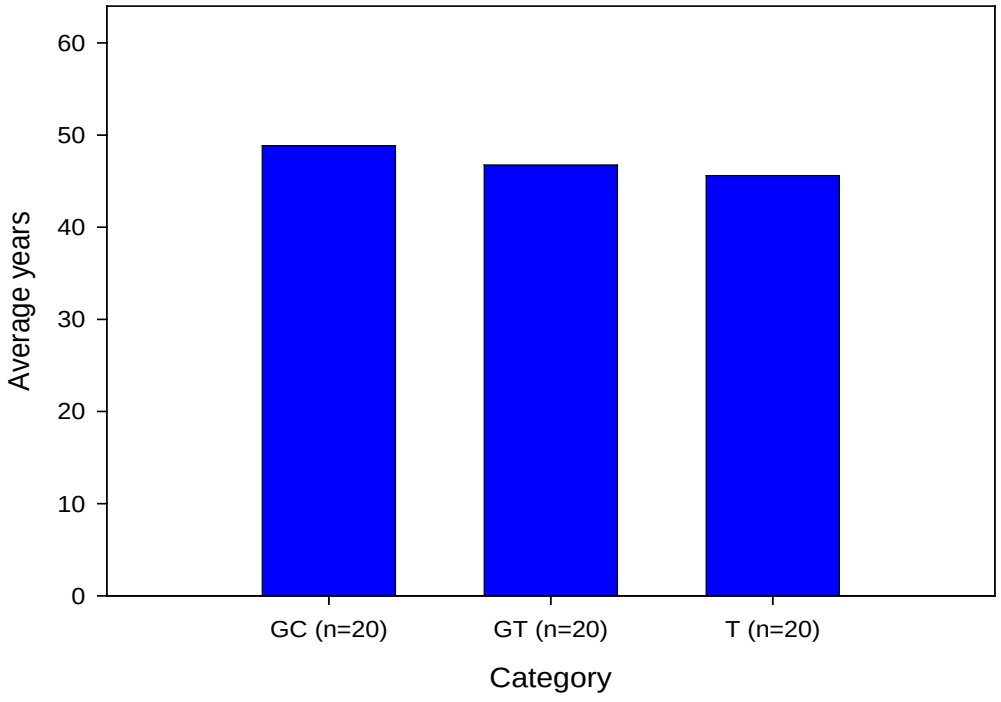

Figure 4.2. Social capital: The average number of years that the head of the household had lived at Sokhulu. GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Figure 4.2 shows the average number of years that the three household types had lived in Sokhulu. Growers selling to company showed a higher average number of years (48.85) residing at Sokhulu, followed by growers selling to timber suppliers (46.75) and timber suppliers (45.6).

Household heads in the group of growers selling to company show a slightly higher average number of years of having lived at Sokhulu compared to the growers selling to timber suppliers and the timber supplier households. These households might have been able to develop social networks over the years; they have a better understanding of the physical landscape of Sokhulu and they understand the climatic conditions of the area. They will know which species will perform better in the area, and also what tree or agricultural maintenance programmes they should follow to ensure maximum crop returns.

4.5.2 Households' use of services

Households' use of services by the three grower types is compared. Participation in co-operatives and access to extension services provide empowerment to households. Access to the health centre will improve household's health level and households could become more productive. Table 4.8 shows the services that households make use of.

Table 4.8 Social capital: Households' use of services. *n* = 60

	Category					
Services	**GC**	**GT**	**T**	**Chi-square**	**Df**	**P**
Health centre	90%	65%	70%	3.733	2	0.155
Extension services	20%	5%	10%	2.264	2	0.322
Co-operatives	10%	15%	10%	0.323	2	0.851
Other	0%	0%	0%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

There was no significant difference in the health centres, extension and co-operative services utilised by households in the respective groups (Table 4.8). All households reported not to be making use of other services. Many households made use of the health service, but the use of extension services was low, although growers selling to company reported a higher usage (20%) than the other groups. Growers selling to company showed a higher overall use of services when compared to the other two groups.

When households are able to associate with others, they will manage to obtain the best deals for their products, as the sales might be done collectively. Households will be able to get free advice through association with others and the knowledge level will also be improved as people learn from each other and share their experiences.

4.5.3 Local institution participation

Households' participation in local institutions is compared. Their access to and use of local institutions will play a significant role in building a sustainable livelihood. By their involvement in forestry and sugar cane committee, households are able to get updates on new forestry and agricultural development, such as improved genetic material that can be planted to improve the yield obtained at harvest. Credit schemes provide households with opportunities to save or borrow money. Table 4.9 shows the level of participation in local institutions by the different grower types.

Table 4.9 Social capital: The level of participation in local institutions for the different grower types. *n* = 60

	Category					
Institution	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Forestry committee	10%	0%	0%	4.138	2	0.126
Sugar cane committee	0%	0%	10%	4.138	2	0.126
School committee	0%	0%	0%			
Credit schemes	0%	0%	5%	2.034	2	0.362
Other	0%	0%	5%	2.034	2	0.362

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers Df = degrees of freedom and P = significant level

Table 4.9 illustrates that there was no significant difference in household participation in local institutions. The total number of households that participated in local institutions in all three groups was very low. If people have access to forestry and sugar cane committees they are able to implement new technology in timber farming and sugar cane farming. Such technology will improve production and increase the income that households receive from farming. Households' involvement in school committees will allow them to create a social network. Credit schemes allow households access to an easy form of credit and also serve as a means of savings. Rural dwellers can find it difficult to obtain credit, but savings can be used to cushion households in difficult times.

4.5.4 Permission to access forestry or forest resources

A comparison is made of where households turned to for obtaining permission to access forestry resources. Households' access to resources such as tickets or a supply number at the depot is discussed. To make it possible for households to sell their timber products, they must gain access to tickets or be able to supply products at the depot. The percentage of means providing households with permission to access forestry and forest resources is shown in Table 4.10.

Table 4.10 Social capital: Permission to access forestry or forest resources.

	Category					
Permission to access forestry resources	**GC (n=19)**	**GT (n=6)**	**T (n=20)**	**Chi-square**	**Df**	**P**
No one	89%	100%	95%	1.742	4	0.783
Supply number	5%	0%	5%			
Letter from tribal authority	5%	0%	0%			

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

As shown in Table 4.10, there was no significant difference in households' obtaining permission to access forestry or forest resources. The majority of households in the growers selling to company (89.5%) and timber suppliers (95%) reported that they did not need permission from anyone to access forestry or forest resources, while a few households (six) that sell to timber suppliers indicated that they did not need permission. One household from the growers selling to company said they only needed a supply number from the forestry company, while one household from the timber supplier group reported that permission could be obtained through a supply number from the local depot.

Although all households in the growers selling to timber suppliers group reported that they needed no permission to access forestry resources, only six households in this group were indeed accessing these resources. When households are able to access these forestry supplies they can sell their timber products to earn an income.

4.5.5 Number of years households had been owning or using land

A comparison is made of the number of years that households had been using land for timber farming. The assumption is that those households that have been practising timber farming for a long period might have been experts in this field. Figure 4.3 shows the number of years that households had owned or used the land for timber farming.

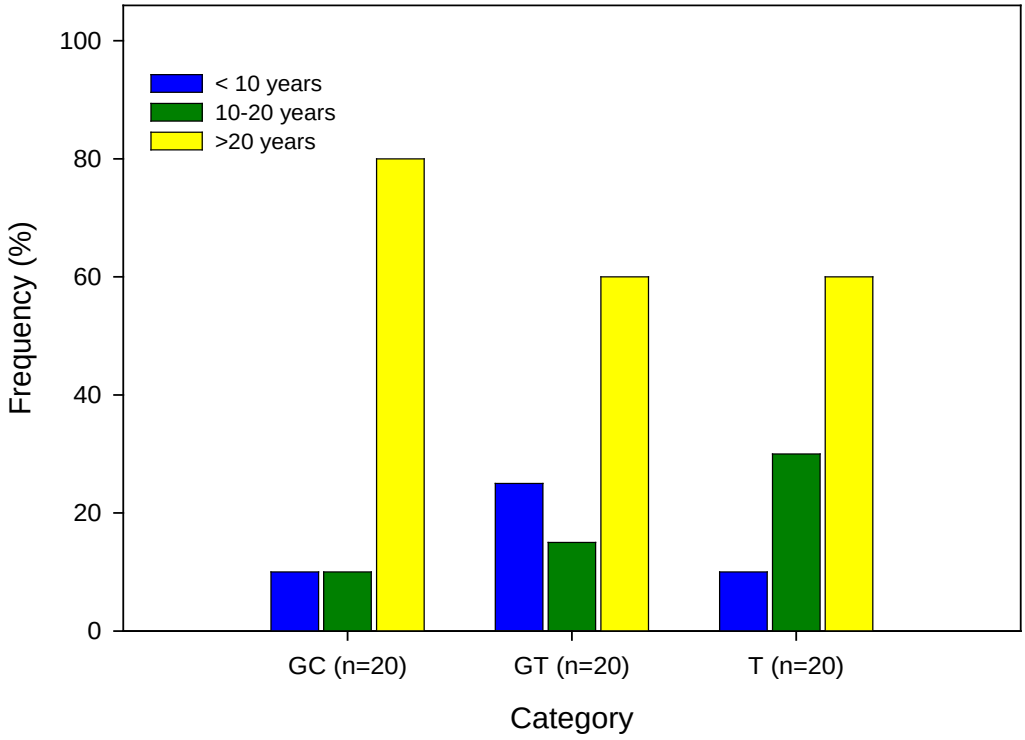

Figure 4.3 Social capital: The number of years that households had been owning/using the land. *n* = 60, GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

As shown in Figure 4.3, there was no significant difference in the number of years that households had owned and used their land for timber farming. The majority of households had practised timber farming on their land for more that 20 years, but a larger number of growers selling to company (80%) had practised forestry on their land for more than 20 years. Only 20% of households in the growers selling to company group had used their land for timber farming for less than 20 years, compared to 40% for both the growers selling to timber suppliers and the timber suppliers themselves.

The number of years that households had been active in forestry correlates with the number of years that they had lived at Sokhulu, as discussed under section 4.4.1. Households that had been involved in forestry for a long period of time might have acquired techniques that will help them to be more productive in their forestry operations. These households have acquired vast knowledge through the years and they might have developed a stronger relationship with forestry companies through the supply of timber.

4.5.6 Sale of crops

The method followed by households for selling their crops or timber is compared among for the three groups. A higher income can be secured by selling to company and organisations, as compared to those selling to a community member. Table 4.11 shows the different avenues that households use to sell their timber and crops.

Table 4.11 Social capital: Sale of crops. *n* = 60

	Category					
Avenues for sales	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Community member	35%	100%	10%	**34.572**	**2**	**0.000**
Company	100%	20%	100%	**43.636**	**2**	**0.000**
Organisation	0%	0%	5%	2.034	2	0.362
Scheme	0%	0%	0%			
Other	5%	0%	5%	1.034	2	0.596

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.11 above shows a significant difference (P=0.000) in the number of households that sell their forestry or agricultural products to community members. All households in the group of growers selling to timber suppliers reported selling to community members, compared to 35% of the households in the growers selling to company and 10% of the households in the timber supplier group.

Table 4.11 illustrates that there was a significant difference (P=0.000) in the number of households that sold to company in respect of all three household types. All households in the growers selling to company and timber supplier category reported selling to company, mainly consisting of their timber products sold to forestry companies. Twenty percent of the households in the growers selling to timber supplier group sell their agricultural produce to companies. There was no significant difference in the number of households that sold their timber or agricultural crops to organisations or other market outlets.

Households in the growers selling to timber supplier groups sold their timber to community members (timber suppliers). This reduces the total income that households received and could influence or limit a household's investment in other capital assets. Households in timber supplier groups and growers selling to company sold their timber to forestry companies. These households receive a higher income which can be used to create or increase their asset base. Income can also be kept as savings and drawn when needed.

4.5.7 Credit sources

A comparison is made of households' access to credit for the three grower types. When households have access to credit they can use the borrowed money to increase their asset base, and thus improve their livelihood. Table 4.12 shows the frequency or percentage of where households turned to for obtaining credit.

Table 4.12 Social capital: Credit sources. *n* = 60

	Category					
Credit facility	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Formal credit schemes	0%	10%	25%	**6.146**	**2**	**0.046**
Informal credit schemes	10%	0%	0%	4.138	2	0.126
Other	15%	35%	30%	2.216	2	0.330
Forestry schemes	0%	0%	0%			
Sugar cane schemes	0%	0%	0%			
Post office	0%	0%	0%			
Bank	0%	0%	0%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.12 shows that there was a significant difference (P=0.046) in the number of households that obtained credit from formal credit schemes with regard to the three household groups. Twenty five percent of households in the timber supplier group sourced credit from a formal credit scheme, as opposed to only 10% in the growers selling to timber suppliers and 0% in the growers selling to company group. There was no significant difference in the number of households that sourced credit from informal credit schemes. Only a minority of households (10%) in the growers selling to company group sourced their credit from informal schemes. There was also no significant difference in the number of households that obtained credit from other sources, forestry schemes, sugar cane schemes, the post office and commercial banks. Credit from other sources was provided by furniture shops, clothing stores, friends, a daughter and an insurance policy.

Households in the timber supplier group had better access to formal credit. These households were able to borrow money from the formal schemes to procure working equipment such as vehicles and tractors. Through access to this type of formal credit households are able to create livelihood strategies. Social capital can play a critical role in creating and maintaining natural capital for a sustainable livelihood.

4.6 Natural capital

Natural capital, which is closely related to the vulnerability context, refers to the natural resources that allow for the provision of services required for livelihoods (Department for International Development, 1999a:11). This type of capital is highly significant for households that gain an income from forestry, agriculture, fishing and mining. This capital includes all the shocks (such as drought) that households can be exposed to (De Sherbinini *et al*., 2008:40) and can destroy the livelihood of households and the natural capital itself, for example the destruction of forests as a result of fire (Department for International Development, 1999a:11).

4.6.1 Households' access to and ownership of natural resources

A comparison is made of the households' access to and possession of natural resources. People at Sokhulu mostly secure their livelihood from resource-based activities, namely forestry and agricultural farming. The possession of and access to natural resources are important for their livelihood. Table 4.13 shows the proportion of households that have access to and ownership of natural resources.

Table 4.13 Natural capital: Households' access to and ownership of natural resources. *n* = 60

		Category					
Natural capital item	**Status**	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Animals	Possess	65%	55%	80%	2.85	2	0.241
Trees	Possess	100%	100%	95%	2.034	2	0.362
Sugar cane	Possess	20%	15%	15%	0.24	2	0.887
Banana	Possess	45%	35%	45%	0.549	2	0.760
Amadumbe	Possess	55%	25%	45%	3.84	2	0.147
Mealies	Possess	45%	15%	55%	**7.333**	**2**	**0.026**
Cabbage	Possess	50%	45%	35%	0.95	2	0.622
Spinach	Possess	45%	50%	40%	0.404	2	0.817
Land	Possess	95%	100%	100%	2.034	2	0.362
Land	Access	5%	0%	0%			
Forestry/forest resources	Access	95%	30%	100%	**32.533**	**2**	**0.000**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

There was no significant difference in the number of households that own animals, trees, sugar cane, banana, *amadumbe*, cabbage, spinach and land, as shown in Table 4.13. More than 50% of households in all three groups own animals. Eighty percent of households in the timber supplier group own animals, compared to 65% of households in the growers selling to company group and 55% selling to timber suppliers. All households in the growers selling to company and

those selling to timber suppliers reported that they possessed trees, compared to 95% of households in the timber supplier group. An equal amount (15%) of households in the growers selling to timber suppliers and the timber supplier categories reported owning sugar cane, compared to a slightly higher proportion (20%) of households in the growers selling to company. A total of 45% of households in the growers selling to company and in the timber supplier group owned banana, compared to 35% of households in the growers selling to timber suppliers. Table 4.13 shows that a larger proportion (55%) of households in the growers selling to company group reported having *amadumbe* crops, compared to the other two groups.

Table 4.13 shows that the growers selling to company group included a larger number of households (50%) that normally plant cabbage. Half of the households in the growers selling to timber suppliers group normally plant spinach. All households in the growers selling to timber suppliers and in the timber supplier group owned land, compared to 95% of the households in the growers selling to company group. Land is vital, as natural resource activities such as forestry and agriculture require land to make such activities possible. When households possess land they can perform income earning activities on this land.

Table 4.13 shows a significant difference (P=0.026) in the number of households that possess mealies in all three household types. The majority (55%) of households in the timber supplier group possess mealies. There was also a significant difference (P=0.000) in the number of households that have access to forestry and forest resources in all three household types. Households in the timber supplier group all reported having access to forestry and forest resources, compared to 95% of households in the growers selling to company groups and only 30% of households in the growers selling to timber supplier groups.

Agricultural (farming) activities are the main type of enterprise that rural people depend on for a livelihood. Forestry is one of the activities that households have embarked on to make a living. Owning farm land, livestock and agricultural products allows households to procure an income that they can use for sustaining their livelihood. Where households have no access or do not possess any of these, their livelihood is affected, because their households are dependent on farming.

4.6.2 Land used by households to grow trees

A comparison is made of the size of the land that households use for timber farming. The bigger the area that a household has available for timber farming, the better its income will be. For

example, an area of two hectares will produce more timber than an area of half the size. Figure 4.4 shows the percentage of households growing trees on different sized land areas.

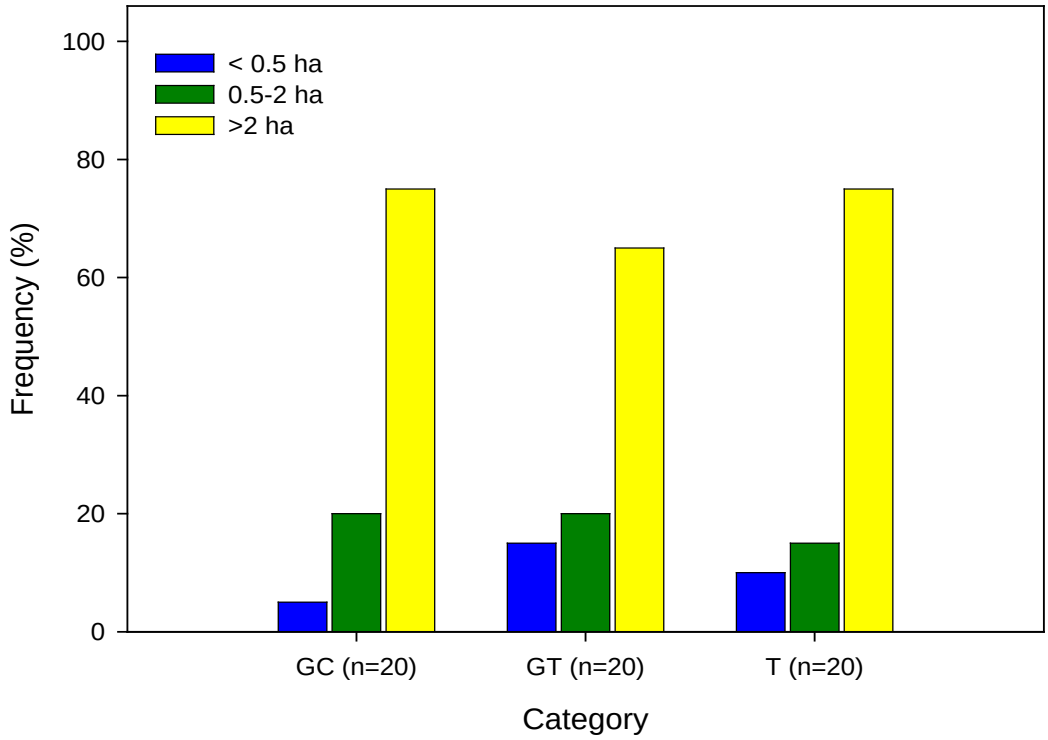

Figure 4.4 Natural capital: Land used by households to grow trees. *n* = 60

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Figure 4.4 illustrates that there was no significant difference in the size of land that the different grower types used for growing trees. The majority of households in all three groups were raising their trees on an area of more than two hectares. The number of households that were growing trees on an area of over two hectares was slightly higher for growers selling to company and for the timber supplier group, as compared to growers selling to timber suppliers.

The larger the area used by households for timber farming, the bigger their income will be and the more advantageous for their livelihood. With more households from the timber suppliers and growers selling to company group growing trees on over two hectares, it means that the tonnage produced by these growers will be bigger when compared to the growers selling to timber suppliers.

4.6.3 Sale of forestry products

A comparison is made of the intervals at which households sold their forestry products. The longer the households wait before they can sell their timber, the bigger their revenues from the timber sales will be. The number and percentage of households that sold forestry products from their plots, together with the intervals at which the products were sold, are shown in Table 4.14.

Table 4.14 Natural capital: Sale of forestry products. *n = 59*.

	Category					
	GC (n=20)	**GT (n=20)**	**T (n=19)**	**Chi-square**	**Df**	**P**
Product sold						
Timber logs	100.0%	100.0%	95.0%	2.034	2	0.362
Timber selling interval (yrs)						
3	10.0%	5.0%	5.6%	6.51	10	0.771
4	20.0%	40.0%	33.3%			
4.5	10.0%	5.0%	5.6%			
5	15.0%	30.0%	27.8%			
6	35.0%	10.0%	16.7%			
7	10.0%	10.0%	11.1%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

There was no significant difference in the number of households that sold timber logs from their plots (Table 4.14). All households in the growers selling to company and growers selling to timber supplier category sold their timber logs. There was also no significant difference regarding the intervals at which households in the three grower types sold their timber logs (Table 4.14). Very few households felled their timber at 3 years and very few waited until their trees were 7 years old. A larger proportion (50%) of households in the growers selling to company group felled their timber plots at 5 to 6 years. This was slightly higher compared to the other two groups (40%) in respect of trees within the same age range.

Felling trees at an early stage will have an impact on household income from timber farming. Waiting until trees are mature before they are felled will increase the returns that those households receive from their plots. More income is received by growers selling to company, as more of their households sold timber at 5 or 6 years, compared to the timber suppliers and growers selling to timber suppliers.

4.6.4 Households that kept seed, planted trees and engaged in hunting

A comparison is made of the number of households that planted trees in the last 12 months, kept agricultural seed and participated in hunting with regard to all three groups. For the growing of

trees to be sustainable it is essential that new planting takes place, replacing old stock with new stock and thereby ensuring maximum production from the plot. When agricultural seed is stored, it can be used in the next production phase. Hunting makes it possible for households to provide food for their families. Table 4.15 shows the frequency and percentage of households that kept agricultural seed, have planted trees in a period of 12 months, and households that engaged in hunting.

Table 4.15 Natural capital: Households that kept agricultural seed, planted trees and have engaged in hunting.

	Category					
Activity	**GC (n=8)**	**GT (n=5)**	**T (n=3)**	**Chi-square**	**Df**	**P**
Store agric seed	100%	100%	75%	3.453	2	0.178
	GC (n=20)	**GT (n=20)**	**T (n=20)**			
Planted trees in the past 12 months	30%	25%	45%	1.95	2	0.377
Hunting	0%	10%	0%	4.138	2	0.126

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Cf = degrees of freedom and P = significant level

As shown in Table 4.15, there was no significant difference in the number of households that kept seed for their next agricultural production. A larger number of households among the growers selling to company and growers selling to timber supplier groups kept seed at harvest, compared to the timber supplier group. Table 4.15 illustrates that there was no significant difference in the number of households that have planted trees in the past 12 months. More households in the timber suppliers group have planted trees in the same period. There was no significant difference in the number of households that engaged in hunting.

When households store seed, it will ensure the sustainability of their agricultural production and this could mean a greater sustainability of income procured from the sale of their agricultural crops, while also ensuring food security in the households. The tonnage received from a plot will decline over time. For maximum site output, old stock will have to be replaced with new stock, which will also ensure sustainability of the timber farming practice. In addition, the quality of the timber plot will determine the quantity of the harvest.

4.6.5 Crises experienced by households

A comparison is made of the different types of crises that households were exposed to. Households depend on the trees and agricultural farming for their livelihood and any catastrophic

occurrence that impacts on the natural resources will influence the quantity and quality of natural products produced by households, their income and their livelihood. Table 4.16 shows the percentage of crises experienced by households over a period of 12 months.

Table 4.16 Natural capital: Crises experienced by households. *n* = 60

	Category					
Types of crises	**GC n=20**	**GT n=20**	**T n=20**	**Chi-square**	**Df**	**P**
Drought	70%	55%	25%	**8.4**	**2**	**0.015**
Food shortage	85%	90%	70%	2.894	2	0.235
Disease and pests	25%	35%	30%	0.476	2	0.788
Fire	40%	25%	25%	1.429	2	0.490
Floods	10%	0%	0%	4.138	2	0.126
Other	10%	5%	10%	0.436	2	0.804

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

There was a significant difference in the number of households in all the household types that had experienced drought (Table 4.16). Households in the growers selling to company group (70%) and growers selling to timber supplier group (55%) were more vulnerable to drought, compared to the timber supplier group (25%). Table 4.16 shows that there was no significant difference in the number of households that experienced food shortage in the last 12 months. A larger number of households had experienced food shortage, with the growers selling to company and the growers selling to timber supplier households appearing to be more vulnerable. There was no significant difference in the number of households that experienced diseases and pests, fire and flood (Table 4.16). Growers selling to company were more vulnerable to the latter, compared to the other two grower types. There was no significant difference in the number of households in all the groups that reported other crises.

Drought has an impact on the yield that households produce; this will impact on households' income and food security. A large number of households in the growers selling to timber suppliers and growers selling to company reported food shortage, and drought could have had an impact in this regard. Fires cause destruction and reduce the quality of timber produced, while fires force households either to harvest their timber immediately after the fire or fell the timber to waste. Households cannot sell burnt timber to the mills, which means that households will fell their timber to waste. When timber is felled to waste, it will not generate any income, resulting in a negative impact on a household's livelihood.

4.6.6 Food as a household expense

Household spending on food is compared in respect of the three respective groups of growers. The aim was to determine what expenses were regarded as important by households. Table 4.17 indicates the number of households that reported food as an important expense incurred in a period of 12 months.

Table 4.17 Natural capital: Food as a household expense. *n* = 60

	Category		
Expense incurred	**GC n=20**	**GT n=20**	**T n=20**
Food	100.0%	100.0%	100.0%

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Table 4.17 demonstrates that all households reported food being an important expense over the past 12 months. This means that all households in all three grower types will spend money on food. As food is essential for human survival, it forms one of the basic needs. It is expected that food will be an important expense for all households.

4.6.7 Consumption patterns of households

A comparison is made of the food consumption patterns of the three types of households. Households with more money will be able to consume certain types of food on a regular basis, while those with little money will turn to the cheaper types of food, or to food that can easily be accessed. Table 4.18 shows the frequency and food consumption patterns of households.

Looking at all the household types, there was no significant difference in the number of households that consumed meat (Table 4.18). A large number of households in all three groups ate meat 1-3 times a week and almost an equal proportion of households in all groups ate meat daily. A total of 30% households in the group of growers selling to timber suppliers ate meat less than 3 times a week, compared to 10% in the growers selling to a company group and 5% in the timber supplier group. Table 4.18 shows that there was no significant difference in the number of times that households consumed rice in all three groups. A large number of households in all three groups reported eating rice 1-3 times a week. The timber supplier group reported a higher figure compared to the other two grower types. A few households reported that they never consumed rice or ate rice only once a year.

Table 4.18 Natural capital: Consumption patterns of households. *n* = 60

Food types	Frequency of consump-tion	Catego-ry GC n=20	GT n=20	T n=20	Chi-square	Df	P
Meat	Every day	20%	15%	20%	6.082	6	0.414
	1-3 times a week	70%	55%	75%			
	Once a month	10%	25%	5%			
	Once a year	0%	5%	0%			
Rice	Never	5%	5%	5%	2.449	8	0.964
	Every day	25%	20%	20%			
	1-3 times a week	50%	50%	65%			
	Once a month	15%	20%	5%			
	Once a year	5%	5%	5%			
Bread	Never	0%	5%	0%	7.000	8	0.537
	Every day	60%	45%	75%			
	1-3 times a week	30%	30%	20%			
	Once a month	10%	15%	5%			
	Once a year	0%	5%	0%			
Porridge	Never	15%	20%	15%	4.278	8	0.831
	Every day	50%	55%	65%			
	1-3 times a week	10%	15%	5%			
	Once a month	20%	10%	15%			
	Once a year	5%	0%	0%	0.645	4	0.958
Vegeta-bles	Never	5%	5%	10%			
	Every day	55%	50%	50%			
	1-3 times a week	40%	45%	40%			
Fruits	Never	5%	10%	5%	7.394	8	0.495
	Every day	55%	55%	40%			
	1-3 times a week	15%	25%	45%			
	Once a month	20%	10%	10%			
	Once a year	5%	0%	0%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.18 shows that amongst all three groups there was no significant difference in the number of times households that consumed bread. The consumption of bread on a daily basis was common in all household types, although the growers selling to company (60%) and timber

suppliers (75%) reported a higher bread consumption compared to growers selling to timber suppliers (45%). Only 5% of the households in the group of growers selling to timber suppliers reported that they never consumed bread at all. Overall, bread is frequently consumed by households in all three types of growers.

There was no significant difference in the number of households that consumed porridge in the respective household types. A large proportion of households ate porridge on a daily basis. Table 4.18 further shows that there was no significant difference in the number of households that consumed vegetables. Large numbers of households in all three groups either ate vegetables every day or 1-3 times a week. The data in Table 4.18 show a regular consumption of vegetables by households in all the grower types.

There was no significant difference in the consumption of fruits by households in all the household types (Table 4.18). A total of 55% of the households in the growers selling to company and growers selling to timber supplier groups reported consuming fruits everyday, compared to 40% of households in the timber supplier group. A total of 45% of the households in the timber supplier group reported consuming fruits 1-3 times a week, in contrast to 25% of households in the growers selling to timber groups and 15% of households in the growers selling to company group. Eighty five percent of households in the timber supplier category, 80% in the growers selling to timber suppliers and 70% in the growers selling to company consumed fruits more often. The purpose of measuring frequency and food consumption is merely to get an indication of households' access to assets and not to measure nutritional intake.

4.6.8 Households that had sufficient food

A comparison is made of the number of months that households had sufficient food to eat. The poorer the household, the more months of food shortage it would have experienced. Households that remain self sufficient for most months are able to sustain their livelihood. Figure 4.5 shows the number of months in which members of all households had sufficient food to eat.

Figure 4.5 shows that 25% of growers selling to company, 25% of timber suppliers and 10% of growers selling to timber suppliers had sufficient food for 12 months. Forty percent of growers selling to company, 30% of timber suppliers and 25% of growers selling to timber suppliers had sufficient food to eat for 11 months. For a period of 10 months 15% of growers selling to company, 20% of timber suppliers and 30% of growers selling to timber suppliers had sufficient food to eat. The lowest number of months that the timber supplier households had enough food was 7 months (15%), while for growers selling to company it was 4 months (10%). Five percent

of households in the growers selling to company group reported that throughout the 12-month period they did not have sufficient food to eat.

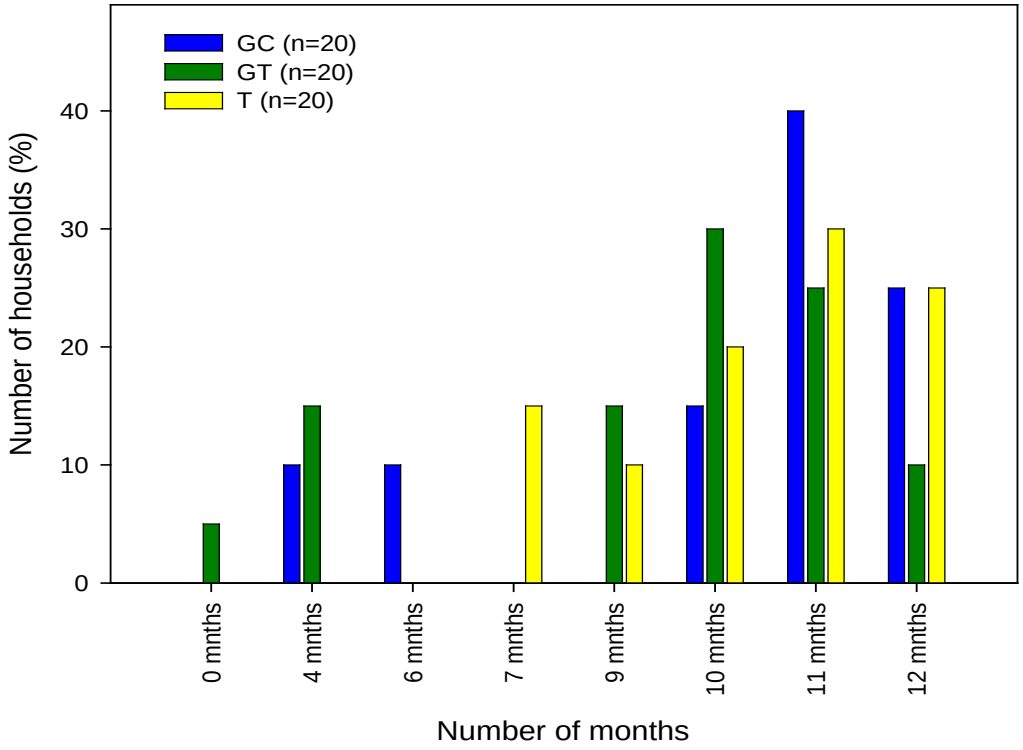

Figure 4.5 Natural capital: Households that had sufficient food to eat. *n = 60*

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Timber suppliers' households had enough food for most months of the year, which could mean better sustainability. Even though the households from growers selling to company had enough food for themselves for most of the months, there were households that reported having enough food for 4 months only. Household in the group of growers selling to timber suppliers had enough food for the majority of households, although some households did not have enough food throughout the year. Not being able to access food can have an impact on the health level and productivity capacity of a household, which again impacts on its livelihood.

4.6.9 Households' food self-sufficiency

A comparison is made between the household types in terms of their self-sufficiency with regard to food. When households are able to provide food (a basic need) for themselves over a large number of months within a specified period, it could indicate that those households are able to

cope, which could again be an indicator of better livelihood. The number of months in which households were self-sufficient with regard to food is shown in Figure 4.6.

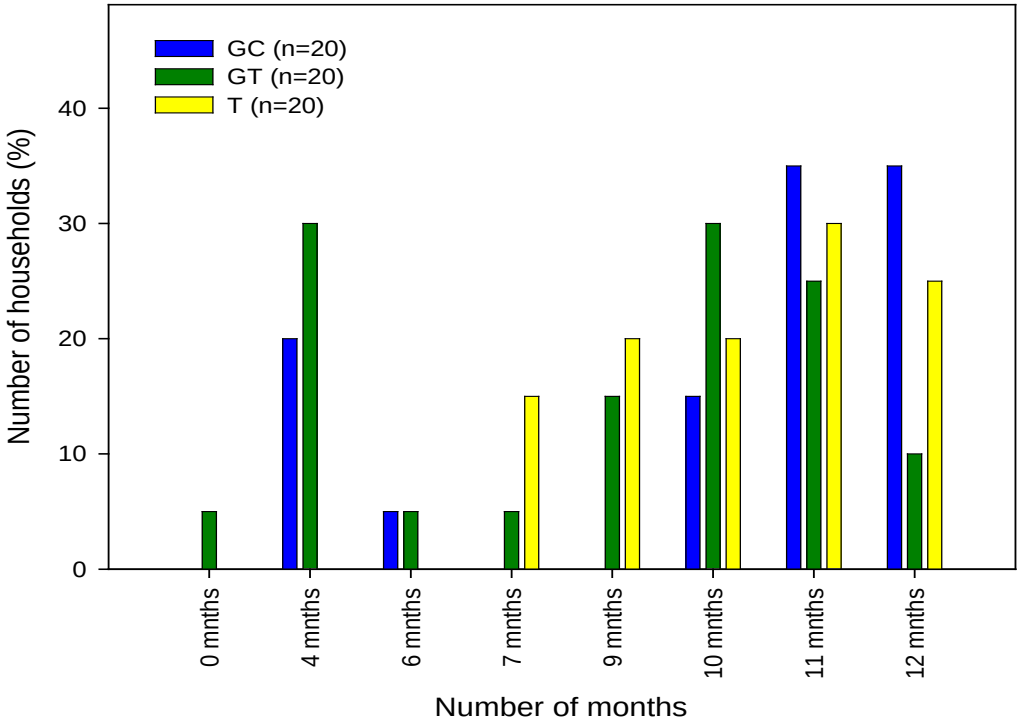

Figure 4.6 Natural capital: Households' food self-sufficiency. *n = 60*

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Households in the group of growers selling to company (35%) reported to have been self-sufficient for 12 months, followed by a total of 25% in the timber supplier group and 10% in the growers selling to timber suppliers (Figure 4.6). Eighty five percent of households in the growers selling to company group were able to provide food for themselves for a period of 10-12 months, followed by 75% in the timber supplier group and 65% in the growers selling to timber suppliers. Households in the growers selling to company group were more self-sufficient in terms of providing food.

4.6.10 Difficult months for obtaining food

A comparison is made of the months in which households from all three grower types found it the most difficult to obtain food. Households that depended on agricultural products for their food indicated that obtaining food might be difficult during the winter months. Households with a diversified income, for example those that did not depend on agriculture, might find it difficult to

obtain food over a smaller number of months or zero months. Figure 4.7 shows the months that households found the most difficult to obtain food.

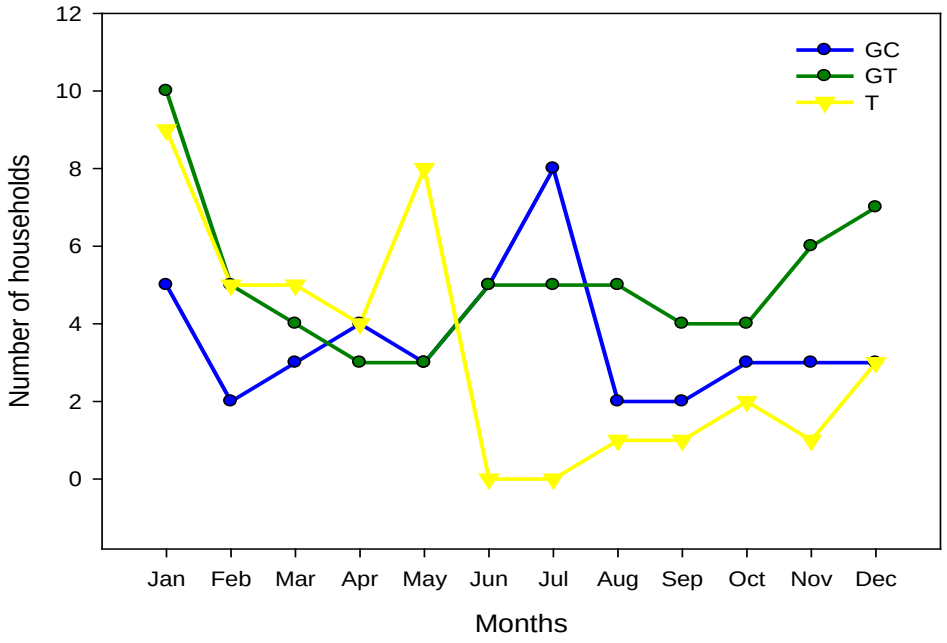

Figure 4.7 Natural capital: Difficult months for obtaining food. *n = 60*

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Figure 4.7 shows that growers selling to company found July (peaking in July) the most difficult months in which to obtain food, while the least difficult months were August and September. The growers selling to timber suppliers found January (peaking in January) the most difficult month in which to obtain food, with April and May being the least difficult months. For the timber suppliers January (peaking in January) was the hardest in which to obtain food, with August, September and November being the least difficult months in that respect. In the timber supplier group zero households indicated June or July as being difficult months.

January was a difficult month for both growers selling to timber suppliers and for timber suppliers in terms of food access, while July was a difficult month for growers selling to company. The reasons for these difficulties would require further investigation and fall beyond the scope of this study.

4.6.11 Number of meals consumed during difficult months

The number of meals consumed by households is compared with regard to all three groups. The inability of households to access and provide food for themselves during a certain point in time

might result in fewer meals being consumed. This inability could be the result of a shock or crises that they had experienced. Table 4.19 shows the number of meals that households could consume during the most difficult months.

Table 4.19 Natural capital: The number of meals consumed during difficult months. *n = 60*

Number of meals	Category GC n=20	GT n=20	T n=20
0	5%		
1	35%	50%	25%
2	35%	35%	25%
3	15%	10%	25%
Same quantity of meals	10%	5%	25%

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Table 4.19 shows that 25% of households in the timber suppliers group did not experience any changes in the quantity of food consumed during the difficult period, compared with 10% in the growers selling to company group and 5% in the growers selling to timber supplier group. Five percent of households in the growers selling to company group indicated that in difficult times they would go to sleep without having anything to eat. Equal numbers of households (35%) in the groups of growers selling to company indicated to be consuming 1 or 2 meals. A larger number of households in the growers selling to timber suppliers (50%) indicated to be consuming only 1 meal during difficult times. Equal numbers of households (25%) in the timber supplier group were consuming 1, 2 or 3 meals.

Households with a better livelihood are still able to consume the same amount of meals even during difficult times, possibly forcing these households to turn to their reserve (savings) during those periods. Households with a reduced livelihood or no savings will have to adjust their eating quantities in order to survive. Households that rely on agricultural products during times of crises such as drought will have less food to eat and hence a smaller number of meals.

4.6.12 Households' access to forestry resources

A comparison is made of the different types of forestry resources that households are able to access. Access to these resources will ensure the sustainability of households involved in timber farming. Households' access to tickets and their permission to supply at the depot play a vital role in the sale of their timber products. Planting seedlings and using fertiliser will ensure maximum site productivity. Table 4.20 shows the frequency of households' access to forestry resources.

Table 4.20 Natural capital: Households' access to forestry resources. *n* = 46

Resource type	Category GC n=20	GT n=6	T n=20	Chi-square	Df	P
Tickets	50%	5%	70%	**18.24**	**2**	**0.000**
Supply at depot	50%	25%	75%	**10**	**2**	**0.007**
Seedlings	5%	10%	20%	2.264	2	0.322
Planting	5%	0%	0%	2.034	2	0.362
Fertiliser	0%	0%	5%	2.034	2	0.362

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and p = significant level

As shown in Table 4.20, there was a significant difference (p=0.000) in the number of households that had access to tickets for supplying timber to the mills. A larger number of households (70%) in the timber supplier group were able to access tickets, followed by growers selling to company (50%) and then growers selling to timber suppliers (5%).

There was a significant difference (p=0.007) in the number of households that supplied timber to the local depot (Table 4.20). Timber suppliers reported the highest access (75%) to the depot, followed by the growers selling to company (50%), while the lowest figure was reported by growers selling to timber suppliers (25%). It is clear from Table 4.20 that households in the timber suppliers and growers selling to company group have better access to means of selling their timber, as they can either sell it at the local depot or deliver it to the mills in Richards Bay. There was no significant difference in the number of households that had access to seedlings, planting assistance and fertiliser. Timber suppliers had better access to seedlings compared to the other two types of growers.

Households' access to tickets and their permission to supply at the depot allow households to earn returns on their timber investment. Being able to obtain tickets and supplying at the depot allows households access to the formal timber market where they can sell their timber products at competitive prices in return for financial capital

4.6.13 Households' views on the financial value of timber farming

A comparison is made of the number of households that reported either yes or no with regard to seeing financial value in timber farming. The aim was to determine the value that households attached to timber farming. Figure 4.8 shows the number of households that responded yes or no to whether they see financial value in timber farming.

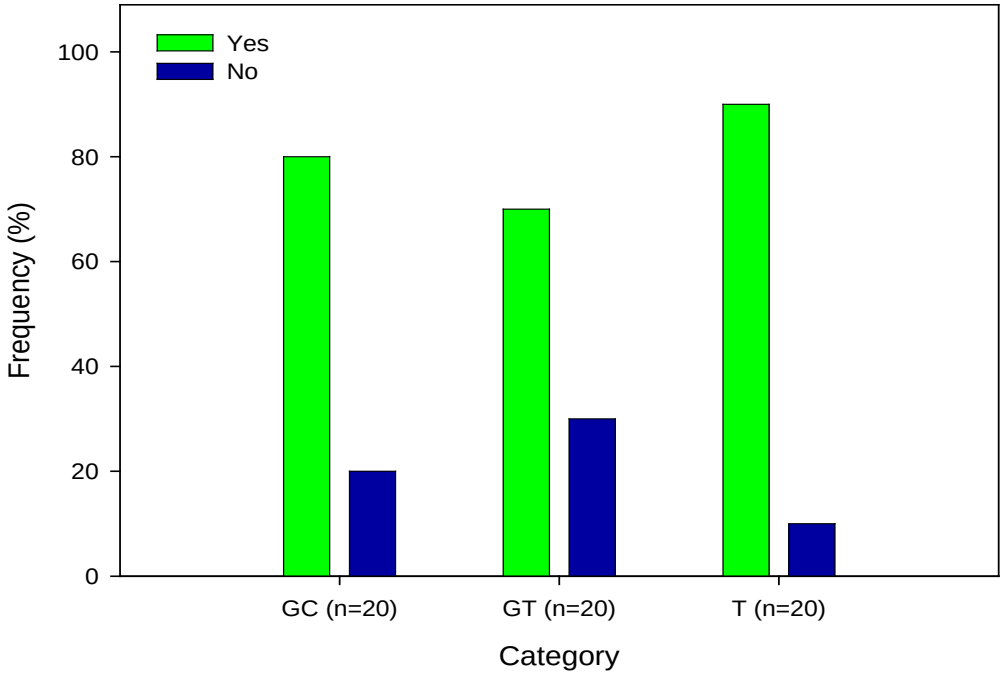

Figure 4.8 Natural capital: Households' views on the financial value of timber farming. *n = 60*
GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

A larger percentage of households reported seeing financial value in timber farming, as shown in Figure 4.8. Growers selling to timber supplier groups had the most number of households (90%) reporting that they did see financial value in timber farming, but growers selling to timber suppliers had fewer such reports (70%). More households in the growers selling to timber suppliers (30%) did not see financial value in timber farming when compared to the other household types.

Timber farming plays a significant role in the lives of households involved in this type of enterprise at Sokhulu. This is borne out by the high value that households attach to this farming practice. The high number of households in the group of growers selling to timber suppliers reporting not to see value in timber farming could be due to these households' poor access to forestry resources.

4.6.14 Households living from timber farming

Households that indicated yes and no to living from timber farming are compared. The aim was to determine, from the households' perspective, whether they saw timber farming as enabling

them to sustain their livelihood. Figure 4.9 shows the number of households that responded yes and no to the question whether they could live from timber farming alone.

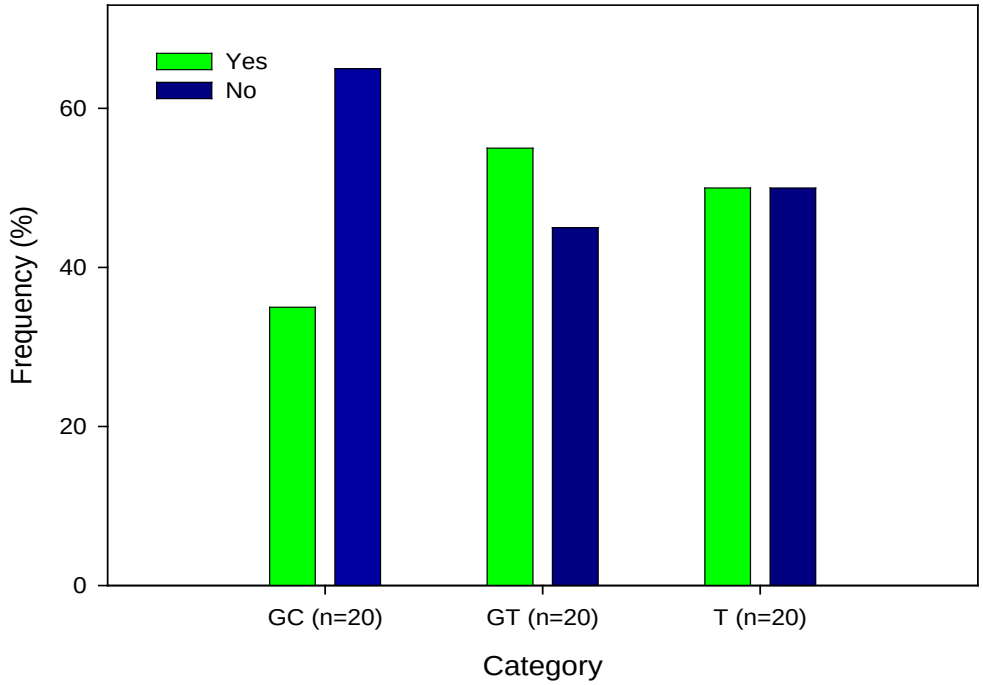

Figure 4.9 Natural capital: Households living from timber farming. *n = 60*

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Figure 4.9 shows that 50% of households in the timber supplier group reported that households could live from timber farming alone, and another 50% said that households could not do so. The number of households that answered positively was slightly higher (55%) than those households among growers selling to a timber supplier groups that said no (45%). Sixty five percent of households in the group of growers selling to the company said households could not live from timber farming only, and fewer of those households (35%) reported that it was indeed possible. Overall most respondents reported that households could not live from timber farming only. In total, when all three types are combined, 160% of households indicated that they could not live from timber farming only. This implies that the perceptions of most households were that they will not be able to sustain their livelihood from timber farming alone, which implies that there is a need for households to diversify their income.

4.6.15 Households' views on the area planted to trees being expanded

Households' responses to the possible expansion of the area planted to trees at Sokhulu are compared. This was to determine whether households saw the potential of timber farming adding more value to their lives if there was an opportunity to expand their farming. Figure 4.10 shows the number of households that responded yes and no to the expansion of the area planted to forestry trees at Sokhulu.

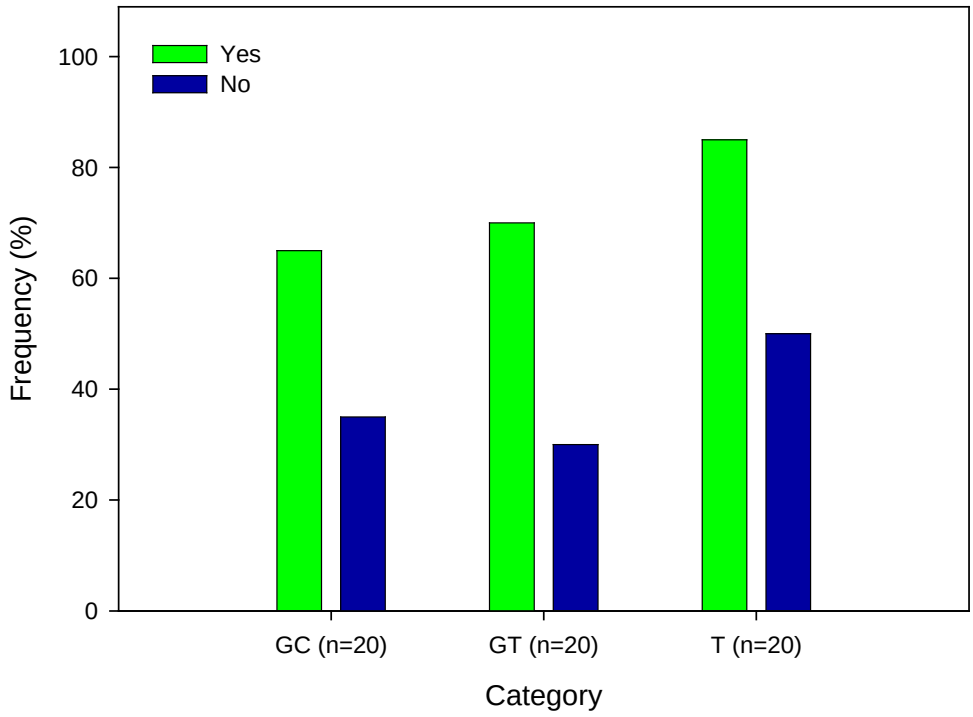

Figure 4.10 Natural capital: Households' views on the area planted to trees being expanded. *n* = 60. GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

In each group a larger percentage of households were of the opinion that more trees should be planted than those that disagreed, as can be seen in Figure 4.10. A higher number (85%) of households in the timber suppliers group indicated yes to the area being expanded, while 70% of the growers selling to timber suppliers and 65% of growers selling to company also responded yes. The higher number of positive responses to the area being increased shows that timber farming plays a significant role in the lives of households, and that households are willing to invest more in this type of farming. Natural capital, like all other capitals, requires financial capital to show significance.

4.7 Financial capital

At the same time, financial capital is essential for people to obtain their livelihood objectives (Ali *et al*., 2007:589), and this includes savings and income (Department for International Development, 1999a:15; De Sherbinini *et al*., 2008:40). This is a significant livelihood building block (it provides cash) that enables people to engage in different livelihood strategies. To the poor, financial capital will be the least available asset (Department for International Development, 1999a:15).

4.7.1 Household income and per capita income

A comparison is drawn between the total monthly income and per capita income of the three grower types. Household income will determine the livelihood of the households and whether households live above or below the poverty line. Household income can be used to build other assets. Table 4.21 shows the medians of the total household income per month and the per capita income (the total income divided by number of persons in the households) for all the categories of respondents (growers selling to company, growers selling to timber suppliers, and timber suppliers) combined. The total is the mean income of all types of households together. The cases are treated as one sample, instead of sub-dividing them into three household types.

Table 4.21 Financial capital: Household income and per capita income. *n = 60*

Category of respondent (Median)	Category GC (n=20)	GT (n=20)	T (n=20)	Total (n=60)
Total income	3700.00	3455.00	13405.00	5975.35
Per capita income	649.00	621.17	2141.00	949.70

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the category of respondents combined. Per capita income is the total income divided by number of persons in the households.

As shown in Table 4.21, the income earned by households was higher in the timber supplier group than for growers selling to company group, and the least for growers selling to timber supplier groups. The total income for all three household types was lower than that received by the timber suppliers, but higher than the total for growers selling to a company group. Households in the timber supplier group showed a high per capita income, while it was almost the same for the growers selling to company and the timber supplier category. The per capita income for all categories of respondents combined was higher than for the growers selling to company and growers selling to timber suppliers, but lower than for the timber supplier category. Table 4.21 shows that households in the timber supplier group earned a higher income compared

to the other grower types. Households in the timber supplier group will be able to create better livelihoods than growers selling to company and those selling to timber suppliers.

4.7.2 Household income in percentages

Other forms of monthly household income were compared with income earned from timber farming in the case of all three grower types. This was to determine what forms of income households obtained other than their income from timber farming, and how it related or compared to timber farming. Table 4.22 shows the level of contribution derived from other particular fields of income (per month) in relation to timber farming.

Table 4.22 Financial capital: Household income in relation to timber farming in percentage. *n* = 60

	Category					
	GC	**GT**	**T**	**Chi-**		
Form of income	**n=20**	**n=20**	**n=20**	**square**	**Df**	**P**
Full-time employment	10%	35%	30%	0.335	2	0.846
Part-time / seasonal employment	25%	30%	5%	0.285	2	0.867
Pension	60%	45%	40%	3.503	2	0.174
Government grants	50%	40%	20%	0.391	2	0.823
Donations	0%	10%	0%			
Income from selling, trading	5%	0%	20%	0.132	1	0.717
Timber farming	65%	65%	95%	**18.675**	**2**	**0.000**
Other	5%	10%	20%	2.308	2	0.315

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.22 shows that there was no significant difference in the number of households that received income from full-time employment, part-time or seasonal employment, pension, government grants, income from selling and other means. A larger proportion of households from the growers selling to timber suppliers group (35%) received income from full-time employment compared to the timber suppliers (30%) and growers selling to company (10%) groups. A few households received income from part-time and seasonal employment, but growers selling to timber suppliers reported a higher figure (30%) in this regard when compared to the other grower groups. The majority of households in all three groups received income from pension (P=0.174). A higher number of households in the growers selling to company (50%) and of the growers selling to timber suppliers (40%) received income from government grants (P=0.823). Twenty percent of households from the timber supplier group received income from trading, compared to 5% in the growers selling to company group and 0% in the growers selling to timber suppliers. A total of 20% of households in the timber supplier group, 10% in the growers selling to timber

suppliers and 5% in the growers selling to company reported receiving income from other sources. A total of 10% of the households from the growers selling to timber supplier group reported receiving income from donations.

There was a significant difference (P=0.000) in the number of households that received income from timber farming. A large proportion of households in the timber supplier group (95%) received income from timber farming, compared to the groups of growers selling to company (65%) and growers selling to timber suppliers (65%). This is the case because timber suppliers are involved in timber farming as a permanent means of employment. The timber supplier households received most of their income from timber farming. This specific income is not only limited to felling their own plot, as they also buy timber plots from other growers, apart from felling for other growers and transporting timber.

4.7.3 Median values of household income

A comparison is made of the median values of households' monthly income from timber farming to determine how it compares with other forms of income received by the three respective grower types. Table 4.22 shows the median values of the contribution of other forms of monthly income in relation to timber farming for all the household types and for all household groups combined.

Table 4.23 Financial capital: Median values of other forms of household income in relation to income earned from timber farming. *n = 60*

Category of respondent	**Category**			
	GC (n=20)	**GT (n=20)**	**T (n=20)**	**Total (n=60)**
Full- time employment	7000.00	7000.00	6000.00	6000.00
Part- time / seasonal employment	2000.00	2000.00	1500.00	1900.00
Pension	950.00	950.00	950.00	950.00
Government grants	710.00	610.00	480.00	600.00
Donations	0	400.00	0	400.00
Income from selling, trading	4000.00	0	3750.00	4000.00
Timber farming	3600.00	667.00	9500.00	3600.00
Other	700.00	800.00	4250.00	900.00

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the categories of respondents combined

Income received by the households from full-time employment was the highest among the growers selling to company group, followed by income from trading and then income from timber farming (Table 4.22). Income from full-time employment was again the highest for households of growers selling to timber suppliers, followed by income from part-time or seasonal employment and lastly pension income. Income from timber farming appeared fifth in the ranking of growers

selling to timber supplier groups. In the timber supplier group the highest income was earned from timber farming, followed by full-time employment, while other forms of income were the third highest. From Table 4.22 it is evident that the timber supplier group earned a large amount of income from timber farming.

In terms of all respondents there was little variation in the income earned from full-time employment, part-time or seasonal employment, pension funds and trading. The income from government grants for both the growers selling to company and those selling to the timber suppliers was higher than the total for all household types, but lower than the for the timber supplier group. There was a marked variation in the income that the timber supplier group received from other sources when compared to growers selling to company and those selling to timber suppliers. This was also higher than the total for the different households combined.

For the timber supplier the household income from timber farming will play a significant role in the household's livelihood, as it proved to be the household's highest source of income. For the growers selling to company and those selling to timber suppliers the income from full-time employment was higher and could play a significant role in these households' livelihoods.

4.7.4 Households' payment for the use of forest and forestry services

The percentage of households that pay for the use of forest and forestry services are compared with regard to the three household types. The purpose was to determine if households were paying for the forest and forestry services that they were utilising. The number and percentage of households that pay for the forest and forestry services that they utilise are shown in Figure 4.11.

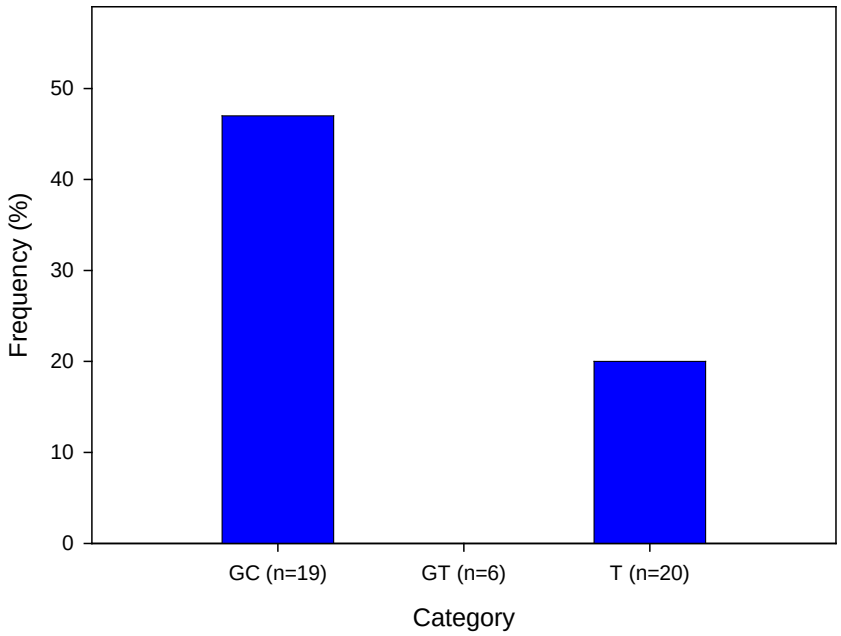

Figure 4.11 Financial capital: The number and percentage of households that pay for the forest and forestry services utilised. GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

Households in the growers selling to company group (47%) have the highest numbers paying for the use of forestry services. Twenty percent of timber suppliers were paying to use this service (Figure 4.11). There was a significant difference (p=0.041) among the three grower types as to the number of households that pay for the forest and forestry services utilised. Payment for the use of services included households paying for using other growers' tickets and paying to obtain a letter of permission from the tribal authority.

4.7.5 Income intervals from timber sales

A comparison is made as to at what intervals households were earning income from the sale of their timber. Households could fell their timber early to expedite their income, but the income received at this stage would be less than when they felled their timber later. The percentage of intervals at which households earned income from selling timber is shown in Table 4.24.

Table 4.24 Financial capital: Income intervals from timber sales. *n* = 59

Income interval (yrs)	Category GC (n=20)	GT (n=20)	T (n=19)	Chi-square	Df	P
3	10%	5%	6%	6.51	10	0.771
4	20%	40%	33%			
4.5	10%	5%	6%			
5	15%	30%	28%			
6	35%	10%	17%			
7	10%	10%	11%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

There was no significant difference (P=0.771) in terms of the intervals at which households earned income from the sale of their timber (Table 4.24). At any given interval the highest number of households in the group of growers selling to timber suppliers (40%) reported earning an income at 4-year interval. Households in the group of growers selling to company (35%) reported earning an income at 6-year intervals, while households in the timber supplier group (30%) earned an income at 4-year intervals. However, no patterns emerged at any specific interval and earnings are mostly spread over any given interval.

4.7.6 Most recent harvesting figures

A comparison is made of the tree felling interval, estimated production costs, revenues from timber farming, tonnage received at last harvest, proportion sold from the received tonnage, quantity of the harvest used in the household and the amount earned from the proportion sold. The purpose is to determine which household type had the highest returns from the sale of their timber. Table 4.25 shows the median values of the intervals of felling, estimated production costs of last harvest, tonnage received from last harvest, tonnage sold at last harvest, quantity of timber used in the household and the amount earned by households in the respondent categories. Revenues from timber farming shows the amount earned from the proportion sold, less the estimated production costs (the figures in the table might not balance, because the median and not the mean amount was used, for example in the case of growers selling to company).

Table 4.25 Financial capital: Most recent harvesting figures. *n = 60*

Category of respondent	Category GC (n=20)	GT (n=20)	T (n=20)	Total (n=60)
Tree felling intervals (years)	4.75	4.25	5.00	4.50
Estimated production costs of last production (Rands)	13975.00	0.00	5400.00	3200.00
Revenues from timber farming (Rands)	15375.00	8000.00	16110.00	10800.00
Tonnage received at the last harvest	60.00	70.00	50.00	51.50
Proportion of the harvested tonnage that was sold	60.00	70.00	50.00	51.50
Quantity of the harvest that was used in the household	0.00	0.00	0.00	0.00
Amount earned from the proportion sold (Rands)	27500.00	8000.00	18000.00	15000.00

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the category of respondents combined

The tree felling intervals (in years) were almost the same for all three household types (Table 4.25). The production costs incurred by households in the growers selling to company group were higher than the costs incurred by those in the timber supplier group. The total estimated production costs for all three categories combined were lower than the production costs of the two household groups that reported to have incurred costs. The growers selling to timber suppliers incurred zero production costs as they sold their timber standing (there were no harvesting or transport costs) to the timber suppliers; all costs were incurred by the timber supplier. The highest revenue from timber farming was earned by the timber supplier group (median=R 16110), followed by the growers selling to company group (median=R 15375), and lastly the growers selling to timber suppliers (median=R 8000). The total income from timber farming for all households was only higher than the income of the growers selling to timber suppliers. Growers selling to timber suppliers received the biggest median tonnage from harvest, followed by the growers selling to company and lastly the timber supplier group. The total median tonnage received at harvest for all the household combinations was higher than that of the timber suppliers, but lower than that of the growers selling to company and growers selling to timber suppliers. From Table 4.25 it is demonstrated that households sold all the tonnage that they had harvested and no timber was used in the household. The amount earned from the sale of timber was the highest for growers selling to company group (median=27500), followed by the timber supplier group (median=18000) and lastly the growers selling to timber suppliers (median=8000). The total amount for all the households in all three groups combined was higher than for the growers selling to timber suppliers, but lower than the growers selling to company and timber suppliers. The revenue received from timber farming was higher in the timber supplier group, which is due to the high production costs incurred by the growers selling to company group.

The timber supplier group seems to be making more money from the sale of timber from their plots and they have reduced production costs. Their reduction in production costs is due to the fact that most of the timber suppliers use their own equipment for felling and transporting their timber. The higher revenues from timber farming will play a significant role in improving households' livelihood.

4.7.7 Households' earnings from crop sales

The income that households generate from the sale of their agricultural crops is compared. The aim is to determine the revenues that households obtain from crop sales. Table 4.26 shows the number and percentage of revenues earned by households that sold bananas, sugar cane, *amadumbe*, mealies, cabbage, spinach and other produce over the past year.

Table 4.26 shows all households that sold sugar cane, indicating that the growers selling to company earned an income of R5000-5999. Fifty percent of households that reported growing sugar cane in the growers selling to timber supplier group received revenues of R5000-5999 and the other 50% reported revenues of R9000-9999. 50% of households in the timber supplier group earned an income of R7000-7999 and another 50% earned an income of R 12000 and above.

As shown in Table 4.26, the most common income band was from the sale of *amadumbe.* The income of growers selling to company group was R0-999 and only one household reported receiving R1000-1999. Sixty percent of households in the growers selling to timber supplier group earned an income of R0-999 from *amadumbe* sales and the other 40% earned R1000-1999 and R2000-2999 respectively. Households in the timber supplier group earned an income ranging from R0-999 and R5000-5999 from selling *amadumbe*.

Most households reported receiving revenues of R0-999 from the sale of mealies and cabbage in all three household types. Revenue of R0-999 was received by a household that sold its spinach in the growers selling to company group. The one household that sold spinach in the grower selling to company group earned an income of R0-999 and the other earned an income of R1000-1999. Households that sold other produce in the growers selling to company group received revenues of R0-999, while the timber supplier group earned R 2000-2999 from their sales.

Table 4.26 Financial capital: Households' earnings from crop sales

		Category					
Agric crop	**Revenue**	**GC(n=2)**	**GT(n=2)**	**T(n=2)**	**Chi-square**	**Df**	**P**
Banana	R0 - R999	50%	50%	100%	1.5	2	0.472
	R1000 - R1999	50%	50%	0%			
		GC(n=2)	**GT(n=2)**	**T(n=2)**			
Sugar cane	R5000 - R5999	100%	50%	0%	8	6	0.238
	R7000 - R7999	0%	0%	50%			
	R9000 - R9999	0%	50%	0%			
	R12000 and above	0%	0%	50%			
		GC(n=5)	**GT(n=5)**	**T(n=2)**			
Amadumbe	R0 - R999	80%	60%	50%	7.05	6	0.316
	R1000 - R1999	20%	20%	0%			
	R2000 - R2999	0%	20%	0%			
	R3000 - R3999	0%	0%	50%			
		GC(n=1)	**GT(n=2)**	**T(n=1)**			
Mealies	R0 - R999	100%	50%	100%	1.333	2	0.513
	R1000 - R1999	0%	50%	0%			
		GC(n=2)	**GT(n=2)**	**T(n=1)**			
Cabbage	R0 - R999	100%	50%	100%	1.875	2	0.392
	R1000 - R1999	0%	50%	0%			
		GC(n=1)	**GT(n=2)**	**T(n=0)**			
Spinach	R0 - R999	100%	50%		0.75	1	0.386
	R1000 - R1999	0%	50%				
		GC(n=2)	**GT(n=0)**	**T(n=1)**			
Other	R0 - R999	100%		0%	3	1	0.830
	R2000 - R2999	0%		100%			

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

Table 4.26 illustrates that there was no significant difference in the revenues that households earned from the sale of bananas, sugar cane, *amadumbe*, mealies, cabbage, spinach and other agricultural produce over the past year. Households in the timber supplier group that reported selling their bananas received revenues from R 0-999 and above. Half of the households in both

the growers selling to company and those selling to timber supplier group reported that selling their bananas at harvest earned them revenues of R1000-1999.

Earnings that households generated from agricultural crop production will play a significant role in their livelihood. This income is important, because agricultural farming yields faster returns than timber farming. Agricultural returns can be annual and timber returns will take a number of years, ranging from three to seven years before they are realised.

4.7.8 Proportion of agricultural crops sold

A comparison is made of the percentage of the agricultural crops sold by households, as they have indicated. The purpose is to determine how much agricultural produce households managed to sell out of the total agricultural harvest. Table 4.27 shows the medians of the proportion of the agricultural crop harvested (in percentages) that households managed to sell in terms of all three groups.

Table 4.27 Financial capital: Proportion of agricultural crops sold. *n = 17*

	Category			
Category of respondent	**GC (n=8)**	**GT (n=5)**	**T (n=4)**	**Total (n=17)**
Median	65.00%	70.00%	75.00%	70.00%

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the categories of respondents combined

A large proportion of the agricultural crop was sold by households in all three grower types (Table 4.27). Households in the timber supplier group (median=75%) sold most of their agricultural crop, followed by the growers selling to timber suppliers (median=70%) and growers selling to company (median=65%). The percentage of the harvest that was sold by growers in the timber supplier group was higher than that of all three groups combined. The percentage that was sold by the growers selling to timber suppliers was equal to the total for all the household types, while the percentage for the growers selling to company was lower than the total. If households manage to sell the products yielded by agricultural crop farming, they add to the income of the household, which would in turn improve their livelihood.

4.7.9 Household spending

Household spending on food, medicines, doctors' fees, fees for traditional healers, hospitals, school fees, school uniforms, other school expenses, clothes, vehicles, vehicle maintenance,

petrol or diesel, public transport and other goods in the past 12 months is compared using median values for the three grower types. This is compared to determine the spending patterns of the respective households. Household spending is shown in Table 4.28.

Table 4.28 Financial capital: Household spending. *n = 60*

Expense type	Category GC (n=20)	GT (n=20)	T (n=20)	Total (n=60)
Food	13200.00	12000.00	18000.00	15000.00
Medicines	1680.00	1050.00	1000.00	1200.00
Doctors' fees	1680.00	1125.00	3180.00	1680.00
Fees for traditional healers	600.00	920.00	2400.00	700.00
Hospital	240.00	240.00	20.00	240.00
School fees	250.00	800.00	3350.00	600.00
School uniforms	925.00	1000.00	2000.00	1000.00
Other school expenses	500.00	875.00	1800.00	875.00
Clothes	6000.00	4500.00	4000.00	5500.00
Vehicle	400.00	104400.00	96000.00	88200.00
Vehicle maintenance	7000.00	7000.00	15000.00	8000.00
Petrol / diesel	18000.00	95000.00	41000.00	24000.00
Public transport	1800.00	1440.00	2100.00	1800.00
Other	11000.00	5750.00	12000.00	7000.00

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the category of respondents combined

Households in the timber supplier group were spending most of their income on food in the past 12 months, followed by households in the growers selling to company group and households in the growers selling to timber supplier group (Table 4.28). Spending on food with regard to households in the growers selling to company and growers selling to timber suppliers was lower than the total spending for the three categories, but the figure for the timber supplier group was higher than the total. Households in the growers selling to company group were spending more on medicines compared to the other groups. Growers selling to company showed a higher expenditure on medicines in the past 12 months when compared to the total spending for the categories combined. In this regard, figures for both the growers selling to timber suppliers and for the timber suppliers themselves were lower than the total. Spending on doctors' fees was very high in the timber supplier group, followed by the growers selling to company group and growers selling to timber suppliers. Table 4.28 shows a higher amount spent by the timber supplier group than the total for all the categories on doctors' fees, while spending by growers selling to company was equal to the total, and growers selling to timber suppliers spent less than the total. Households in the timber suppliers group spent more on fees for traditional healers, compared to the other two groups. Growers selling to company and growers selling to timber suppliers were equal (median=240) in their spending on hospital fees, which in turn was equal to

the total for all the categories combined. Timber suppliers spent less on hospital fees than the total for all groups.

Table 4.28 demonstrates that the timber supplier group was spending much more on school fees in the past 12 months, followed by the growers selling to timber supplier, with the growers selling to company spending the least. The figures for both growers selling to timber suppliers and for the timber suppliers themselves were higher than the total for all three household groups, but the figures for growers selling to company were lower than the total. Timber supplier group households were spending almost double on school uniforms for the past 12 months when compared to each of the other two groups. Total spending on school uniforms by households in all the categories was higher than spending by growers selling to company and equal to that of growers selling to timber suppliers, but lower than that of the timber supplier group. The figures for spending on other school expenses were higher in the timber supplier group (median=1800) compared to the growers selling to timber suppliers (median=875) and growers selling to company (median=500). The timber supplier group's spending on other school expenses was higher compared to the spending of all three groups. Overall, households in the timber supplier group appeared to have spent more on school expenses in the past 12 months.

Table 4.28 further shows that households in the growers selling to company group were spending more on clothes, followed by the growers selling to timber supplier, and lastly the timber supplier group. Total spending for all three household types combined exceeded that of the growers selling to timber and the timber supplier group, but it was lower than that of growers selling to company. Spending on vehicle costs was high for both the growers selling to timber suppliers and the timber supplier household group, both of them spending more than the total for all the households combined. Spending on vehicles in the past 12 months was very low in the case of growers selling to company compared to the other two groups, and far lower than the total for all the households. Timber suppliers use transport means such as trucks and tractors for their timber farming businesses. The high spending figure on vehicle costs incurred by households from growers selling to timber suppliers was based on the spending of one household that owned a taxi.

Spending on vehicle maintenance was high for the timber supplier household group, while the other two groups spent equal amounts on vehicle maintenance in the past 12 months. The median for the three households combined was higher than that of the growers selling to company and growers selling to timber suppliers, but lower than the median for vehicle maintenance amongst timber suppliers on. Table 4.28 shows high spending figures on petrol and diesel for growers selling to timber suppliers on, followed by the timber suppliers, with the least

spent by growers selling to company. Spending on petrol and diesel by growers selling to timber suppliers and by timber suppliers themselves exceeded the total spending of all the categories combined, but figures for growers selling to company were lower than the total.

The timber supplier group spent more on public transport, followed by the growers selling to company and growers selling to timber suppliers. The total spending on public transport by all households was lower than the spending figures for timber suppliers, equalling the spending of growers selling to company, but exceeding that of growers selling to timber suppliers. The amount that households spent on other expenses in the past 12 months was higher for the timber suppliers and for growers selling to timber supplies groups, both amounts being higher than the total for all categories.

How households spend their money will determine the households' lifestyles and their future livelihood. Due to the higher standard deviation, the medians and not the means were used.

4.7.10 Savings by households

A comparison is made of the percentage of households that save some of their earnings. This is to determine whether households are saving some of their income, and also the ways in which it is done. When households are able to save, they do not need to rely on others during difficult times, as they will turn to their savings. Table 4.29 shows the percentage of households that have savings, their types of savings, as well as those who had used their savings over the past 12 months.

Table 4.29 Financial capital: Savings by households.

		Category				
Savings	**GC(n=20)**	**GT(n=20)**	**T(n=20)**	**Chi-square**	**Df**	**P**
Households that have savings	55%	30%	55%	3.348	2	0.187
		Category				
Types of savings	**GC(n=11)**	**GT(n=6)**	**T(n=11)**			
Alone	91%	100%	91%	3.133	4	0.536
Group	9%	0%	0%			
Scheme	0%	0%	9%			
Used savings	80%	33%	64%	3.506	2	0.173

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers, Df = degrees of freedom and P = significant level

In respect of all three household types there was no significant difference in the savings, the types of saving and whether the savings had been used in the past 12 months (Table 4.29). Table 4.29 shows that a larger proportion (55%) of households among the growers selling to company and the timber suppliers (55%) had more savings than the households of growers selling to timber suppliers (30%). Of the households in the group of growers selling to company and the group of timber suppliers that reported to be saving some of their income, 90.9% indicated that they had personal savings (keeping their money in a separate bank account). Only 9.1% households in the growers selling to company group reported to be saving as a group (having opened a joint account with others) and 9.1% in the timber supplier group reported to be saving as members of a scheme (having opened a joint account with other sugar cane growers). The majority of households that were saving in the growers selling to company group (80%) and the timber supplier group (64%) reported to have used their savings over the past 12 months (Table 4.29). Savings assisted households by cushioning them against the crises experienced in the past 12 months, thus minimising its impact on their livelihood. The median value of the portion of saved income used by households is shown in Table 4.30.

Table 4.30 Financial capital: The median values of the amounts used by the categories of respondents from their savings in the past 12 months. *n = 60*

Savings	**Category**			
	GC (n=20)	**GT (n=20)**	**T (n=20)**	**Total (n=60)**
Amount used from savings	10000.00	2500.00	12000.00	9000.00

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the category of respondents combined

Table 4.30 demonstrates that some households in all three groups used their savings in the past 12 months. The timber supplier group shows a higher figure for savings that had been used, followed by the growers selling to company, with the growers selling to timber suppliers using the smallest amount. The total amount used from savings for all three household types combined was lower than that of the growers selling to company and that of timber suppliers, but higher than that of the growers selling to timber suppliers. The amount used from the savings also depended on the amount that had been saved.

4.7.11 Household credit

The three grower types were also compared in respect of the percentage of households that obtained credit in the past 12 months. The aim was to determine whether households were able

to obtain credit to sustain their livelihood in the absence of available cash. Figure 4.12 shows the number and percentage of households that obtained credit in the past 12 months.

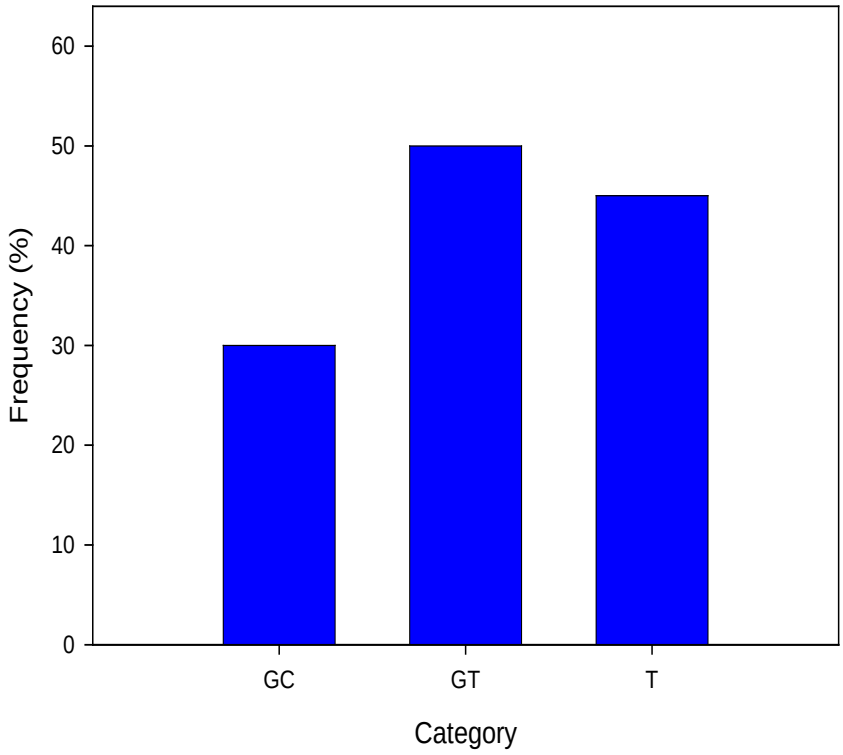

Figure 4.12 Financial capital: The number and percentage of households that had obtained credit in the past 12 months. *n* = 60

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

There was no significant difference in the number of households from all three household types that had obtained credit in the past 12 months. Groups of growers selling to timber suppliers showed the highest figures for obtaining credit, namely 50% of their households, followed by timber suppliers (45%) and a lesser proportion of households (30%) from growers selling to a company group (Figure 4.12).

Households' access to credit enables them to survive in times when households do not have the necessary financial resources. Access to credit has enabled households to procure the equipment needed for activities that generated income. The median of the time span related to credit obtained by households in terms of months, as well as to the lending rate at which credit was obtained. This appears in Table 4.31 as percentages for all categories of respondents.

Table 4.31 Median length and rate of credit. *n = 60*

Credit	Category GC (n=20)	GT (n=20)	T (n=20)	Total (n=60)
Length (months)	2.00	6.50	36.00	6.00
Rate (%)	5.00	23.00	12.00	12.00

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers and Total = all the categories of respondents combined

Households in the timber supplier group had the longest period of credit, as shown in Table 4.31. The period of credit for both the growers selling to company and growers selling to timber suppliers was short when compared to the timber supplier group. The period of credit for the growers selling to company was lower than the total for all three household groups combined. The rate that the households obtained in the growers selling to timber supplier group was very high when compared to the rate obtained by households in the timber supplier group and the growers selling to company. The rate enjoyed by the timber supplier group was equal to the total for all categories. Growers selling to timber suppliers received a higher rate than the total for all categories, while the growers selling to company received a lower rate. Higher credit rating can have a negative impact on households' livelihoods when a large portion of income earned is used to pay for credit, leaving households with little money to maintain their livelihood.

4.7.12 Households' exposure to financial crises

A comparison is made of the percentage of households indicating that they had faced financial crises in the last 12 months. The purpose is to determine the scope of household exposure to financial shock. Financial capital was measured by asking households if they had experienced financial crises in the last 12 months. Figure 4.13 shows the frequency and percentage of households that were faced with financial crises over the past 12 months. Figure 4.13 demonstrates that there was no significant difference in the number of households that had faced financial crises. A higher number of households in the three grower types had experienced financial crises.

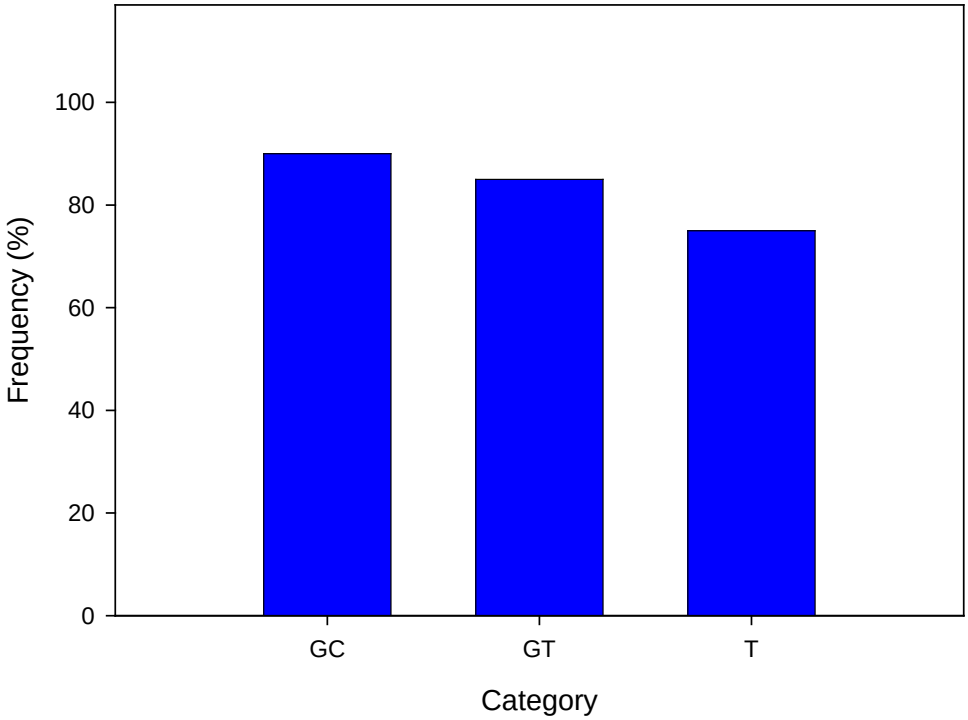

Figure 4.13 Financial capital: Households' exposure to financial crises. *n* = 60

GC = growers selling to company, GT = growers selling to timber suppliers and T = timber suppliers

From Figure 4.13 it is evident that households in the group of growers selling to company and the group selling to timber suppliers were more exposed to financial crises when compared to the timber supplier group. Households' exposure to financial crises is likely to impact on all the other capital groups; for example, if households do not have money, they cannot send their children to school.

4.8 Summary

This chapter has reported the results of the study based on the Sustainable Livelihood Framework. The details of each of the capitals provided in this chapter made it difficult to draw a comparison between the three types. However, it does appear that the timber supplier group shows the most sustainable livelihood, while the group of growers selling to timber suppliers shows the least sustainable livelihood. This can, however, only be confirmed once the discussion presented in the next chapter is concluded. The different grower groups are compared in terms of the five asset-related capitals. Sustainable livelihood pentagons offer a graphical representation for each of the three groups, thereby facilitating the comparison between each one of the groups regarding the five asset capitals.

CHAPTER 5: DISCUSSION

5.1 Introduction

The first objective of this study was to examine the livelihood levels of growers selling to company, growers selling to timber suppliers, and timber suppliers themselves. The second objective was to determine the benefits enjoyed by growers and timber suppliers who participated in small-scale timber farming. The last objective was to determine households' perceptions of small-scale timber farming. The status of the household livelihood of three grower types at Sokhulu has been assessed according to the Sustainable Livelihood Framework. This was achieved by looking at the five types of livelihood capital (assets), namely human, social, natural, physical and financial capital. This chapter presents a discussion on households' livelihoods and the aim of the chapter is to relate the results to the objectives and conceptual framework. Each capital section ends with a table showing scores of the selected capital indicators.

5.2 Scoring capital indicators

The scores from the selected indicators were used to draw up the asset pentagon (paragraph 5.8). The scores for the asset pentagons have been calculated as follows: The number of households that had access to each capital was calculated for each of the household types. If 0-6 households had access to a certain capital within a household type a score of 0 (zero) was assigned to indicate low access to that particular capital. For example, zero households in the growers selling to timber suppliers category reported being members of a forestry committee and therefore scored 0 (zero) for this capital.

If the number of households that had access to a capital ranged between 7-13 for a grower type, a score of 1 indicated medium access to that capital; similarly, 14-20 households scoring 2 indicated high access. Each selected asset in all five capital groups was evaluated using this scale. The revenues from timber farming were determined by dividing each sum by 1000 and scoring according to the scale above. The proportion of the agriculture crop that households managed to sell has been evaluated by using a percentage, as this is the unit it was measured in, with the scale for this indicator being 0 to 100%. A value of 0% will indicate low sales, and 100% very high sales of agricultural crops. The scale for this indicator is as follows: 0%-30% shows low sales and the score is 0; 31%-65% shows medium sales and the score is 1; while 66%-100% shows high sales and the score is 2. The number of indicators per capital group was multiplied by 2, which is the highest possible value (score) and the percentage score was obtained. For example, there are 10 selected indicators in the human capital, and these multiplied by 2 will give

20. For the growers selling to company group, 13 (total score) divided by 20 equals 65%. The results based on the five capitals are discussed below.

5.3 Human capital

The human capital of the three households is discussed and compared. Human capital is looked at in terms of household demographics, education, employment, income-earning activities, sale of timber in the household, health status of households and expenditure patterns of households. The section concludes with the selected asset composition and table for human capital.

5.3.1 Household demographics

Household demographics refer to the composition of the households. This category will show the quantity and the quality of labour likely to be available in the household, considering the size of the household and the age of household members.

(i) Household demographics: growers selling to forestry companies

The size of households was higher in the group of growers selling to company than among the growers selling to timber suppliers, but lower than in the timber supplier group. There were more adult females than males in the growers selling to company group and most female heads of the household were either pensioners or close to pension age.

(ii) Household demographics: growers selling to timber suppliers

The total number of members of the households in the growers selling to timber supplier group was slightly lower than in the other groups. There were more adult females compared to males in the group of growers selling to timber suppliers.

(iii) Household demographics: timber suppliers

The timber supplier group had a slightly larger number of household members and it also had more adult males. The timber supplier group had more household members aged from 15-59 years.

Pauw (2005:4-7) reported an average agricultural household member size in KwaZulu-Natal of 4.8 (strict) and 5.6 (broad). The average household size (GC=7.05, GT=6.60 and T=7.50) in this study was bigger than the size reported by Pauw (2005:4-7). This places more pressure on these particular households, as provision has to be made for a larger number of household members,

thereby possibly reducing the financial assets of the household. Due to the higher number of people of working age in the timber supplier group the available quantity and quality of labour will be better than in the other two groups. Households objectives are affected by the composition of the household, working age group is the labour supplier, as opposed to others that might be a burden to a household (Liang, Li, Feldman & Daily, 2012:153). This group will be able to provide income and increase their asset base, resulting in a more sustainable livelihood.

5.3.2 Education

Education is very important in building human capital. Households that are better educated have better access to jobs, especially jobs that offer reasonable salaries, and these individuals will be better informed.

(i) Education: growers selling to forestry companies

The average education of the growers selling to a company group is better than that of growers selling to a timber agent group. This group has invested in the education of their children. With regard to growers selling to company, human capital in terms of education was the second best compared to the other groups.

(ii) Education: growers selling to timber suppliers

The average level of education of growers selling to timber supplier groups is lower than for the other two groups, because of their limited income. This means that these households might also lack funds to send their children to tertiary institutions, as it would require considerable sums of money.

(iii) Education: timber suppliers

The timber supplier group had a better level of education compared to the other grower groups. The education level of the timber supplier group was the highest; they generate a higher income and are therefore able to send their children to school and even to higher institutions of learning. The higher educational level of the timber supplier households is the one factor that enables them to gain access to formal forestry services and to acquire better entrepreneurial forestry skills.

Households send their children to school, because they believe that their children require education to access better jobs and to obtain job security. Education was also seen as a way of guaranteeing a sustainable livelihood for their children. Parents or households indicated that if they educated their children, this would also ensure a better life for parents or members of the

household in their old age. Meena and O'Keefe (2007:16) reported that education enabled farmers to access formal agricultural knowledge, for farmers with some form of higher education had more contact with extension services. This is evident from the study, as the timber supplier group had a better contact rate with forestry companies, while the growers selling to timber suppliers had fewer opportunities for such contact.

5.3.3 Employment

The level of employment is crucial in any household, as employment determines the household income. The type of employment will determine the permanency or security of the income earned by households. Employment can be linked with skills, as these will determine the individual's competency and ability to perform.

(i) Employment: growers selling to forestry companies

The level of permanent employment among growers selling to company is very low and very few households reported permanent employment in timber farming. When households become involved in timber farming it is only for a limited time, and more specifically during the period when they fell their plots. Very few of the household members among the growers selling to company are involved in other jobs on a permanent basis. When compared to other groups, a high number of people in the growers selling to company group are unemployed or have temporary work only. This household group has a high number of pensioners, which could explain the high unemployment figures.

(ii) Employment: growers selling to timber suppliers

In the growers selling to timber suppliers only a few members of the households hold permanent jobs. These figures were higher than for the growers selling to a company group, but lower than for the timber supplier group. As only a few households in this group as compared to the other two groups fell in the employment age category, this could impact on the employment level of the household. Despite this group having fewer members of employment age, the employment figures for this group were better than for the growers selling to forestry companies.

(iii) Employment: timber suppliers

For timber supplier groups timber farming is a permanent form of employment; therefore the number of people with permanent employment will be higher in this group. However, in spite of the timber supplier group showing higher figures for permanent employment,

and due to the nature of timber farming, it does not mean that there are no risks involved for timber agent households. The amount of work that is available in the community, ranging from buying plots from other growers to timber harvesting and timber transport, will determine the risks of this type of permanent employment. There is also the risk of not being able to find jobs, as the availability of jobs is dictated by the owners of the timber plots. The level of education of the children from households in the timber supplier group might make it easier for them to find permanent work (even in other fields) when compared to the other household types.

Livelihood opportunities in rural areas are restricted and the levels of poverty are high (Lewis *et al*, 2005:28). The findings of this study correlates with the literature, as finding employment was reported to be a problem for households. Casual employment is only a temporary solution, as temporary workers are employed on a casual basis and their employment depends on the employer or contractor being able to secure work. South Africa is faced with the challenge of unprecedented unemployment (Klasen & Woolard, 2008:2). Even those who have jobs are faced with the challenge of being working poor (Frye, 2005:11-13). The 2011 South African budget focus is to accelerate employment through supporting rural development and regional integration (Gordhan, 2011:10).

Community forestry projects can improve people's skills and this type of forestry can assist with the development of small businesses to enhance the local market (Ham & Theron, 1999:75). The introduction of small-scale timber farming has created various economic activities within communities, ranging from growers and communities obtaining economic benefits to individuals from the communities finding jobs in the form of small-scale contracting businesses (Ham & Theron, 1999:76). The livelihood of these people will be affected as the quality and quantity of wood and other products decline (Ascher, 1995:3-11). The timber supplier households have benefited considerably from small-scale timber farming employment that enabled them to create sustainable livelihoods.

5.3.4 Income earning activities

The type of activities that households engage in will determine their household income. When households involve themselves in diverse activities, they have a better chance of increasing their income.

(i) Income-earning activities: growers selling to forestry companies

Only one household in the growers selling to a company group reported to be doing harvesting. Due to the high costs of chainsaws, households might not have the funds to procure this machinery. To get maximum value from their equipment growers need to find other work to keep their equipment working. Owning one small timber plot that is only harvested once in a few years might not justify owning a chainsaw, except for those households that have large areas planted to timber. If a grower owns a chainsaw it helps to reduce the costs incurred for harvesting a plot. A few households in the growers selling to company group reported to be involved in the transport of timber. The benefit for these households is that during the time of harvesting their timber they are able to transport their own timber to the mills in Richards Bay or to the local depot. These households are also in a position to earn income from transporting timber for other growers. A number of households complained that the people they hire to fell and transport their timber demanded high wages, and as a result they received very little returns from their plots. All the households participated in timber farming. This group was more involved in agricultural farming, but not in livestock farming.

(ii) Income-earning activities: growers selling to timber suppliers

Households in the growers selling to timber supplier group were not involved in either timber harvesting or timber transport. These households sold their timber *in situ*, which means that all the timber harvesting and the timber transport were the responsibility of the buyer. A number of them reported that the reason why they sold their timber *in situ* was because they did not have chainsaws for harvesting or trucks and tractors for transporting the timber to a point of sale. Households' access to tickets or to means of supplying timber also played a significant role in forcing households to sell their plots to timber agents. One household reported that they sold their timber *in situ* to avert the risk of managing the entire felling and transport operations. Therefore, the selling of timber *in situ* was also done as a livelihood strategy to avoid risks. This particular household emphasised that the timber agent has to pay the money upfront before the felling operation commenced. Other households reported that the timber supplier will pay for the number of tractors or truck loads received at felling. All households reported to be taking part in timber farming. A total of five households said they were involved in types of agricultural farming other than forestry, but no households reported involvement in livestock farming. One would expect these households to be more involved in agricultural farming as they are not so much involved in the harvest of their timber, and seeing that timber farming required very little attention during the growing stage.

(iii) Income-earning activities: timber suppliers

All households in the timber supplier group performed timber harvesting, which means that these households had the chainsaws required for performing this activity. As these households were able perform this operation themselves, their operational costs were reduced. The same applied to timber transport, as most of the households in the timber supplier group had tractors that could be used to transport timber to the local depot. Livestock farming was not very popular with any of the sampled households at Sokhulu, and timber agents also showed a very low involvement in livestock farming. Similar to the growers selling to forestry companies and growers selling to timber suppliers, all households in this category participated in timber farming.

Some of the economic benefits arising from small-scale forestry included the establishment of small enterprises for contracting and haulage, and the employment of local people in building roads (Gandar & Forster, 1994:27). In this study it has been evident that through small-scale timber farming some households have started contracting and transport businesses, which have played a significant role in household livelihood, as households received income from these activities. Timber harvesting and timber transportation produce the biggest returns in timber farming (Karumbidza , n.d:17) and this has also been shown to be the case in this study, as seen in the timber supply households. The involvement of households in timber farming will ensure that this type of farming contributes to the total income required to sustain households' livelihood. If households were more involved in agricultural and livestock farming they would be diversifying their income, which is a positive aspect as agriculture provides a quick form of revenue.

5.3.5 Sale of timber by the household

The sale of timber enables households to earn an income from their timber farming activities. The households' skills, competencies and their ownership of working equipment will have an impact on how the sale of the timber is conducted.

(i) Sale of timber by households: growers selling to forestry companies

Almost all the household heads in the growers selling to company group reported that they were responsible for the sale of their timber. Only a few households reported that the timber sales were performed by their wives. In the case of households whose timber plots had been planted by company schemes, most of the household heads were the ones who registered as owners of the land, which automatically made them responsible for the plot. Female heads of the households inherited the plots from their husbands who had passed away. Even though the timber plot might be seen as belonging to the whole

household, it could be possible that the income received from the timber sale was controlled by one individual. This income would still be utilised to reduce a household's vulnerability.

(ii) Sale of timber by households: growers selling to timber suppliers

The sale of the timber plot among growers selling to timber suppliers was mostly directed by the heads of the households. However, two growers reported that they managed the sale together with their son and another indicated that it was her husband's responsibility. From this information it can be deduced that the decision to sell the timber plot *in situ* to a timber agent was made by the household head. This means that in most cases the negotiation of the selling price took place between the head of the household and the timber agent. In some instances, however, the number of truck or tractor loads would determine the price paid to the grower. Further research is needed to determine whether fluctuations in the petrol or diesel price will impact on the price negotiations.

(iii) Sale of timber by households: timber suppliers

A large number of household heads in the timber supplier group were responsible for the sale of the timber in their particular households, while three households reported that they were selling timber together with their sons and wife. Decisions on the management of the timber plot were mainly the responsibility of the head of the household, although in some instances other members were involved or consulted in the process.

The larger the number of people involved in the sale of timber, the better, as skills are transferred to a large number of individuals in the households. In all groups the timber sales were mostly conducted by the head of the household. It was only when the head died that another member of the household would assume responsibility for the sale. Despite the sale being done by the head of the house, the income received from the sale was utilised by the household for improving the well-being and sustenance of life. The improvement in an asset base will benefit everyone in the household.

5.3.6 Health status of households

Respondents also reported on the frequency and types of disease that had impacted on their households. The health level of the household is important, as it has a direct effect on the human capital, seeing that it impacts on the quantity and quality of labour. The health status of households will be affected by their ability to access health services.

(i) Health status of households: growers selling to forestry companies

One household in the growers selling to company group reported having experienced malnutrition. There were incidences of flu, high blood pressure, skin disease, bone disease and diabetes among the growers selling to company. Some households in the growers selling to company group were reported to be suffering from bronchitis or TB and a member of one household voluntarily disclosed that he or she was HIV positive. The voluntary disclosure of households of their HIV/Aids status was an indication of households' awareness, acceptance and level of maturity in dealing with the disease. Due to the higher number of elderly people in the growers selling to company group compared to the other two groups, one would expect a high incidence of bone disease, high blood pressure and diabetes which are most commonly associated with old age. However, bone disease and high blood pressure in the growers selling to forestry companies were lower than among growers selling to timber suppliers and the timber supplier groups.

(ii) Health status of households: growers selling to timber suppliers

Flu was very common among household members in the growers selling to timber suppliers. These households also reported a high incidence of bone disease and high blood pressure. Households also reported incidents of skin disease and diabetes, but these were low. Two households in the group of growers selling to timber suppliers reported that some of their members suffered from bronchitis and one household member disclosed that he or she was suffering from HIV/Aids. Even though a low number of people in the growers selling to timber supplier (compared to the other two groups) were older than 60, there was a high incidence of bone disease and high blood pressure.

(iii) Health status of households: timber suppliers

All households in the timber supplier group reported that they experienced flu, while some households also reported incidents of bone disease, skin disease, high blood pressure and diabetes. Even though the timber supplier group reported a high incidence of high blood pressure, they generally had a better health level (if all health incidents were combined) than the other groups.

The incidence of flu was common in all three groups. The high incidence of bone disease in the households of growers selling to timber suppliers will have an impact on the households' ability to participate in forestry activities which can be physically demanding. This will reduce the

availability of labour and impact on the income that households could earn, which will in turn impact on households' livelihood.

5.3.7 Expenditure patterns of households

The way in which households spend the income that they have earned will have an impact on household livelihood. If households spend their income on activities that will result in an increase in their assets base, the better their livelihoods would be.

(i) Expenditure patterns of households: growers selling to forestry companies

More households in the growers selling to company group reported that spending on clothes, school uniforms, other school expenses and doctors' fees were the most important expenses incurred in the past 12 months. A large number of households in the growers selling to company group could be spending more on clothes, school uniform and other school expenses, because they had more children under the age of 15 years. Households in the growers selling to company group were paying for their children to attend school excursions, which might be seen as a luxury by households of growers selling to timber suppliers. Large numbers of households included elderly people who might require medical attention, as they had reported spending on doctors' fees. These households also reported to be buying medicines for their members. More households in the growers selling to company group indicated spending on traditional healers as one of the most important expenses they had incurred. Some households in the growers selling to company reported that even though they did visit doctors and hospitals, they still sought traditional ways of treating their illnesses; hence they consulted traditional healers. Amounts spent on hospitals were generally low, and very few households reported hospital fees as being an important expense among growers selling to company. Others used hospitals when referred by their doctors. These households could afford to consult doctors, thereby reducing their need to visit hospitals.

(ii) Expenditure patterns of households: growers selling to timber suppliers

Household spending on clothes in the growers selling to timber supplier group was average, while spending on school uniforms, other school expenses and school fees was less than in the other two groups. The growers selling to timber supplier group had children under the age of 15 years who might be attending school. Due to the total household income, however, they were limiting their spending on school uniforms and other school expenses. Very few households among growers selling to timber suppliers reported that school fees were an important expense, because they might not have been

paying school fees and their children were probably receiving free education. Post 1994 the democratically elected South African government introduced free education for the income-poor households. Few households in the growers selling to timber suppliers reported spending on medicines, hospitals and traditional healers. These households were more likely to attend a local clinic where they could obtain free medication when they fell ill.

(iii) Expenditure patterns of households: timber suppliers

The number of people under 15 years of age in the timber supplier household type was high compared to the other two household types. However, fewer households indicated spending on school uniforms and other school expenses as an important expense. Households that could afford higher school fees in the timber supplier group sent their children to public and private schools in town. The number of households that reported spending on school fees was average for the timber supplier group. One household head indicated that his children were attending boarding school. Due to the higher income of the timber supplier group compared to the other groups, one might have expected more households in this group to be spending on clothes. Few households in the timber supplier group indicated spending on doctors' fees, medicines, traditional healers and hospitals as an important expense. This could be due to the fact that their level of health has improved.

Spending on school expenses is a good indicator of households enjoying better livelihoods in the future. The growers selling to forestry companies indicated that they had been spending higher amounts on their children's school expenses. This means that households are ensuring future livelihood enhancements, which will ensure a sustainable livelihood for these households

5.3.8 Human capital indicators

Table 5.1 shows the selected human capital indicators for the different growers groups. The scores have been obtained (as indicated in section 5.2) and the total capital score per grower type is shown at the bottom of the table.

Table 5.1 Indicators selected for the evaluation of human capital assets for the three grower types.

Human capital	GC		GT		T	
	No. of households reported	Score	**No. of households reported**	Score	**No. of households reported**	Score
HC1:Timber harvesting	1	0	0	0	20	2
HC2:Timber transport	3	0	0	0	10	1
HC3:Timber farming	20	2	20	2	20	2
HC4:Not suffering from bone disease	11	1	6	0	10	1
HC5:Not suffering from high blood pressure	7	1	6	0	5	0
HC6:Spending on clothes	19	2	11	1	8	1
HC7:Spending on school uniforms	15	2	8	1	8	1
HC8:Spending on other school expenses	15	2	7	1	8	1
HC9:Access to fees for doctor	18	2	5	0	4	0
HC10:Spending on medicine	10	1	5	0	3	0
Total capital score per type		13/20		5/20		9/20
Score in percentage		**65%**		**25%**		**45%**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

HC1: Timber harvesting

Households owning harvesting equipment are able to do their own felling, thereby reducing their harvesting costs. Timber harvesting is one of the most expensive operations in the small-scale timber farming business. This operation requires heavy duty machinery such as chainsaws, which some households cannot procure due to a lack of financial resources.

HC2: Timber transport

Once timber has been harvested it has to be transported to the point of sale. Only once timber has been moved to this point can revenues from timber farming be realised. Timber products are transported to a depot or the local mills in Richards Bay by means of tractors and timber trucks. It has been observed that timber transport takes up a huge portion of a household's earnings at harvest. Households that are able to transport their timber can reduce these costs, as the operation is done in-house, while other households have to hire contractors or individuals to do this operation on their behalf.

HC3: Timber farming

Timber farming is a livelihood strategy that some households embark on to earn income and enhance their livelihood. Shackleton *et al.* (2007:565-566) report that timber farming provides a

safety net for households in times of difficulty. A study by Cairns (2000:41) has established that timber farming contributes from 12% to 45% of the households' income required to keep the household above the poverty line (Cairns, 2000:41).

HC4: Not suffering bone disease

Poor health and poor education are regarded as contributing to poverty, so that the main livelihood objective of households will be to overcome these conditions (Department for International Development, 1999a:7). Diseases reduce human capital and the health of household members will determine their potential to be able to perform or work. Healthy household members contribute in building human assets (Cherni & Hill, 2009:653). Forestry is a physically demanding operation and requires workers to be physically fit. Someone suffering from a bone disease is more prone to fractures. The assumption is that the presence of bone disease will reduce the total household labour force.

HC5: Not suffering from high blood pressure

High blood pressure is reported to be causing of diseases related to the heart and blood vessels (Steyn, 2007:2). Steyn (2007:2) mentions that strokes, heart muscle disease, a heart attack, heart failure and heart diseases are caused by high blood pressure, which are the leading causes of disability and death worldwide (National Intelligence Council, 2008:17). The household's health level is reduced by the presence of this and related diseases.

HC6: Spending on clothes

The assumption is that once households have fulfilled all their basic needs such as buying food, they can use a portion of their earnings to buy clothes. The idea is that households will spend money on clothes when they are satisfied that their basic needs have been met.

HC7&HC8: Spending on school uniforms and other school expenses

By investing in education households are able to increase their human capital (Heffernan & Misturelli, 2000:17). Households' investment in education is crucial for their livelihood.

HC9&HC10: Access to doctors and spending on medicines

Attending doctors require consultation fees, something which not all households will be able to afford. Apart from paying for a consultation, households might be required to purchase medicines. Households with a higher income will be able to consult doctors and purchase medicines when they fall ill.

Access to human capital has been compared for the three grower groups, using timber farming, timber harvesting, timber transport, incidence of disease and household spending as indicators. The next section compares the physical capital of the three household types.

5.4 Physical capital

A comparison is made of the physical capital of the three households. Household infrastructure and access to drinking water, household expenditure and land ownership are discussed. Scores are finally presented for the three households, based on the selected capital indicators.

5.4.1 Households' infrastructure and access to drinking water

Household infrastructure is a yardstick that can be used to determine the level of household livelihood. Access to safe and potable drinking water will not only impact on households' health status, but on the time available for households to carry out productive activities.

(i) Household infrastructure and access to drinking water: growers selling to forestry companies

The detached type of house is very common among the group of growers selling to company. The roofing material used by most of the growers selling to company is corrugated iron sheets, followed by tiles and asbestos. Most of the walls are constructed from bricks or blocks, while a few houses in the case of growers selling to company were constructed from mud and sticks. Constructing walls using mud and sticks is very cheap, as both these materials can be obtained at a low price or even free of charge. The more sustainable households lived in houses made from bricks or blocks, while and the less sustainable households occupied the mud-stick houses and traditional thatched or zinc-roofed huts. This statement is based on the assumption that households that have access to funds are able to build better houses; the opposite will apply to households that have difficulty accessing funds. The most common floor type in the growers selling to company was concrete, and only one household used mud for the floor. It was observed that all households had ventilated improved pit latrines, probably due to a lack of running water at the house. The housing conditions for the growers selling to company households were generally average in comparison to the other two groups' households.

Most households in the growers selling to company reported that they could access safe and potable drinking water. The households were sourcing this water either from communal taps or from the local Mondi depot. However, some households indicated that their only source of water was the local depot and that they were located far from communal taps. Access to water was generally not a problem in the area, except that all households had to obtain water from common sources of collection, as they did not have water taps in their homes.

(ii) Household infrastructure and access to drinking water: growers selling to timber suppliers

A large number of households in the growers selling to timber supplier group were living in detached houses, with a few households living in the traditional hut houses made of mud. Roofing with corrugated iron was very common in the growers selling to timber supplier household group, with only a few using asbestos. Only one household was observed to have used tiles as roofing material and another used plastic. Even though a large number of these households used bricks and blocks for their walls, there was a higher number in the growers selling to timber supplier group that used mud and sticks for their walls, compared to the other two groups. This shows that there were a larger number of households in the growers selling to a timber supplier group that had a cheaper form of housing. This means that these households were not earning enough to build better houses. All houses were observed to have concrete floors and the type of toilet used was the ventilated improved pit latrine.

A large proportion of households in the group of growers selling to timber suppliers reported being able to access safe and potable drinking water. One household in the timber supplier group reported that although they had access to water, the water was very far; she had to wait for her sons to return from work so that they could go and collect water. The households in the group of growers selling to timber suppliers who had no access to safe and potable drinking water indicated that clean water was very far; hence, they were collecting water from the nearby river. This made them vulnerable to diseases with the potential of contaminating pit latrines into the water table.

(iii) Household infrastructure and access to drinking water: timber suppliers

Nearly all households in the timber supplier group had the detached type of house and only one traditional hut was observed. The most common material used for roofing was tiles, although a small number of households in the timber supplier group used corrugated iron sheets and asbestos for roofing. The walls of almost all the houses of households in the timber supplier group were made of bricks or blocks Most of the floors were made out of concrete, but in some cases both tiles and concrete were used. The timber supplier group appeared to have better houses when compared to the other two groups. The largest portion of households had a ventilated improved pit latrine; only one respondent in the timber supplier household had a piped flush toilet system in their household. Households' choice of the ventilated improved pit latrine was linked to the unavailability of piped water as required by the flush toilet system.

The timber suppliers had better housing types, followed by the growers selling to company. This could mean that the livelihood of these two grower types was better than that of the growers selling to timber suppliers. The income earned by the households of timber suppliers enabled them to build better houses.

Most households in the timber supplier group reported having access to safe and potable drinking water, even though the figure was lower than for the other groups. Households were sourcing water from the communal taps and from the depot. Others reported having water tanks at home and yet another household in the timber supplier group reported that they had a tap at home. However, some households in the timber supplier group were either collecting water from the river, or they had to travel long distances to collect water or had to collect water using a tractor. This could have some impact on households' productivity, as in these cases households would have to stand in lines to collect water. The poor toilet infrastructure in the households was driven by the inability to access piped water.

5.4.2 Household expenditure

The type of activities carried out by households and the lifestyle that they enjoy will determine the type of expenses that they will incur. In order for workers to function effectively working equipment is essential, and there are certain costs associated with the running of the equipment.

(i) Household expenditure: growers selling to forestry companies

Households in groups of growers selling to company incurred some vehicle maintenance and petrol and diesel costs. A reasonable number of households in the growers selling to company group owned vehicles. These were mainly used for general household purposes such as buying groceries and at times when they needed to travel. Households in the group of growers selling to company also incurred costs for public transport, mainly for going to town and visiting doctors. The households in the growers selling to company group also reported that they incurred electricity fees, paid their television licence, built their houses and one particular head of the household reported that they had paid lobola (lobola is a bride's fee) for their son's bride.

(ii) Household expenditure: growers selling to timber suppliers

Households among the growers selling to timber suppliers spent very low amounts on vehicle maintenance and petrol or diesel. This was due to the fact that very few households in the growers selling to timber supplier group owned vehicles. Spending on public transport was higher, because the households of growers selling to timber

suppliers did not own vehicles and they relied more heavily on public transport to get to town, doctors and hospitals. One of the households among the growers selling to timber suppliers reported that they had incurred funeral expenses; two reported that they had performed a traditional ceremony for their ancestors; another reported that the birth of a baby in the household required them to incur important expenses; and two others reported incurring electricity and building costs.

(iii) Household expenditure: timber suppliers

Spending on transport was common in the timber supplier group, as these households' main type of employment was timber farming. The timber supplier households mostly had tractors which were used for transporting timber from the site to the depot, and this equipment needed to be maintained or repaired from time to time. Other timber suppliers also had vans that they use for fetching their labourers and transporting them to site. Sometimes timber suppliers would source labour close to where they were working, thereby reducing transport costs. To keep the equipment such as chainsaws running the timber supplier households needed to purchase petrol and diesel. These households were also spending money on public transport, mainly for going to town. Households in the timber supplier group also mentioned other expenses, such as the cost of renewing truck licences, car licence renewal, child maintenance and building costs.

Due to the nature of their jobs, the timber supplier group spent large amounts on vehicles. The spending on vehicles is essential for timber suppliers, for it enables them to carry out their jobs which will bring in income and ensure livelihood. The higher spending correlated with the higher income earned by households.

5.4.3 Land ownership by households

Land ownership is very important as it constitutes the households' security. Land can be sold at any given point in time to obtain income, and also to create income-earning activities.

(i) Land ownership by households: growers selling to forestry companies

Most of households among growers selling to company reported that they owned land and only one household reported having permission to use land. For the household that did not own land, the degree of vulnerability was higher when compared to the other households in the group. In the case of households that were female-headed the land was inherited from their husbands when they passed away. Other households inherited

the land from their parents and some were placed on the land by the local chief. Land ownership has benefits for owners such as being able to secure loans.

(ii) Land ownership by households: growers selling to timber suppliers

All households in the growers selling to timber supplier group had their own land. This land belonged to them and they could sell it at any given point in time. The sale of land was not common; more often land is inherited by the children on the death of their parents.

(iii) Land ownership by households: timber suppliers

All households in the timber supplier group reported that they owned land. This is a good indicator of some form of wealth, as this forms part of the household's tangible assets.

Land ownership is a significant pointer for livelihood security (Fernando, 2003:10). Almost all households (in all the three groups) had access to land. This means that households had security that they could use in difficult times to sustain their livelihood and reduce their vulnerability.

5.4.4 Physical capital indicators

Table 5.2 shows selected physical capitals for the comparison of the livelihood of the three groups. The scores were obtained as indicated in section 5.2. The total score for all the grower groups is indicated at the bottom of the table.

Table 5.2 Indicators selected for the evaluation of physical capital assets for the three grower types.

Physical capital	GC		GT		T	
	No. of house-holds reported	Score	**No. of house-holds reported**	Score	**No. of house-holds reported**	Score
PC1:Detached house	15	2	13	1	19	2
PC2:Tiles (roof)	5	0	1	0	9	1
PC3:Bricks/Blocks (walls)	14	2	13	1	19	2
PC4:Safe potable water	19	2	19	2	14	2
PC5:Land ownership (owner)	19	2	20	2	20	2
Total capital score per type		8/10		6/10		9/10
Score in percentage		**80%**		**60%**		**90%**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

PC1: Detached house

For sustainable livelihoods protected shelter is imperative (Department for International Development, 1999a:13). The house that a household will build (or reside in) will be determined by the affordability of the house. Households that do not have sufficient money will turn to traditional house types for shelter, as these houses are cheaper to build.

PC2&PC3: Tiles (roof) and bricks/blocks (walls)

When income increases, it is spent on shelter, water and energy (Department for International Development, 1999a:14). The way in which a house is built and the material used for its construction will be determined by the amount of money that the household has available. The supposition is that households that have more money will turn to building their houses from bricks or blocks, using tiles as roofing material.

PC4: Safe potable water

Water is essential for human survival on earth. Households use water for sanitation, washing (Kuria, 2005:7) and drinking. When households are not able to access enough water or land, they cannot participate in agricultural production (Rwelamiral, Phosal, Makhural & Kirsteen, 2000:535). Limited access to water results in a deterioration of human health; and when households have to travel long distances to obtain water it reduces the time they could spend on productive activities (Department for International Development, 1999a:13).

PC5: Land ownership (owner)

Good indicators of economic welfare are land ownership and housing quality (World Food Programme's, 2009:19). Rwelamiral *et al.* (2000:531-532) state that for many decades land ownership has been responsible for social and economic inequality in the rural areas of South Africa. Land ownership enables households to embark on activities such as agriculture.

Access to physical capital has been measured by using housing types, material used for the construction of houses, access to safe and potable drinking water and land ownership as indicators. Access to social capital is compared in the section that follows.

5.5 Social capital

The three household types are compared in terms of their social capital. A comparison is made by considering the average number of years that the households had been living at Sokhulu, the households' use of services, local institution participation, the number of years that households had owned or used the land, sale of crops and sources of credit.

5.5.1 Average number of years lived at Sokhulu

The assumption is that the higher the number of years the households had lived at Sokhulu, the better their social capital would be. Over the years the households might have created networks or connections. The longer the period the households had lived at Sokhulu, the better the chances were that they had learned technical skills that would allow better management of their small-scale timber farming businesses.

(i) Average number of years lived at Sokhulu: growers selling to forestry companies

The growers selling to company group showed a higher average number of years (48.85) of living at Sokhulu. This correlated with the demographical data reported in paragraph 4.3.1.

(ii) Average number of years lived at Sokhulu: growers selling to timber suppliers

Household heads in the growers selling to timber supplier group showed an average of 46.75 years of living at Sokhulu. The figure for this group was the second highest when compared to those for the other two groups.

(iii) Average number of years lived at Sokhulu: timber suppliers

The timber supplier households showed the least number of years (45.6 on average) of having lived at Sokhulu. Although the timber supplier group showed the least number of years, it was not too far removed from the other groups.

The higher number of years that the households have lived at Sokhulu does not necessary show that the household livelihood will be better. The timber supplier households had lived at Sokhulu for the least number of years, but their livelihood level was not lower than that of growers selling to company and growers selling to timber supplier. The lower number of years for timber supplier groups shows that the head of households were younger; hence their active involvement in timber farming.

5.5.2 Households' use of services

The presence of services and whether households can access the services, along with their ability to utilise them, will impact on their social capital. For an instance, when households are able to access the health service, their health status could be improved.

(i) Household use of services: growers selling to company

Most of the growers selling to companies made use of the health services, and a large portion of households had access and could make use of these services. The second most frequently used service was extension, but only a few households in the growers selling to company had access to this service. The co-operative was the least frequently used in the list of services available to households among growers selling to company groups. Those who indicated to be using extension as a service also indicated that the service allowed them to obtain advice on tree farming and to be advised on when they should fell their timber plots. The service that growers selling to company received from co-operatives related to the planting of indigenous trees along roads and to sugar cane farming.

(ii) Household use of services: growers selling to timber suppliers

A large proportion of growers selling to timber suppliers indicated to be using the health service. The use of health services was expected to be higher among the group of growers selling to timber suppliers due to the high incidence of illnesses. It might be difficult for households in the group of growers selling to timber suppliers to access this service, because they lacked money for transport. Only one household in the group of growers selling to timber suppliers indicated to be using forestry extension, while three households were using the co-operative service. Those making use of the co-operative service indicated that they were able to obtain advice on the conservation of the natural ecosystem. They gathered with other women to do sewing and they also sold their agricultural produce.

(iii) Household use of services: timber suppliers

A large number of households in the timber supplier group indicated that they made use of a health service. Fewer timber supplier households said that they made use of forestry extension and co-operative services. The forestry services received by timber suppliers included the provision of books on timber farming by forestry companies, while they were also taught how to manage their plots. They particularly highlighted that they received advice from Sappi and Mondi on how to plant and grow their trees. Households in the timber supplier group indicated that through co-operatives they were able to sell their agricultural products and plant sugar cane, and also to do weeding, chemical spraying, ripening, harvesting and to sell their crops. Through access to institutions and information the livelihood outcome was improved, income was increased and the well-being of households was promoted, as shown in the findings with regard to this timber farming type.

The use of health services was high in all the groups, but the growers selling to timber suppliers showed a more limited use when compared to the other two groups. This was due to the households' inability to access these services as they did not have the necessary means of transport, which could in turn impact on household livelihood. The idea of the forestry partnership was that each farmer within a particular district would grow their own private *eucalyptus* woodlot that was to be managed with the assistance of a company extension forester or officer (Ham & Theron, 1999:76). From the result of the study it is evident that access to extension services by all grower types was very poor. This means that only a few households were able to obtain advice on the management of their timber plots from company extension foresters, which could result in poor management of the plot. Further research will be necessary to determine whether this was the case at Sokhulu.

5.5.3 Local institution participation

Household involvement in local institutions can be significant for vulnerable households. Such organisations are able to provide support to the households in terms of social support, skills and knowledge, and can increase households' access to resources.

(i) Local institution participation: growers selling to forestry companies

A few households in the growers selling to company group indicated that they were members of a forestry committee. No households indicated that they participated in sugar cane committees, school committees or credit schemes.

(ii) Local institution participation: growers selling to timber suppliers

Among the growers selling to timber suppliers the involvement of households in local institutions and their use of available services were poor, and appeared to be lower than in the other two groups. In terms of access to institutions the social capital of growers selling to timber suppliers was low, and this could limit their access to information and social networks.

(iii) Local institution participation: timber suppliers

Two households in the timber supplier group indicated that they were involved in a sugar cane committee, one of which was playing a role in the community trust. Those in the timber supplier group who participated in sugar cane committee activities indicated that they were able to act as representatives of other sugar cane growers in the area. The timber supplier involved in a community trust indicated that he represented the community of Sokhulu in terms of the land redistribution programme. The timber supplier

group's access to and use of local institutions was better when compared to the involvement of the other two groups.

Household involvement in local institutions was very poor in all three groups. Due to the households' poor participation they were not able to exercise influence. Moreover, households' access to information could be limited, which could result in reduced access to the natural resource base. There is a need for households to increase their participation in local institutions, allowing them to influence policies and to obtain more insight into the management and use of natural resources. Further research will have to be conducted to determine whether this was the case at Sokhulu.

5.5.4 Permission to access forestry or forest resources

Permission to access forestry resources might have an impact on how households sell their timber. Where households require permission and it is not granted, they will not be able to access the resources or required services.

(i) Permission to access forestry or forest resources: growers selling to forestry companies

Larger numbers of households in the growers selling to company group indicated that they needed permission to access the above-mentioned forestry supply or services. However, a few households indicated that they either needed permission from the tribal authority or a supply number to be able to use these forestry services. (A supply number is allocated to a timber grower and used when a household wishes to supply timber to a forestry company or to the depot.)

(ii) Permission to access forestry or forest resources: growers selling to timber suppliers

The six households in the group of growers selling to company that had access to forestry suppliers indicated that they did not need to obtain permission from anyone to access forestry suppliers. Whenever they wanted to use the supplies they could do so.

(iii) Permission to access forestry or forest resources: timber suppliers

Most households in this group indicated that they did not need permission for gaining access to the above-mentioned suppliers. A few households indicated that they needed a supply number as a means of access.

Andrew *et al.* (2000:13) reported that individuals can obtain permission from the tribal authority for embarking on the schemes. A few households among the growers selling to company indicated that they had to obtain permission from the tribal authority. As most of the households participating in the survey had been involved in timber farming for a long period of time, they would already have depot supplier numbers and access to tickets (a ticket is a permit that allows the supply of timber to the mill) for supplying to the mills, which is why most of them indicated that they did not need permission to access forestry resources or services.

5.5.5 Number of years households had been owning or using land

The number of years that the households have owned or used the land will determine the households' ability to be familiar with the land and to use the land effectively. The contention is that those households that have used the land for longer periods of time will have more experience of its management through different seasonal extremes.

(i) Number of years households had been owning or using land: growers selling to forestry companies

The growers selling to company had the highest number of households that had been using the land for more than 20 years. This can be explained by the age range of the growers selling to company, with this household group having a higher number of elderly people.

(ii) Number of years households had been owning or using land: growers selling to timber suppliers

A large number of households in the group of growers selling to timber suppliers had used their land for timber farming for more than 20 years, while 25% indicated to have been using the land for less than 10 years. The growers selling to timber suppliers had the most newcomers in the timber farming business when compared to the other two groups.

(iii) Number of years households had been owning or using land: timber suppliers

More households in the timber supplier group had utilised the land for timber farming over more than 20 years. The results showed that a larger number of people from the timber supplier group had used the land for between 10 and 20 years. Even though the timber supplier group had a small number of households that have used the land for timber farming over more than 20 years compared to the growers selling to company, they saw timber farming as a business rather than merely an activity that could be embarked on.

The growers selling to company had used the land for a longer period than the other grower types. This correlates with the average number of years these households had been living at Sokhulu (discussed in paragraph 5.5.1). Through the years these households have learned techniques allowing them to use their land effectively.

5.5.6 Sale of crops

The method used for selling timber will determine the income that households receive from their sales. Selling directly to companies or shops will increase the profit margin, as opposed to profits earned from selling to community members.

(i) Sale of crops: growers selling to forestry companies

Households from growers selling to a company group that were also selling their agricultural produce to community members, company and other households indicated that they sold their produce to the market at Mkhuze (a small town situated north of Sokhulu). All their timber products were sold to forestry companies.

(ii) Sale of crops: growers selling to timber suppliers

Households in the group of growers selling to timber suppliers sold all their timber to community members. Growers selling to timber suppliers sold their agricultural produce either through a company or directly to members of the community.

(iii) Sale of crops: timber suppliers

The timber supplier group sold their agricultural produce mainly to community members, company and organisations, while another household indicated that they sold to shops. The sale of timber in the timber supplier household was done through companies only.

When households sold their timber to forestry companies they were able to get maximum returns on their investments. The total income received by growers selling to timber suppliers, however, was reduced when they sold their timber to community members. This reduced their potential profits from timber farming, and in turn reduced household income, impacting negatively on the household livelihood.

5.5.7 Credit sources

Households' access to credit enables them to buy the equipment needed for carrying out their income-earning activities. Access to formal credit ensures that households receive reasonable rates on money borrowed through credit facilities.

(i) Credit sources: growers selling to forestry companies

Two households indicated that they had obtained credit from informal credit schemes. One household reported having obtained credit from a friend, another from her daughter and yet another said they obtained building materials on credit from a shop selling building supplies. Credit was mostly used for health expenses, clothing, building purposes and for a wedding.

(ii) Credit sources: growers selling to timber suppliers

A total of two households in the group of growers selling to timber suppliers said that they had obtained their credit through formal credit schemes. Two households obtained credit from a furniture shop, three reported that it was obtained from a clothing shop and the other obtained credit from a friend. Households in the growers selling to timber supplier group reported that they used the credit for food, clothing, education, furniture and to buy a car.

(iii) Credit sources: timber suppliers

A total of 25% timber supplier households obtained credit from a formal credit scheme. Other households reported that they had obtained credit from clothing shops, furniture shops and an insurance policy. Three households in the timber supplier group reported that the credit was used for clothing, while others used it to buy cars, a timber loader, a tractor, furniture, for depositing money into their business account and for a funeral. A few households in the timber supplier group complained that they could not access formal credit to purchase work equipment, mentioning that the equipment that they were currently using was old and required much maintenance.

Households' ability to obtain credit seemed to be problematic, especially with regard to obtaining credit from formal credit schemes. This could impact on the households' ability to increase their asset base, which in turn could impact on their livelihood. A system is required that would enable households to access formal credit schemes. A very important distinction between the groups refers to the entities for which credit was obtained. Only the timber supplier group used credit for activities related to timber farming, which would help to generate an increased income. Both of

the other two groups spent the credit on non-income generating entities, except for one household in the growers selling to timber supplier groups that used the credit to purchase a taxi.

5.5.8 Social capital indicators

The selected social capital indicators are shown in Table 5.3 below. The social capital level of the grower types is compared to determine which growers had the best access to social capital assets. The scores were obtained as explained in section 5.2. The total access for the three types of growers is shown at the bottom of the table.

Table 5.3 Indicators selected for the evaluation of social capital assets for the three grower types.

Social capital	GC		GT		T	
	No. of households reported	Score	**No. of households reported**	Score	**No. of households reported**	Score
SC1:Use health centre	18	2	13	1	14	2
SC2:Forestry committee	2	0	0	0	0	0
SC3:Permission to access forestry resources	17	2	6	0	19	2
SC4:More than 20 yrs using land	16	2	12	1	12	1
SC5:Sell timber to company	20	2	4	0	20	2
SC6:Obtained credit from formal schemes	0	0	2	0	5	0
Total capital score per type		8/12		2/12		7/12
Score in percentages		**66%**		**16%**		**58%**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

SC1: Use of health centre

The availability and use of health services increase households' social capital. At a health centre household members can receive free treatment for illness or disease. Households without any means of transport and those who cannot afford public transport will find it difficult to access these centres when they live far away.

SC2: Forestry committee

Households' involvement in a forestry committee will allow them to access knowledge on timber farming. New research developments and the availability of improved planting material are communicated in these committees or co-operatives (Shelembe, 2009:9). The committees provide a platform or means of contact between households and forestry companies. Meetings are conducted by timber farmers and an extension forester representing companies.

SC3: Permission to access forestry resources

Permission to access forestry resources (no one's permission for means of accessing) means that these households require permission from no one (for example a tribal authority) to access forestry resources. Households who can freely access and use forestry resources are able to improve their livelihoods. There are bigger benefits for households that enjoy direct access to forestry services. In instances where permission has to be obtained, it is often granted at a cost (by paying a fee).

SC4: More than 20 years of using land

The assumption is that households that had been using the land for timber farming over more than 20 years might have gained experience and discovered better or new ways of farming. Department for International Development (1999a:12) states that households accumulate knowledge which enables them to improve the productivity of resources.

SC5: Selling timber to company

When households are in a position to sell their products to companies they can earn a higher income from their products. Households' inability to access tickets, supply at the depot or sell their products to companies is an indicator of reduced social capital. For example, when growers sell to timber suppliers, their profit margin is reduced and there is an increased potential of being cheated by timber suppliers. Cairns (2000:36-38) asserts that growers are also cheated by contractors who charge high prices, thereby reducing the growers' net profits.

SC6: Credit obtained from formal schemes

Households indicated that access to credit formed a major impediment to their timber farming businesses. They mentioned that access to formal credit was very difficult to obtain, because they did not have permanent jobs. Should households have access to credit from formal institutions, they are enabled to buy the much needed equipment for their timber farming operations.

Participation in a forestry committee, the use of a health centre, permission to access forestry resources, using the land for timber farming over a period of time, the selling of timber and enjoying access to credit through formal schemes were the selected indicators of social capital. The three household types are next compared in terms of their access to natural capital.

5.6 Natural capital

Natural capital refers to all the natural resources that households need in order to create other asset bases. Whether the natural resources are productive or not will be influenced by the way they are managed by households. A comparison is made of households' natural capital in terms of their access to and ownership of natural resources; land used by households to grow trees; their sale of forestry products; households that keep seed and those that have planted trees and done hunting; crises experienced by households; food as a household expense; consumption patterns of households; households that had sufficient food; households' food self-sufficiency; difficult months for obtaining food; the number of meals consumed during difficult times; households' access to forestry resources; households' views on the financial value of timber farming; households living from timber farming; and households' views on areas planted to trees being expanded.

5.6.1 Households' access and ownership of natural resources

As Sokhulu is a rural area, the access to and possession of natural resources are vital. Households need to have certain skills to be able to manage these natural resources. When households possess these skills they could successfully enhance their livelihoods by using natural resources and engaging in economic activities.

(i) Households' access to and ownership of natural resources: growers selling to forestry companies

A large number of households in this group owned domestic animals. All households reported possessing trees, a high number reported possessing land and only one reported having access to land. Their possession of banana, *amadumbe*, mealies, cabbage and spinach was average. A few households grew sugar cane. It can be reported that these households showed an involvement in agricultural farming, albeit on a small-scale, with some households keeping homestead gardens and others growing their crops in the wetland or swamp areas.

(ii) Households' access to and ownership of natural resources: growers selling to timber suppliers

All households reported that they possessed trees and land, with 55% reporting that they possessed animals. These households' possession of spinach and cabbage was average. The growing and selling of banana, *amadumbe* and mealies were low, and lower than for the other two groups. Very few households cultivated sugar cane.

(iii) Households' access to and ownership of natural resources: timber suppliers

All households reported that they possessed trees and land, with only a few households reporting that they possessed sugar cane. These households' possession of banana, *amadumbe* and mealies was average. Their possession of cabbage and spinach was lower than in the other two household types.

The ownership of domestic animals enhances livelihood security and reduces the households' vulnerability to uncertainties. Land also plays a significant role in providing security, as it can be sold to improve a household's livelihood.

5.6.2 Land used by households to grow trees

The bigger the area that households have at their disposal to grow trees, the better their returns will be. A large area will produce more tons; and selling more tons would mean more income.

(i) Land used by households to grow trees: growers selling to forestry companies

Most households in the growers selling to company group had timber plots of more than two hectares in size. This means that a large number of households among growers selling to timber suppliers are likely to produce a higher tonnage at the end of the rotation, depending at what age their timber is felled.

(ii) Land used by households to grow trees: growers selling to timber suppliers

Even though there was a high number of households in the group of growers selling to timber suppliers that had plots exceeding two hectares in size, this was slightly lower than in the other two groups. This means that at any given point in time, if all households were to fell their timber at the same age and assuming that all other variables were constant, the total revenue received by the growers selling to timber suppliers would be lower.

(iii) Land used by households to grow trees: timber suppliers

More households in the timber supplier group had timber plots of more than two hectares in size. The size of the plot will determine the tonnage produced at harvest. A two-hectare plot will produce more tons compared to one consisting of fewer hectares, should the timber be felled at the same age.

The size of the land has a marked influence on the benefits that households will receive from timber farming, and thus on improving their livelihoods. Cairns (2000:35) states that many

households do not have access to large areas of land. This means that trees can contribute to household income, but will probably not lift households from poverty. Households in the groups of growers selling to timber suppliers and the timber suppliers themselves had less land compared to growers selling to forestry companies. This would impact on their income and also on their livelihood.

5.6.3 Sale of forestry products

The longer the period that households wait before harvesting their timber, the higher their income will be. If households felled their timber early, their income would be reduced.

(i) Sale of forestry products: growers selling to forestry companies

There were more households in the group of growers selling to forestry companies that indicated that they felled their timber at 6 years compared to other intervals reported by this group. A large number of households felled their timber before the trees could reach an age of 6 years.

(ii) Sale of forestry products: growers selling to timber suppliers

A felling interval of 4 years appeared to be popular in the growers selling to timber supplier group. Due to the felling of immature trees the full benefit of the tonnage could not be realised. Moreover, a large number of households felled their timber before a period of 6 years had lapsed.

(iii) Sale of forestry products: timber suppliers

More households felled their timber at intervals of 4 years, compared to the other felling intervals mentioned. A large number of households felled their plots before 6 years had lapsed.

In all the household groups it appeared that most households sold their timber before the trees could reach maturity. This reduced the total income that households could obtain from their timber sales. The additional income that is lost could be used to further enhance household livelihood. Further research is needed to determine whether households could not wait for optimal tree maturity, either by engaging in other forms of income, or selling by-products from timber such as honey until trees fully mature. Further research is needed to determine whether higher prices earned from selling more tonnage would be sufficient to sustain households for the additional years of waiting.

5.6.4 Households that keep seed and those that have planted trees and done hunting

When households keep seed it can be used for the next planting. The planting of trees results in the re-establishment of the timber plot, thus ensuring that the site remains productive.

(i) Households that keep seed, and those that have planted trees and engaged in hunting: growers selling to forestry companies

All households that practised farming kept seed for their next agricultural planting. A few households have planted trees in the past 12 months. This is because the households had felled the trees and could access or obtain planting stock to re-establish their plots.

(ii) Households that keep seed and those that have planted trees and engaged in hunting: growers selling to timber suppliers

All households in this group that practised farming reported that they kept seed from their planting for the next agricultural production. Only two households reported that they engaged in hunting, while few households had planted trees in the past 12 months.

(iii) Households that keep seed and those that have planted trees and engaged in hunting: timber suppliers

A total of 75% households in this group that were involved in farming reported that they kept seed, while the other households' indicated that they bought seed, with one household reporting that they obtained seed from the Department of Agriculture. Some households reported to have planted trees in the previous 12 months.

Almost all households from the three groups that were practising farming have kept seed. This will ensure the continuation of agricultural farming and the preservation of good genetic material for future planting. Households proceeding with their agricultural farming will ensure a constant income and sustainable livelihood for themselves. Households that plant trees will ensure the sustainability of their timber farming and help to boost the household's livelihood.

5.6.5 Crises experienced by households

Growing trees involves certain challenges. Growers risk damage incurred by animals and fire, while marketing the product might be a problem for poor farmers who have only small quantities to sell (Food and Agricultural Organisation, 1989:93). The ability of the households to survive in spite of a crisis will determine their vulnerability context. The crises experienced by households are discussed in the following sections.

(i) Crises experienced by households: growers selling to forestry companies

Food shortage, drought and fire were the most serious natural hazards to affect the livelihood of households among growers selling to company over the past 12 months. Households in the growers selling to company group reported that drought had a serious impact on their agricultural production. Other minor shocks were disease and pest infestation, flood damage, death of a family member and illness. Households in the growers selling to company reported that in order to survive these crises, most of them harvested their trees. They also harvested crops, sold animals, obtained credit, looked for temporary employment, asked for donations from the local municipality, and reduced their food consumption as well as their spending. The figures indicated for the growers selling to company group were slightly higher than those for the growers selling to timber suppliers and timber supplier group. One would expect that households among the growers selling to company would either turn to their savings or save less during times of hardship, but these households still reported a higher number of savings when compared to the growers selling to timber suppliers. This could mean that growers selling to company households were better endowed with human capital.

(ii) Crises experienced by households: growers selling to timber suppliers

A number of shocks were reported to have affected households among growers selling to timber agents in the past 12 months. Common crises experienced by households in the group of growers selling to timber suppliers in the last 12 months were food shortage and drought. The minor shocks were disease and pests, fire, and the death of a husband. Households in the growers selling to timber supplier group reported that they coped with the crises by selling their trees, though most of them reported that they harvested crops and sold their timber plots (for harvest), obtained credit, asked for government grants, received pension from the government, borrowed money, cut grass and sold it to local people for roofing and asked community members for food. Another household in the growers selling to timber supplier group reported that they assisted people who practised agriculture by helping them with weeding. They were given some of the produce as compensation for their labour.

(iii) Crises experienced by households: timber suppliers

Food shortage was another common crisis experienced by households in the timber supplier group in the last 12 months. Minor crises that affected households in the timber supplier group were drought, disease and pest infestation, fire, a funeral and repairs to a tractor. The households in the timber supplier group were affected by fewer incidents of shocks. This could mean that access to various resources can compensate for shocks.

To cope with the crises, households in the timber supplier type reported that they harvested trees and crops, obtained credit, used savings, felled their timber to waste, bought timber from other growers, asked neighbours for food, worked extra hard, transported timber for other growers and earned money from haulage.

The exposure to shocks tends to reduce the welfare of households (Hoogeveen, Tesliuc, Vakis & Dercon, 2005:4-5). The wellbeing of the household will be affected by the incidence of shocks experienced. Households' inability to absorb this shock will result in a decline in household livelihood. Forests allow the poor a method of investment for the future; therefore they can escape the poverty cycle (Falconer & Arnold, 1991:5). This has been evident in the study where households have harvested their plots during difficult times.

5.6.6 Food as a household expense

All households in all the groups reported food to be a very important expense incurred in the last 12 months. Food is important for human functioning and survival. Without food a human being cannot function; hence all households reported food as an important expense.

5.6.7 Consumption patterns of households

The study also investigated the quality of food consumed by households. The types and quantity of food that households consume will be determined by the money available in the household. The more money there is, the higher the consumption of expensive types of food by the household will be.

(i) Consumption patterns of households: growers selling to forestry companies

The consumption of meat on a daily or weekly basis was very common in the growers selling to company group and only a few of the households had meat only once a month. Meat is one of the most expensive types of food and if a large number of households can afford it, this is an indication of improved lifestyles or financial capital. As households in the growers selling to company group reported eating rice, bread, porridge, vegetables and fruit on a regular basis, it can be concluded that their eating habits reflected a healthy lifestyle.

(ii) Consumption patterns of households: growers selling to timber suppliers

The consumption of meat 1-3 times a week was common among the growers selling to timber suppliers, but lower than in the other groups. Households reported to be eating

rice, bread, porridge, vegetables and fruits more often. It is interesting to note that the eating of fruit and vegetables was high in the growers selling to timber supplier group, correlating with the other two groups of households. Although the consumption of bread was slightly lower in the growers selling to timber supplier group, it was still high. It appeared that households in the growers selling to timber supplier group were consuming cheaper food when compared to the other groups, but this did not mean that the households were compromising on healthy eating. The results show that households in the timber supplier group had healthy eating habits, as they consumed vegetables and fruit.

(iii) Consumption patterns of households: timber suppliers

There was a high frequency of meat consumption in the timber supplier group, which means that this group could afford to buy this expensive food. Another contributing factor could be that more households in the timber supplier group had fridges, enabling them to buy and store meat in bulk. Rice, bread, porridge and fruit were consumed on a regular basis. Households in the timber supplier group displayed a healthy eating lifestyle.

Sound consumption patterns were observed in all households in the respective groups. They were able to use the income at their disposal to provide food for their households.

5.6.8 Households that had sufficient food

Food is a necessity for people to survive. Whenever livelihood is discussed, food will always be mentioned. Therefore it needs to be considered whether people have sufficient food to eat.

(i) Households that had sufficient food: growers selling to forestry companies

The growers selling to company group indicated fewer months of having sufficient food to eat than the timber supplier households, but more than the growers selling to timber suppliers. Households were able to meet their food requirements for most of the time, but not throughout the year.

(ii) Households that had sufficient food: growers selling to timber suppliers

Households in the growers selling to timber supplier group reported the lowest number of months in which they had sufficient food to eat. The ability of these households to meet their daily food requirements was reduced.

(iii) Households that had sufficient food: timber suppliers

Households in the timber supplier group had sufficient food to eat during most months. The timber suppliers' households were able to meet their daily food requirements for the majority of the 12 months.

When households had sufficient food, it meant that they were able to meet their daily food requirements, as was displayed by the timber supplier groups' households. This means that these groups had sufficient stocks of food or finances (money to purchase food) to cushion them against crises, ensuring that their households' livelihood was not affected.

5.6.9 Households' food self-sufficiency

The household's ability to provide its own food, will determine its food security. Households that cannot produce or provide their own food are susceptible to shocks.

(i) Households' food self-sufficiency: growers selling to forestry companies

The number of months in which households in the growers selling to company were self-sufficient was lower than for the timber supplier group, but better than for growers selling to the timber suppliers. Members of these households will experience a decline in their livelihood during the months when they are not self-sufficient.

(ii) Households' food self-sufficiency: growers selling to timber suppliers

The growers selling to company group had the least number of households that were self-sufficient for most months of the year, compared to the other two groups. The vulnerability of this household type is high in comparison to the other two groups.

(iii) Households' food self-sufficiency: timber suppliers

More households in the timber supplier group were self-sufficient for a number of months. The susceptibility of this household group to shocks was reduced, or their ability to resist shocks was better than that of other household types.

The vulnerability of households in the group of growers selling to timber suppliers is high; this is also shown above by their inability to be self-sufficient in terms of food. If households are not able to provide food for themselves, their livelihood security is threatened.

5.6.10 Difficult months obtaining food

If households cannot produce food for themselves, or lack the financial resources to buy food, they will not have access to food. Households' inability to produce food for themselves could either be due to their inability to access water (for agricultural farming) or a lack of financial resources for procuring food.

(i) Difficult months for obtaining food: growers selling to forestry companies

Growers selling to company group reported that they found July to be the most difficult month for obtaining food. This could be aligned with the drought reported as being one of the shocks that households had experienced, as drought affects agricultural production.

(ii) Difficult months for obtaining food: growers selling to timber suppliers

Growers selling to timber supplier groups found January to be the most difficult month for obtaining food. Households probably spent a large amount of their income during the festive season, while school expenses (school uniforms and school fees) also peaked in January.

(iii) Difficult months for obtaining food: timber suppliers

The timber supplier household group type indicated that January was the most difficult month for obtaining food. Households in this group incurred high school expenses (in January) compared to the other months, which could impact on their food supply.

Food is critical for the survival and livelihood of households. The fewer the months that households are not able to obtain food, the better, for members of the household cannot function on an empty stomach. The longer the period that households find it difficult to obtain food, the bigger their vulnerability will be, and as a consequence there will be a decline in the standard of their livelihood.

5.6.11 Number of meals consumed during difficult months

When times are tough one of the strategies employed by households to survive is cutting down on the number of meals that they consume. A comparison is made of the number of meals that each household type consumed during the most difficult months.

(i) Number of meals consumed during difficult months: growers selling to forestry companies

A larger number of households in the growers selling to company group had one or two meals per day. The balance of the households either had three or the same number of meals, while one household indicated that they had no meals at all. Households reduced their number of meals during difficult months.

(ii) Number of meals consumed during difficult months: growers selling to timber suppliers

Half of the households among growers selling to timber suppliers had one meal a day during the most difficult period, while the rest either had two, three or the same number of meals. The most common coping strategy was to consume cheaper food and to reduce the number of meals during crisis periods, thereby reducing the households' vulnerability. Households also purchased food on credit, as indicated in paragraph 5.5.7.

(iii) Number of meals consumed during difficult months: timber suppliers

An equal number of households in the timber supplier group either had one, two or three meals, or did not change the quantity consumed during difficult periods. Households were able to turn to their savings during difficult months.

In order to survive during difficult months, households reduced the number of meals that they consumed. Households also consumed less expensive food as a coping strategy during difficult times. The strategies that households employed reduced their vulnerability during difficult months, thereby minimising the impact on their livelihood.

5.6.12 Households' access to forestry resources

Access to forestry resources is an imperative for timber farmers' households. The access enjoyed by growers included being able to supply timber to the local depot (Mondi Khulanathi depot); acquiring tickets to supply timber to pulp and chipping companies such as Sappi, Mondi, NCT Forestry Co-operative Limited (formally known as Natal Co-operative Timber) and TWK (Transvaal Wattle Kwekery); obtaining planting material (seedlings) from Mondi and obtaining extension advice.

(i) Households' access to forestry resources: growers selling to forestry companies

Access to resources was high in the growers selling to company group, as half of the households were able to obtain tickets for delivering timber to the mills, while another half

were able to supply timber to the local Mondi depot. One household managed to acquire seedlings and another reported receiving planting assistance.

(ii) Household access to forestry resources: growers selling to timber suppliers

Access to forestry resources by the households of growers selling to timber suppliers was very poor. A few saying that they had access indicated that they could sell their timber at the Mondi Khulanathi depot, obtain free seedlings from Mondi, buy seedlings from the Mondi nursery and procure tickets to supply to companies in Richards Bay.

(iii) Household access to forestry resources: timber suppliers

A large number of households indicated that they had access to tickets for supplying timber to the mills in Richards Bay, and for supplying at the depot. Others could access seedlings, and one household reported having access to fertilisers. The timber supplier group reported the highest access to forestry resources when compared to all the other groups. The financial capital was high as a result of households being able to supply their timber directly. Profits were better, thereby increasing household income and well-being and thus reducing vulnerability. The higher financial capital enabled households to save and these savings could be used during times of uncertainty. By being able to access seedlings the natural resource base of the household was improved, as new areas could be planted and the old planting replaced with new and improved material, thereby ensuring the sustainability of timber farming.

Households' access to forestry resources plays a big role in the sustainability of timber farming. Many growers (including Sappi growers) sold their timber at the Mondi (Sokhulu and Mbonambi) weigh bridges as they are located closer to the growers (Karumbidza, n.d:11), and this was also observed in the study. Project Grow helps emerging rural farmers and contractors to gain access to the formal market (Sappi, 2008:5). Through company schemes households have been able to gain access to the formal timber market, which has a positive impact on households' livelihood.

5.6.13 Natural capital indicators

Table 5.4 shows natural capital indicators for comparing the natural capital assets for the three grower types. The different groups were scored (as explained in section 5.2) and the total score for each group is indicated at the bottom of the table.

Table 5.4 Indicators selected for the evaluation of natural capital assets for the three grower types.

Natural capital	GC		GT		T	
	No. of households reported	Score	**No. of households reported**	Score	**No. of households reported**	Score
NC1:Animals (possessed)	13	1	11	1	16	2
NC2:Trees (possessed)	20	2	20	2	19	2
NC3:Mealies (possessed)	9	1	3	0	11	1
NC4:Land (possessed)	19	2	20	2	20	2
NC5:Forestry and forest resource (access)	19	2	6	0	20	2
NC6:Plot more than 2 ha	15	2	13	1	15	2
NC7:Access tickets	10	1	1	0	14	2
NC8:Access depot	10	1	5	0	15	2
Total capital score per type		12/16		6/16		15/16
Score in percentages		**75%**		**38%**		**94%**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

NC1: Animals (possessed)

When households own domestic animals, their natural capital is increased. Animals are used for lobola, they can be slaughtered for food, they are used for traditional ceremonies, and, most importantly, in times of financial crisis they can be sold or exchanged for cash.

NC2: Trees (possessed)

Trees require very little capital investment and some trees have the ability to reproduce themselves (Food and Agricultural Organisation, 1989:93). Trees can be harvested at any time (Food and Agricultural Organisation, 1989:93) when a need for extra income arises. During difficult times households are able to harvest their trees as a means of relief, so that trees serve as a safety net in times of hardship (Shackleton *et al*., 2007:565-566).

NC3: Mealies (possessed)

In a study undertaken by Rose, Borne and Bradshaw (2002:19) maize (mealies) and samp were identified as the most common starch food consumed by black people. Maize forms a basic foodstuff in many black households, and more so in rural areas.

NC4: Land (possessed)

Households' possession of land leads to increased human capital. When households possess land they are able to carry out a variety of activities ranging from agriculture to forestry. Land

serves as a means of security and can be sold for cash. Fernando (2003:10) asserts that land ownership is a significant pointer towards livelihood security.

NC5: Forestry and forest resources (access)

When households are able to access forestry resources, this constitutes an increased natural capital. Households' livelihoods can be improved by their access to these natural resources.

NC6: Plots of more than two hectares

The size of land that a timber farmer possesses will have a big impact on the income that the farmer will receive at harvest. The larger the area the growers have planted to timber, the bigger their income will be. When households have only a small piece of land that has been planted with trees, their income will be small too.

NC7&NC8: Access tickets and access to the depot

When households have access to tickets and can supply to the depot, it means that they can sell their timber directly to either forestry or procurement companies. Growers who do not have access to these services will either use other growers' supply numbers or sell their timber to a member of the community. When growers access the said services through other growers, these growers charge a fee.

Selected natural capital indicators have been compared. These indicators are: The households' possession of animals, trees, mealies, land, the size of the land and access to forestry resources. The financial capital of the three households is compared in the next section.

5.7 Financial capital

Financial capital considers all the moneys that households have or earn, as well as their savings. Households' financial capital is compared in terms of household income, per capita income and total expenditure, household income in percentages, median values of household income, households' payment for the use of forest and forestry services, income intervals from timber sales, most recent harvesting figures, households' earnings from crop sales, proportion of agricultural crops sold, household spending, savings by households, households' credit and households' exposure to financial crisis.

5.7.1 Household income and per capita income

Income and per capita income for the three household types are compared. Statistics South Africa (2007:3) defined the poverty line as one of the means of determining poverty to get a better insight into it and to devise means to remove poverty (Frye, 2005:7-10). Govender *et al.* (2007: 124) define the poverty line as a line that can be used to determine the wealth status of people

and that can, therefore, classify them as poor. Whether households are able to access a sufficient consumption bundle cannot be determined by the poverty line, for the line shows what households require to maintain a basic livelihood, including food and other essential non-food items (Statistics South Africa, 2007:9).

(i) Household income and per capita income: growers selling to forestry companies

The total median income for households in the growers selling to company group was R3 700. This income was lower than the total median income for timber suppliers, but higher than the income of growers selling to timber suppliers. Per capita income for each member of the household in this group was R649.

(ii) Household income and per capita income: growers selling to timber suppliers

The household of growers selling to timber suppliers had a lower median income (R3 455) compared to the other household types. The calculated per capita income was R621.

(iii) Household income and per capita income: timber suppliers

The total median income (R1 3405) for households in the timber supplier group was very high when compared to all the other household groups. Per capita income for members of the timber supplier households was R2 141, which was also very high.

About half all South Africans are reported to use less than R353 per adult per month (Schreiner & Van Koppen, 2002:969-970), while Ardington *et al.* (2006:829) reported a poverty line of between R124 and R340 per capita. The per capita income of households in all three groups was high. The schemes are said to contribute from 12% to 45% of the household income needed for households to remain above the poverty line (Cairns, 2000:41). Schemes will contribute an additional income where households rely on pension (Lewis *et al.*, 2005:33). The high median income in the timber supplier group will ensure that households remain well above the poverty line. There is more sustainability in their livelihood compared to the two grower groups.

5.7.2 Household income in percentages

Other incomes are studied in respect of how they compare with income derived from timber farming. As the household income plays a significant role in households' livelihood, the income of all three groups is compared.

(i) Household income in percentages: growers selling to forestry companies

A large portion of households in the growers selling to company households earned an income from timber farming. This was followed by pension income, government grants and part-time or seasonal work. The income that households earned from timber farming enabled them to improve their well-being, while also reducing their vulnerability context. Other types of income received by households in the growers selling to company group came from full-time employment, selling (tuck shops) and disability pension. Labour force participation and employment rate have been reported to increase in households receiving social grants as opposed to those that do not receive this type of earnings (Samson *et al*., 2004:134). The growers selling to company group had the largest number of members that received a pension income; this was due to the higher number of elderly people in this group when compared to the other groups. More households in the growers selling to company group received an income from the government compared to the other groups. Income from full-time employment and trading contributed least to the income of households in the growers selling to company group.

(ii) Household income in percentages: growers selling to timber suppliers

The households were involved in quite diverse economic activities, although timber farming seemed to be the most popular. Households engaged in permanent work, temporary or seasonal employment and timber farming. A larger portion of households earned an income from timber farming, followed by pension income, government grants, full-time employment and part-time or seasonal work. On the other hand Samson *et al.* (2004:1) state that social grants play a significant role in poverty reduction and also encourage social development. Other household income came from donations, disability pensions and payouts on the death of a husband. This group reported a higher number of households receiving an income from permanent employment. The risks associated with this type of employment type were less than that of trading or part time jobs. This group also received more income from the government (pension and grants) in comparison to the timber supplier group. The same group showed many diverse sources of income. As a consequence these households will be more resistant to shocks and stress, and their vulnerability can be minimal. This group is likely to recover quickly if a household member were to lose a job, compared to the timber supplier group where a large proportion of their income was concentrated in one person, possibly the head of the household. Full-time employment, part-time or seasonal employment and pension funds proved to be the most common sources of income for this household type. A few households in this group indicated that they were involved in other types of employment,

with one household member reporting that he worked as a taxi driver and another as a security guard.

(iii) Household income in percentages: timber suppliers

Timber farming contributed a large portion of the income received by households in the timber supplier group, followed by pensions and lastly by income derived from full-time employment. Other types of income for timber supplier households was earned from part-time or seasonal employment or came from government grants, trading, traditional healing, disability pension and nurseries (selling seedlings). A larger number of timber supplier households received an income from business (selling and timber farming), which also explains the big difference between the total income for this group and the other groups. All households in the timber supplier group felled their own timber and about half of them were able to transport the timber using their own transport.

Security income plays a significant role in the livelihood of most growers selling to company, as a large percentage of households received this form of income. One of the ways in which the South African government is addressing poverty is through social security systems (Inter-Regional Inequality Facility, 2006:1). Using different methods to assess the impact of social grants on people's livelihood, South Africa's social security system demonstrates to have successfully reduced poverty (Samson *et al*., 2004:133). Households rely heavily on timber farming as a source of income, as these households are situated in rural areas. Forests provide many other benefits to rural people, such as employment opportunities which are vital for poor people who have limited options (Falconer & Arnold, 1991:4). Through their involvement in forestry some rural households are able to escape poverty (Shackleton *et al*., 2007:573), as forestry will provide forest foods and income through the sale of forest products. Even though forest resources, like other activities that rural people engage in, cannot remove millions of rural people from a situation of poverty, they can help to reduce the degree of poverty for some (Shackleton, 2004:35-36).

5.7.3 Median value of household income

The income received by households is important in helping them to sustain their livelihood. The median value of household income in relation to timber farming is compared.

(i) Median values for household income: growers selling to forestry companies

The biggest median income for growers selling to forestry companies was earned from permanent employment. This was followed by income from trading, timber farming and

lastly from part-time or seasonal employment. The rest of the income consisted of pensions, government grants and other sources. Income from permanent employment was significant in this group.

(ii) Median values for household income: growers selling to timber suppliers

Households earned a large proportion of their median income from permanent employment. The second highest median income was from part-time or seasonal employment, followed by pensions, other forms of income, timber farming, government grants and donations. From the median values discussed here the contribution made by timber farming was very low for this household group.

(iii) Median values for household income: timber suppliers

The timber supplier households earned a high percentage of their median income from timber farming. This was followed by full-time employment, other forms of income, trading, part-time or seasonal employment, old age pensions and government grants. From the median values it is clear that income from timber farming contributes a large portion of the income received by timber supplier households.

From the median income values reported it is obvious that timber farming contributed the largest portion of income for timber supplier households, followed by growers selling to forestry companies. Income from timber farming plays a significant role in the livelihood of the timber supplier households and in that of growers selling to company, ensuring a sustainability of their livelihood. The lowest contribution that timber farming made to the household income was reported in the group of growers selling to timber suppliers. The contribution of timber farming to the livelihood of the growers selling to timber suppliers is questioned.

5.7.4 Households' payment for the use of forest and forestry services

In order for timber growers to manage their small-scale timber farming effectively they require access to certain forestry services. The discussion that follows looks at households that paid for the use of the forestry services.

(i) Households' payment for the use of forest and forestry services: growers selling to forestry companies

More households in the groups of growers selling to company than those in the timber supplier group indicated that they could access forestry services without any costs attached, while a few pointed out that they were required to pay. Half of those reporting

that they were required to pay said that they paid R50 to the tribal authority for a letter of permission to use these services. The other half said they had to pay those who already had access to tickets R100 per ticket for supplying to the mills. Even though the growers selling to company had better access to forestry resources when compared to the growers selling to timber suppliers, these households were subject to some form of exploitation, seeing that they had to pay for their tickets.

(ii) Households' payment for the use of forest and forestry services: growers selling to timber suppliers

No households in the growers selling to timber supplier groups reported to have paid for the use of forest and forestry services.

(iii) Households' payment for the use of forest and forestry services: timber suppliers

A large number of timber suppliers reported that they did not pay anything for using the resources, while a smaller proportion said they did so. Of the few households that paid for using the resources, some reported that the payment was required for using other growers' tickets to supply to the mills. Others indicated that they had to pay back the planting loan to Mondi and Sappi. Although the timber supplier group appeared to be better off, to have better education and to be more informed than the other two groups, certain households in this group were subject to manipulation by others.

Not all households were able to make use of the forestry services free of charge; some had to pay for using them. The company provides the farmers with advance payments and technical assistance, but in turn the farmers must sell their timber to the forestry company (Andrew *et al*., 2000:31-33; Cairns, 2000:1-2) and pay back the loan. Those households that were dependent on others for tickets were subject to some form of exploitation by the owners of the tickets, as these households could only supply when the ticket owners had surplus tickets. This could impact negatively on their livelihood when they did not receive tickets in time to be able to sell their timber.

5.7.5 Income intervals from timber sales

Ham and Theron (1999:76) estimated a period of six to seven years for trees to reach full maturity in the Northern Zululand region. Due to the urgency to receive income, households turned to selling their timber early. This early felling of timber could reduce profits.

(i) Income intervals from timber sales: growers selling to forestry companies

Some households in the growers selling to timber supplier group reported to be earning income from their timber sales at 6 years, while other households earned income at 4 years. The rest of the households earned income at 3, 4.5, 5 and 7 years.

(ii) Income intervals from timber sales: growers selling to timber suppliers

Eight households in the growers selling to timber supplier group reported having earned income from the sale of timber at 4 years. Six households reported to have earned income at 5 years, while the rest earned income at 3, 4.5, 6 and 7 years.

(iii) Income intervals from timber sales: timber suppliers

In the timber supplier group most of the households (11) felled at intervals of 4 and 5 years. The other households felled their timber at 3, 4.5, 6 and 7 years.

Households that felled their timber early could not wait for the recommended felling age. These timber growers depended on the income derived from forestry for their livelihood. Forestry is seen to be playing a major role in alleviating or mitigating poverty in the rural areas, as forestry is an important economic activity for some rural occupants (Shackleton *et al*., 2007:558-559).

5.7.6 Most recent harvesting figures

The income that households receive at felling is important, as households have invested their resources and waited for years to earn revenue on these investments. At the time of harvesting the timber the households incur costs, which will determine the revenue that these households eventually receive.

(i) Most recent harvesting figures: growers selling to forestry companies

The growers selling to company group has a median tree felling interval of 4.75 years, which was earlier than the timber supplier group, but later than the growers selling to timber supplier households. This means that households are harvesting before timber has matured optimally, resulting in lower tonnage per hectare, which in turn means that households earn less revenue. The production costs for the growers selling to company group were much higher when compared to those of the timber agents. Most of the households in the growers selling to company group did not have equipment for felling and transporting their timber to the mills or depot; consequently they had to outsource all or most of the operations. Even those households that could do their own felling still required transport to move their timber. At the sale of their last harvest the total amount

earned by households in the growers selling to company group was higher than that of the timber suppliers, but these households had to pay contractors to fell their trees or transport their timber products.

(ii) Most recent harvesting figures: growers selling to timber suppliers

The growers selling to timber supplier groups had the lowest median tree felling intervals compared to the other two groups, indicating that this group felled their timber earlier than the other household types. The total revenue earned by growers selling to timber supplier groups was lower than that of the other two groups, despite the group reporting a higher median tonnage received at harvest.

(iii) Most recent harvesting figures: timber suppliers

The median felling interval for the timber supplier group was 5 years, which was higher than for the other household types. Almost all households sold timber logs from their plots. The total revenue that the timber supplier group received from their timber sales was higher than that of the growers selling to company group, because of the reduced production costs.

The rate at which trees grow presents a challenge, as trees normally require five to ten years to provide significant returns. This sometimes conflicts with the needs of low income people who require cash immediately (Ascher, 1995:51-54; Huu-Dung & Yeo-Chung, 2012:66). This has also been the case in the study, because households needing an urgent income were selling their timber early. Further research is needed to determine the optimal break-even point for harvesting timber in the Sokhulu area. There is a need to introduce other income-earning activities that households can embark on while waiting for their timber to mature. The high production costs incurred by households tend to reduce their household profits significantly and this will impact on their livelihood. The costs of felling trees and transporting timber need to be monitored or subsidised to assist households in meeting their production costs, thereby ensuring that they obtain high revenues. As the profits of households selling timber to timber agents were significantly reduced, it impacted on their household income, which in turn impacted on their livelihood.

5.7.7 Household earnings from crop sales

In order for households to support themselves while waiting for the timber to grow, households combine several activities to spread the risks. Where various households in the Sokhulu area have a piece of land that is allocated to or used by them, vegetables are grown in a fertile

wetland. As wetlands do not dry up, people are able to obtain food during the dry season. This reduces the households' vulnerability context and results in improved food security.

(i) Household earnings from crop sales: growers selling to forestry companies

Households' involvement in agricultural farming was shown to be very poor. Very few households reported crop sales. Their highest income in this regard was generated from sugar cane farming.

(ii) Household earnings from crop sales: growers selling to timber suppliers

Households' participation in agricultural farming was very poor. The sale of crops was practised by few households, and sugar farming sales brought the best returns. Returns from *amadumbe* were better than for growers selling to forestry companies, but lower than for the timber supplier group.

(iii) Household earnings from crop sales: timber suppliers

The involvement of households in agricultural production was lower than for the other two groups of growers. For the timber supplier groups, as for the other grower groups, sugar cane farming brought higher revenues than any of the other agricultural crops.

The contribution of income earned from the sale of the agricultural crops was very poor for all the grower types, and even lower for the timber supplier group. Although households relied on timber farming, there is a need for households to pursue other activities, as diverse sources of income would scatter their risks. Some households complained that they did not have access to the fertile wetland area, as space was limited.

5.7.8 Proportion of agricultural crops sold

The larger the portion of harvest that households are able to sell from their agricultural production, the higher their income would be. Income from agricultural production can be used to supplement forestry.

(i) Proportion of agricultural crops sold: growers selling to forestry companies

Revenues from agricultural produce were shown to be lower than in the other two groups. Households in the growers selling to company group managed to sell 65% (median) of their crops. The remaining portion was mostly consumed by the households, and the rest was lost after the harvest.

(ii) Proportion of agricultural crops sold: growers selling to timber suppliers

Agriculture is very important in any rural community; households are sometimes located far from the cities and the level of employment might be low. Growers selling to timber suppliers earned the highest revenue from their agricultural produce when compared to the other two groups. Households selling to timber suppliers managed to sell 70% (median) of their crops. The remaining portion of the harvest was either consumed at home or lost post harvest.

(iii) Proportion of agricultural crops sold: timber suppliers

Timber supplier groups earned higher agricultural revenues than growers selling to company group, but lower than growers selling to timber suppliers. This timber supplier group managed to sell 75% (median) of the proportion that was harvested. A small portion of the produce that was not sold went to waste and a larger portion was consumed by the households.

Households managed to sell more than half of their products. The households involved in agricultural farming were able to earn income from sources other than forestry. Households' livelihood was enhanced by this additional income, because agricultural products are annual crops and income from sales could be used to sustain livelihoods while households waited for their timber to mature. There is a need for further research to determine the implications of the loss of crops after harvest, and also to determine what intervention programmes can be introduced.

5.7.9 Household spending

Households' future livelihood will be determined by how they utilise their income. Poor households tend to spend most of their income on food, as food is essential for human survival.

(i) Household spending: growers selling to forestry companies

For households selling to company the median value showed that spending was higher on fuel, followed by food and other expenses. Households' spending on food and other expenses was higher than that of growers selling to timber suppliers, but lower than the timber supplier households. Spending on fuel in the case of growers selling to company was lower than in the other household types. Median values for growers selling to company showed that households' spending on school fees, school uniforms and other school expenses were lower than that of all the other household types. The results reflected a median value of R400 for household spending on vehicles, and only one

grower in the growers selling to company group indicated to have spent on vehicles. Spending on medicines and doctors' fees showed the same median value for households in the growers selling to company, while median spending on fees for traditional healers was lower than for the other two groups.

(ii) Household spending: growers selling to timber suppliers

For households selling to timber suppliers the median spending on food, public transport, doctors' fees and other expenses was lower than for the other two groups. In the case of growers selling to timber suppliers the median spending on fees for traditional healers, school fees, school uniforms and other school expenses was lower than for the timber supplier group, but higher than that of growers selling to company. Median spending on medicines and clothes by the growers selling to timber suppliers was higher than the median for timber suppliers, but lower than that of growers selling to company.

(iii) Household spending: timber suppliers

Median spending values on food in this group were higher than in the other two groups. Median spending on doctors' and hospital fees was lower in this group compared to the other two groups. Median spending on school fees, school uniforms and other school expenses was higher than in the other two household types. The results for this group showed a higher median for spending on doctors' fees and traditional healers.

Timber suppliers showed higher median spending on school expenses. As households were investing in their children's education, these children will be able to pursue higher goals. Moreover, they will be entering the labour market with higher earnings and better employment prospects.

5.7.10 Savings by households

Saving money is very important as it helps to secure households' financial position and to help them recover in the wake of uncertain conditions. Savings serve as a safety net against shocks, thereby reducing household vulnerability.

(i) Savings by households: growers selling to forestry companies

A large percentage of households in the growers selling to company group reported to be saving a portion of their earnings. Most of these households indicated that they were saving independently; only one household indicated that they were saving as a group. The group of growers selling to company tended to use their savings more often than the

other two groups, but the median amount used from their savings was lower than that of the timber agent households.

(ii) Savings by households: growers selling to timber suppliers

Very few households in this group reported that they were saving, and those who did, were saving independently. This means that the majority of households in this group spent most of the income that they earned. Just over 33% of households reported to have used their savings in the past 12 months, which was lower than for the other two groups. For this group, the median amount used from their savings was lower than for the other two groups.

(iii) Savings by households: timber suppliers

Results show that a large proportion of households in the timber supplier group were saving their earnings. The number of timber supplier households that reported to be saving was equal to those in the growers selling to company group. Timber supplier households will buy livestock and young timber plots (not ready for felling) from other growers and keep them as savings. This can be used as a safety net in uncertain conditions, thereby reducing households' vulnerability. Households in the timber supplier group were mostly saving independently, with one household saving in a scheme. Sixty four percent of households in the timber supplier group had been using their savings, which was higher than for growers selling to timber supplier groups, but lower than the growers selling to company. The timber supplier group used the highest median amount from their savings.

Savings were very low in the households of growers selling to timber suppliers, which means that these households' vulnerability was high. In times of uncertainty the households of growers selling to timber suppliers will be vulnerable to crises and this could impact negatively on their livelihood. Households in the growers selling to forestry companies and timber suppliers were better cushioned from shocks. Forestry provides households with a safety net (a guaranteed income or insurance) in the event of death in the family, job losses, drought, floods, crop failure, death of their livestock and any other unanticipated expenditure (Shackleton *et al*., 2007:565-566; Anderson & Gong, 2010:335). The timber plots owned by households also served as a safety net to reduce their vulnerability.

5.7.11 Household credit

Credit can be helpful when used by households to enhance their lives, such as for purchasing equipment that they can use for work. When households take up huge loans that they are unable to repay credit will have a negative impact on their livelihood. The interest rate at which credit is obtained is crucial.

(i) Household credit: growers selling to forestry companies

Very few households in the growers selling to company group obtained credit in the last 12 months. The median rate obtained by these households was low when compared to the other household types. It was far below the inflation rate and the median credit period was the shortest compared to the other two household types.

(ii) Household credit: growers selling to timber suppliers

Half of households in the growers selling to timber supplier group obtained credit. The median period of the credit obtained was longer than for growers selling to company, but shorter than for timber agents. The rate obtained by growers selling to timber suppliers was higher than that of the other two groups and far above the inflation rate reported by South African Development Community (2009:6). When people obtain credit for investments or other purposes it can place a huge burden on the household until such time that the full amount has been repaid.

(iii) Household credit: timber suppliers

Slightly less than half of households in the timber supplier group obtained credit. The median rate at which this credit was obtained was 12%, at a median period of 36 months. The timber supplier group reported the longest credit period, but the indicated median rate was slightly higher than that reported by South African Development Community (2009:6).

Credit can help to boost households' livelihood, but it can also place a burden on households and impact negatively on their livelihood. The median rate that was obtained by the growers selling to timber suppliers was well above the South African Development Community (2009:6) inflation figures. Such high rates result in a reduction of households' revenues, as high lending rates have to be paid back, reducing the money available to the household. The remaining money might not be sufficient to sustain a household's livelihood.

5.7.12 Household exposure to financial crises

Households' exposure to crises tends to impact on their livelihood. When households do not have finances, it will impact on all the other assets, as money is important for livelihood and the functioning of other assets.

(i) Household exposure to financial crises: growers selling to forestry companies

Compared to the other groups, the growers selling to company had the biggest number of households that reported experiencing a financial crisis in the last 12 months. These households nevertheless reported higher savings figures compared to the other two groups.

(ii) Household exposure to financial crises: growers selling to timber suppliers

A large number of households in the timber supplier group reported experiencing a financial crisis in the past 12 months. The results showed figures that were slightly lower than those for growers selling to company, not deviating too far from the figures for timber supplier groups.

(iii) Household exposure to financial crises: timber suppliers

Most households in the timber supplier group were faced with financial crises in the past 12 months. Even though the number of households in the timber supplier group that experienced a financial crisis was higher, it was lower than the number of households in the other two groups. These households were probably cushioned by their savings during these difficult times.

Exposure to financial crises would be expected to occur more often in the growers selling to timber supplier group, as these households saved less than the other households and they also had high credit burdens. The timber supplier groups relied on their savings to sustain their livelihood during times of crisis. The growers selling to forestry companies reported to be most seriously affected, but still managed to save. This could mean a better livelihood for growers selling to forestry companies.

5.7.13 Financial capital indicators

Table 5.5 shows the selected financial indicators for comparing households' financial assets. The number for each asset was scored. The scores (as explained in section 5.2) and the total score are shown at the end of the table.

Table 5.5 Indicators selected for the evaluation of natural capital assets for the three grower types.

Financial capital	GC		GT		T	
	No. of households reported	Score	**No. of households reported**	Score	**No. of households reported**	Score
FC1:Income from timber farming	13	1	13	1	19	2
FC2:Savings	11	1	6	0	10	1
FC3:Obtained credit	6	0	10	1	9	1
FC4:Proportion of agri-crop household managed to sell (%)	65	1	70	2	75	2
FC5:Revenue from timber sales	15	2	8	1	16	2
FC6:Felled at 6 years	7	1	2	0	3	0
Total capital score per type		6/12		5/12		8/12
Score in percentage		**50%**		**42%**		**67%**

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

FC1: Income from timber farming

The employment level is very low in many rural areas in South Africa. Most households depend on subsistence farming. Households that have embarked on timber farming were able to secure an income at harvest or when they sold their plots. Timber farming serves as a source of income for households. Through their involvement in forestry some households are able to escape poverty (Shackleton *et al*., 2007:573).

FC2: Savings

When households have savings they are not dependent on others and their savings provide a favoured financial capital with no accountability (Department for International Development, 1999a:15). When households manage to save a portion of their income, it is a good indicator of financial capital. Savings can be used during times of shock to purchase food and meet other household needs.

FC3: Obtained credit

When households are able to access credit, they can borrow money to increase their asset base. Lending provides a form of cash that is readily available and can be paid back in instalments. Households use credit to purchase furniture and clothes.

FC4: Proportion of agricultural crops that households managed to sell

When households grow agricultural produce it is for the purpose of household consumption. Agricultural crops can also be sold to increase a household's income. The larger the proportion sold from the harvested crop, the bigger the household's income will be.

FC5: Revenue from timber sales

The bigger the revenue that households earn from their timber sales, the larger the benefits realised from the investments. The revenue includes the total income less costs. Higher operational costs reduce the total revenue that households may earn from their timber sales. The financial capital earned can be transformed into other capitals, depending on the transforming processes (Department for International Development, 1999a:15). Department for International Development (1999a:15) states that financial capital can be utilised for the attainment of livelihood outcomes; for example, food insecurity can be eliminated by the purchase of food.

FC6: Felled at 6 years

The longer the households leave their trees to grow before harvesting, the higher the return on their investments will be. The ideal felling age for gum trees in the Northern Zululand region is 6 years (Ham and Theron, 1999:76). For households to obtain the maximum benefit, their trees must be felled at 6 years.

Income from timber farming, savings, credit obtained, agricultural crops sold, revenue from timber farming and a felling interval of 6 years were the selected indicators used to evaluate households' access to financial capital. The asset pentagon presents a schematic presentation of households' access to the different forms of capital.

5.8 Comparison of asset pentagon for household types

The following section presents a schematic diagram of the livelihood information that was collected during interviews, statistically analysed and discussed above. The Sustainable Livelihood Framework (Department for International Development, 1999) is used to determine household livelihood, the framework of which has been discussed in paragraph 3.3.1. The livelihood assets represented by each of the previously described capitals have been analysed for the three small-scale timber farming household types, namely growers selling to company (GC), growers selling to timber suppliers (GT) and timber suppliers (T). Table 5.1-5.5 has been drawn for each capital group and appears at the end of each asset discussion. Table 5.6 shows a summary of the percentage of the total for each capital with regard to the different household types.

Table 5.6 Capital scores for the three household types

Capitals	GC	GT	T
Human capital	65%	25%	45%
Physical capital	80%	60%	90%
Social capital	66%	16%	58%
Natural capital	75%	38%	94%
Financial capital	50%	42%	67%
Total capitals	67%	36%	71%

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

Using figures from the above Table (Table 5.6), the asset pentagon was drawn (Figure 5.1). Figure 5.1 shows the comparison between access to assets for each of the household types.

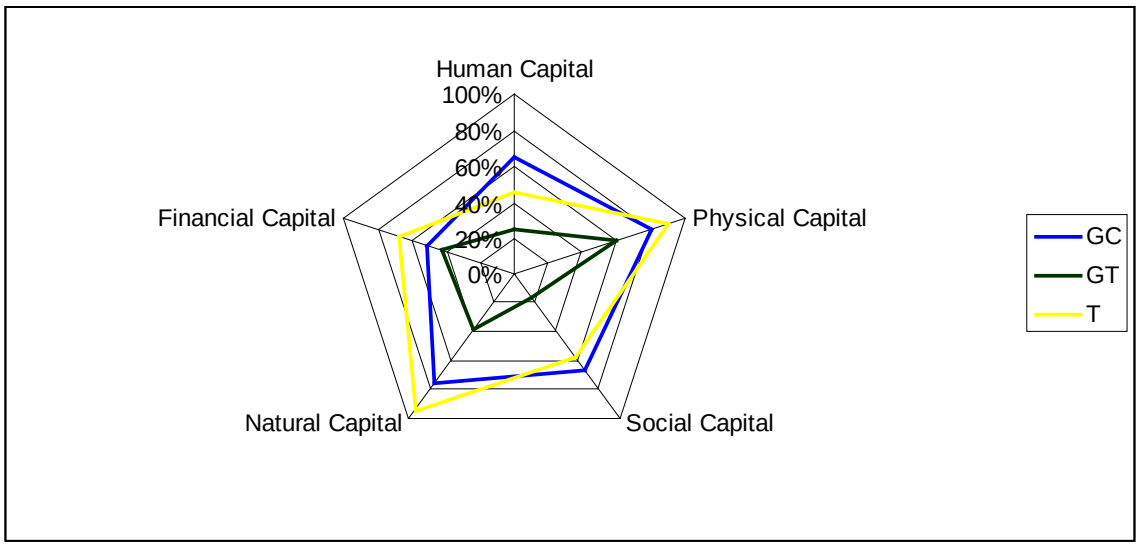

Figure 5.1 Capital asset pentagon for the three grower types.

GC = growers selling to company, GT = growers selling to timber suppliers, T = timber suppliers

The pentagon (Figure 5.1) shows households' access to assets schematically (Department for International Development, 1999a:5). Access to natural capital was high in the timber supplier group, followed by the growers selling to forestry companies and lastly growers selling to timber suppliers. Access to human capital was high for the group of growers selling to forestry companies, followed by the timber supplier group and growers selling to timber suppliers. Access to physical capital was almost similar for households from growers selling to company and households from timber suppliers, but the timber supplier group showed higher access. Growers selling to timber suppliers had the lowest access to physical assets, but it was the better asset for this group, together with natural assets. Access to financial capital was high for the timber supplier group, followed by the growers selling to forestry companies and lastly growers selling to timber suppliers. Social capital was almost similar for the growers selling to forestry companies

and timber suppliers, but the highest for growers selling to forestry companies. The status of social assets was very low among the group of growers selling to timber suppliers.

From the comparison between the grower groups in Figure 5.1 it is evident that access to all types of assets is higher for the growers selling to company and the timber supplier households, while access to capital assets is poor for growers selling to a timber supplier group. When households have a larger number of assets, they have multiple options and can alternate between the different livelihood strategies to sustain their livelihood (Department for International Development, 1999a:6; De Sherbenini *et al*., 2008:40). Households with more assets are able to attain a variety of livelihood outcomes, thereby escaping poverty (Department for International Development, 1999a:6).

The livelihood of timber suppliers was of a higher standard, as these households had high access to all types of assets. When households manage to establish large assets, poverty will be low, whereas a decline in the assets base will increase poverty (Erenstein, Hellin & Chandna, 2010:112-115). Households' access to the market had an impact on their livelihood; those households that could access the timber market directly (by obtaining tickets or supplying the depot) had a better livelihood. A study Orr and Mwale (2001:1325-1343) showed that market freedom enabled households to earn a higher income from their crop sales and to form micro-enterprises, resulting in an improvement in the economic status of households. Kamanga *et al.* (2009:613-624) found that people who had access to forest resources had a higher overall income. Even when households had little access to agricultural land, income from forests permitted supplementary income for households with limited opportunities.

Despite the variation in how households access financial, human, natural and physical capital, the way in which these are directed will determine livelihood strategies, being a function of social capital (De Sherbinini *et al*., 2008:50). Household access to assets has been illustrated schematically by the shape of the pentagon. An understanding of the benefits that households enjoy from timber farming is important in order to determine the value that households attach to timber farming.

5.9 Benefits for timber suppliers and growers from small-scale timber farming

A considerable number of households in the timber supplier group, followed by growers selling to forestry companies and lastly growers selling to timber suppliers, reported that there was financial value in timber farming. Forestry is seen as the main potential role-player in eradicating or

reducing poverty in rural areas, as it is in most cases a significant economic activity in these areas (Shackleton *et al*., 2007:558-574).

The timber supplier households indicated that they received certain benefits from engaging in timber farming. These included the following: timber farming provides employment; it is a source of income; it ensured sustainable living; they were able to use the money earned from timber farming to pay their debts; and in the event of financial emergencies timber farming provided relief. Trees serve as means of insurance and can be harvested during times of emergencies (Falconer & Arnold, 1991:5). This was the case for many of the households and probably explains why their felling intervals were shorter than the time required for trees to reach full maturity. Trees raised on farms are seen as savings, and are therefore harvested and sold to meet emergency cash needs (Food and Agricultural Organisation, 1989:6; Thoms, 2008:1453-1454). One household indicated that the income enabled them to support the school committee and poor households. Through timber farming households have not only been able to sustain their livelihood, but they also ensured livelihood security for others.

Households from timber suppliers reported that timber farming helped them pay for their children's education (university fees and school fees). One benefit derived from investing in education is access to higher earnings; for the more educated people become, the better their chances of earning a higher income. Households reported that they used their earnings to buy food and to build houses. In addition, timber farming contributes to the physical assets of households. One household reported that they were able to procure a tractor, while another indicated that they were able to pay lobola for their son. A tractor is the kind of equipment that households use to generate income, thereby improving their livelihood. Another timber supplier household indicated that in order to receive maximum benefits from timber farming, one should not fell one's plot too early, but leave it to grow. This means that households will have to engage in other income-earning activities to sustain their livelihood while waiting for the trees to reach maturity. The planting of exotic trees in KwaZulu-Natal is encouraged by the fact that households live in poverty, but also by the favourable growing conditions for monoculture planting, cheap land and the reduced cost of the workforce (Karumbidza, n.d:21). The livelihood of people with a low income can be improved by community forestry (Ascher, 1995:11).

The results of the study have shown that households were able to sustain their lives through timber farming. The timber suppliers and the households from growers selling to company were seen to have benefited more than growers selling to timber suppliers. Households used their land to grow *eucalyptus* trees and sold the logs at a later stage. The study reported high per

capita figures for all household types; therefore, it can be concluded that small-scale timber farming can improve the livelihood of rural people.

The benefits for timber suppliers and growers selling to forestry companies were more substantial than those of growers selling to timber suppliers, as shown in the asset pentagons discussed under section 5.8. A large number of households in the two grower groups indicated that they saw the monetary value of embarking on small-scale timber farming. Some of the benefits indicated by the growers were similar to those indicated by the timber suppliers. Some of the benefits mentioned by the growers were that timber farming provided employment and that households were able to build their houses. Some grower households indicated that they were wealthy and that wealth was generated through timber farming. Growers also reported that timber farming provided a source of income and that households used this income for their children's education. Karumbidza (n.d:17) confirmed this, stating that most of the money earned from timber farming was used for children's education. Households also said they were able to buy clothes and food, while some used the money to repair a car and others were able to fulfill all their needs. The role that timber farming plays in sustaining households' livelihood is acknowledged. Grower households reported that it provided income to sustain life, and that the timber plot helped them in times of emergencies. This was better than borrowing money from other people, although some respondents had borrowed in times of crisis. Timber income can also be used for purchasing livestock, building houses and purchasing tractors or trucks if individuals had other regular sources of earnings (Karumbidza, n.d:17). However, findings showed that very few respondents were involved in stock farming. This could be an aspect that merited further research.

Benefits accrued to households if they were able to fell the plot without outside help. One grower household indicated that in order to receive maximum benefits from timber farming, one should not fell their plot too early, but leave the trees to grow. There were households that reported that the low income they earned from timber farming was better than not receiving any income at all. One household likened growing vegetables and planting trees to saving money in a bank account. It gives them hope, because even if they might not have money at present, they know that they will earn income at the time of felling, which will enable them to buy food for their children. Timber farming is most beneficial when practised in conjunction with agriculture that brings faster revenues. One grower household mentioned that timber farming offered more benefits to households that owned a number of plots. It is apparent that access to sufficient land contributed to strengthening household livelihood.

Another grower household said that as they did not have parents or anyone else to take care of them, they regarded the trees as their parents; when they have no money for food or school they can fell their trees. When parents die the children normally drop out of school due to the lack of financial support, so that households find themselves in a state of poverty. This was not the case where timber farming played a significant role to increase certain households' total income. A large number of households believed that their economic situation in terms of livelihood outcomes had improved through their involvement in timber farming.

Some households criticised timber farming. Households in the timber supplier group complained that timber takes a long time to grow, and when emergencies arise they end up felling their plots at a very young age, leaving them with only a small income. There is a need to create other livelihood strategies, rather than depending solely on timber farming to sustain the household livelihood. Another household indicated that in order to enjoy the benefits of timber farming, one also needs money, because some growers expect upfront payment for selling their timber. In addition to that, there was a waiting period of about 1 to 2 weeks before payment was received from the forestry companies. Still another timber supplier household indicated that they received very little income from timber farming, and as a result they could not even accumulate enough money to get married. The implication is that although timber farming might be the main source of income for many households, it should not be the only source of sustenance.

Households in the grower groups complained that as there was no constant flow of income, they could not build proper houses. They mentioned that there were no returns from timber farming, as the income was too small. Households further added that they had to buy seedlings from the already small returns. Once the seedlings have been planted the plot has to be maintained. When the timber is ready for felling, they find someone to fell the plot. These contractors take most of the money and the planters get very little return. Karumbidza (n.d:6-7) also pointed out that there has been some unhappiness about the schemes as they have social and environmental impacts, and the promised financial benefits are not visible. Households mentioned that they end up selling their plot to someone else, because they do not have equipment or means for supplying to the mill. As a result their return is minimal. Kamanga *et al.* (2009:619) also found that people with better access to forest reserves have a higher total income, forest income and relative forest income. It is therefore recommended that intervention programmes be investigated to help households purchase equipment, or to provide communal equipment and train households in all the technical skills that they need for engaging in forestry. Furthermore, timber agents do not pay the amount that was initially agreed upon. Growers are also cheated by contractors who do not function according to accepted standards, often charging high prices for their services and thereby reducing farmers' net profits (Cairns, 2000:36-38).

These aspects were also apparent in this research where respondents were treated according to varying standards, specifically with regard to tickets and the purchase of timber plots. It emerged from this study that restricted access to forest supply can have a significant impact on households' livelihood and welfare, such as causing income inequalities.
Households place high value on timber farming and they see this activity as playing a significant role in their livelihood. The perceptions that households have of timber farming are discussed in the next section.

5.10 Households' perceptions of small-scale timber farming

A large number of respondents were of the opinion that they could not live from timber farming alone, because trees take a long time to grow. Households stated that they needed to grow food crops and plant vegetables. They acknowledged that timber farming was unlikely to suffice as the only source of household income and they realised that a balance should be sought between timber farming and other existing or potential activities. Other households said that their timber plots were too small and that their area was too small to sustain a living. A few indicated that it was possible to live from timber farming alone.

Some households said it was possible to live from timber farming alone, because trees mature at different ages, making it possible to harvest at different times. Households reported that timber farming was the main source of employment at Sokhulu and that timber farming can provide employment, even for the uneducated, as timber farming does not require formal qualification. Households further stated that it would be possible to live from timber farming alone if they had their own equipment. The study has found that small-scale timber farming has practical deficiencies that frustrate households or cause negative perceptions. Certain households emphasised that timber farming needed to be organised. The results of the study have shown very poor involvement by households in local institutions. This situation needs further investigation to determine if the required structures cannot assist in creating better co-ordination. Households also mentioned that it was possible to live from timber farming, depending on the amount they can save from income earned at harvest. If households were able to save money and spread it over a period of time, their livelihood vulnerability would be reduced, as households would use the income to sustain life and minimise the impact of shocks.

A large number of households indicated that there was a need for the area planted to timber at Sokhulu to be increased. They suggested that the area be expanded to provide them with more land for planting and added that every household should have a timber plot. This perception presents certain challenges, as timber farming does not occur in isolation and has to compete

with other activities for the same natural resources. Households also mentioned that if they could obtain better planting stock to replace the old stock with faster growing trees, it would result in an increased tonnage and more timely income. Households indicated that if the area could be expanded, they would also need funds to buy seedlings. It was indicated that another possible means of expansion could include the conversion of land that is currently planted to sugar cane to land for timber farming. One household mentioned that there is no more land for planting trees, while others referred to the need for better co-ordination. Respondents also suggested that the government should assist them with buying tools or equipment for timber farming and also make loans available for purchasing equipment.

It has emerged from the study that households have benefited significantly by participating in small-scale timber farming. Households seem to be dependent on timber farming for their livelihood. However, due to the lapse of time before the timber reaches maturity and the households' limited ability of gaining access to forestry supply, households have been critical of timber farming.

5.11 Summary

This chapter highlighted households' responses and discussed the results obtained from the study. Using the livelihood approach, households' assets have been determined and illustrated schematically by means of a pentagon. The timber supplier group appeared to have the most sustainable livelihood. The timber supplier group was not too far behind the growers selling to company in terms of their livelihood. The growers selling to timber suppliers had the lowest standard of livelihood. Growers acknowledged the value and importance of timber farming and requested expansion, while they also expressed some reservations – possibly due to growers being slightly disillusioned. In the next chapter the recommendation and conclusion of the study are presented, based on the data analysis and discussion.

CHAPTER 6: SYNTHESIS, RECOMMENDATIONS AND CONCLUSION

6.1 Introduction

The synthesis in this chapter will clarify the contribution made by small-scale timber farming to enhancing the sustainable livelihood of the sampled farmers at Sokhulu. Although the study has indicated specific limitations in terms of scope and timescale, the findings along with the supporting literature suggest a number of recommendations for the improvement of the sustainability of livelihoods, as well as for further investigation and research.

6.2 Synthesis

Using the Sustainable Livelihood Framework, the livelihood of different grower groups has been compared. This was achieved by distinguishing between the five capital assets as indicated by the Sustainable Livelihood Framework. Households' assets were divided into human, social, physical, natural and financial capital groups, while and households' well-being was determined in terms of their access to assets or based on their total mix of assets. The use of the Sustainable Livelihood Framework has made it possible to gain a better understanding of the livelihood of growers selling to company, growers selling to timber suppliers and the timber suppliers themselves. The following research question have been addressed by investigating the assets and access to assets of the small-scale timber farming groups: **To what extent has small-scale timber farming contributed to enhancing sustainable livelihood at Sokhulu?**

The research question was addressed by investigating the three stated research objectives, namely:

(i) To compare the livelihood levels of growers selling to forestry companies, growers selling to timber agents, and timber agents.

(ii) To determine the benefits that timber suppliers and growers receive by participating in small-scale timber farming.

(iii) To determine households' perceptions of small-scale timber farming.

In terms of the first objective the livelihood of timber suppliers and growers selling to forestry companies were found to be somewhat similar, but timber suppliers showed slightly better livelihood levels than growers selling to forestry companies. The growers selling to timber

suppliers had a reduced standard of livelihood compared to the other two grower types. Timber suppliers and growers selling to forestry companies had better access to assets than growers selling to timber suppliers. These households received a higher income and had a better asset base than growers selling to timber suppliers. Moreover, the money allowed them to exercise more livelihood options. The timber supplier group showed a higher per capita income, while growers selling to timber suppliers showed the lowest per capita income. From this study it became evident that access to forestry supply indeed contributed to strengthening the households' livelihood. The comparison between the capital assets of the different groups was plotted on an asset pentagon. The growers selling to company and the timber supplier group showed a varied, but overall stronger access to assets than the significantly weaker access of the group of growers selling to timber suppliers.

In terms of the second objective households enjoyed multiple benefits through their involvement in timber farming. While households were enabled to earn an income from timber farming, this type of farming also served as a source of employment for some households, which was seen to be common in the timber supplier group. Households used the income from timber farming to generate means for survival or to sustain their material well-being on a higher level than mere survival. Timber suppliers and growers selling to forestry companies received the most benefits, compared to the growers selling to timber suppliers. Timber farming has also been criticised for the long time it takes before the expected financial benefits are realised. An inability to access forestry supply, a lack of technical skills related to forestry and a lack of equipment have often forced timber farmers to sell their timber to timber suppliers, thereby reducing the benefits received. This reduction in total income has increased the vulnerability of households. The research has also identified that some households selling to timber suppliers were doing so as a risk avoidance strategy; it was not limited only to households that were unable to gain access to forestry supply.

In terms of the last stated research objective it was found that although households see value in timber farming, household heads indicated that it is not possible to ensure a sustainable livelihood by engaging in timber farming only. Households raised concern about the time it takes for trees to mature and about the size of the land that they use to grow trees. Those who had bigger forestry plots reported reaping more benefits compared to those with small plots. Households indicated that a lack of working equipment and an inability to access forestry supplies were the causes of reduced profits. Households emphasised the need to increase the areas planted with trees at Sokhulu. They were in favour of planting larger areas and using improved planting stock that grows faster and produces more tonnage than the old planting stock. Households also expressed the need for better co-ordination in the timber farming industry of the

particular area. Households were of the opinion that timber farming played a major role in providing employment at Sokhulu. They did not regard formal schooling as a prerequisite for participating in timber farming.

The findings of the study are indicated as being case specific and limited to a specific period in time, serving as a case in point for the specified study area.

6.3 Limitations of the research

The study is mostly of a qualitative nature and can therefore not be generalised to the larger population; however, it is expressive and illustrative of the sampled timber grower population. Certain variables such as household behaviour (people are different and will tend to behave differently) could not be controlled and the researcher depended on interpretations. No documents were requested to verify responses provided by the respondents, especially with regard to information on household expenses.

A balance will have to be found between the length of the questionnaire and collecting all the information needed to address the research questions. A long questionnaire takes a considerable time to complete, requiring more time to be spent per individual interview, apart from the large amount of data that needs to be analysed. However, large amounts of information are needed to analyse the various elements that accumulate to present a holistic view on the sustainability of a household's livelihood.

The findings are time specific and households that had recently experienced farming successes will have a different perception of timber farming than those who had recently experienced risks or failures. It would therefore be advisable to repeat the study to achieve a longitudinal and historical view on the long-term sustainability and variations in security with regard to households' livelihood.

6.4 The contribution of small-scale timber farming in enhancing sustainable livelihood

The timber supplier group which was the most successful household type, showing the highest total income and per capita income compared to growers selling to forestry companies and those selling to timber suppliers. Timber farming was the common source of income for all households, although a large proportion of households also depended on pension as one of their sources of income. It was apparent that a diversified income that complements earnings from timber farming is typical in South Africa's rural areas. Timber farming provided households with an increased

variety of livelihood strategies. Through timber farming some individuals (mostly timber suppliers) in the community have been able to start small contract enterprises, which extended income opportunities. Trees served as natural assets (a safety net) that could be transformed into financial capital in times of adversity.

Benefits enjoyed by timber suppliers and growers as a result of their participation in timber farming showed various similarities. Households felt that an income from timber farming alone was not sufficient to sustain their livelihood. Felling of plots at an early age has occurred to counter households' increased vulnerability. The frequency of benefits gained from timber farming was not important, although the financial value was significant for some households. Some of the households that benefited greatly from small-scale timber farming had engaged in this activity on their own initiative, with little or no support from forestry companies. These examples were in the majority and the recommendations that follow are intended to benefit all households involved in small-scale timber farming in the area.

6.5 Recommendations

Recommendations in terms of research findings and further research are discussed.

6.5.1 Recommendations regarding findings of the research

This study supports the literature indicating that small-scale timber farming will not eradicate poverty, but will contribute to the improvement of households' livelihood and well-being. The following recommendations are therefore made to improve the sustainability of household livelihoods from a perspective relating to small-scale timber farming:

- There is a need for intervention by government and forestry companies to provide funding assistance to capacitate farmers, enabling them to acquire the skills to conduct small-scale timber farming effectively.
- Households require assistance in technical training, but also in terms of business acumen to improve their means of supplying timber directly to forestry companies.
- The case study confirmed that small-scale timber farming needs to be integrated with other activities to improve household well-being. Small-scale timber farmers should be sensitised to the benefits of diversifying their income through exercising multiple land-use options, an aspect which is largely absent in the Sokhulu area. The literature has pointed out successful programmes where timber farmers are involved in a variety of farming activities on timber farming plots, such as bee-keeping, livestock farming, etc.

- Due to the observed exploitation of some households by the small-scale timber farming system and certain community members, standardised governance is required, specifically regarding access to tickets and other aspects related to small-scale timber farming.

6.5.2 Recommendations for further research

From the findings of this research, but also due to the limitations of this study, a number of recommendations for further research are supplied:

- As indicated in the synthesis (paragraph 6.2), and based on the comparison in the capital asset pentagon, the small-scale timber farming group that showed a significantly weaker access to assets consisted of growers selling to timber supplier groups. Households in this group would benefit from further research to establish the reasons for their weaker access to assets, as well as finding possible ways in which they could be assisted to gain more access.
- It is recommended that a study be conducted comparing the livelihood of timber suppliers and growers selling to timber suppliers with households that do not practise timber farming. By applying the Sustainable Livelihood Framework to a particular study area, the actual contribution that timber farming makes to the community as a whole can be determined.
- Further research is needed to determine the potential contribution that company extension foresters could make to improve the poor management of forestry plots at Sokhulu.
- There is a need for an enquiry into the role that local institutions can play to create more co-ordination in the area. Furthermore, research needs to be conducted to determine whether existing local institutions at Sokhulu allow households to gain insight into the management and use of natural resources, and whether it allowed them to influence policies.
- Further investigation is needed to determine if households that waited for optimal tree maturity and engaged in other forms of income, such as the selling of forestry by-products, produced significantly better yields from timber farming than those who participated in the felling of immature trees.
- A study is needed to determine if higher prices at more tonnage for trees that have been felled at optimal maturity will serve to sustain households over the additional years of waiting.

- The optimal break-even point on an area-specific basis for rural timber farmers harvesting timber needs investigation.
- A need exists to investigate the potential of introducing other income-earning activities which households could embark on while waiting for their timber to mature.
- The contribution of livestock rearing for the further enhancement of livelihood needs to be investigated for this area, as very few household reported such involvement.
- Households could also benefit from research aimed at determining whether fluctuations in petrol or diesel prices have a significant impact on the price negotiations during the sale of a timber plot to the timber supplier.

6.6 Conclusion

The timber suppliers were shown to be the group that enjoyed the most benefits from timber farming, followed by the growers selling to forestry companies, while the growers selling to timber suppliers benefited the least. Households involved themselves in a number of activities (livelihood strategies) to be able to sustain their livelihood. The need for land and water might cause a conflict of interests between timber farming and other activities, but this was not obvious in the study. Although timber farming is exposed to risks and susceptible to hazards (such as fires), this type of farming is still important at Sokhulu; it enhances well-being and allows households some economic benefits. Timber farming has the potential to contest and complement other income-generating activities. Due to the limited employment opportunities in rural areas certain households depend heavily on natural resources for generating income and meeting their livelihood needs. However, a diversified approach is required for households involved in small-scale timber farming to produce a sustainable income.

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Appendix A: LETTER OF INTRODUCTION

29 April 2009

To whom it may concern

It is with pleasure that I introduce Ms Zanele Jele as a student from the University of South Africa (Unisa). She is presently conducting research for the fulfillment of a Master's degree in Human Ecology. Her research focuses on small-scale timber farming and the associated livelihood sustainability. She will be collecting data using a focus group discussion and interview-based questionnaires.

Should you have any queries, please do not hesitate to contact the supervisor.

Yours sincerely

Dr M Mearns
Supervisor

Appendix B: INTERVIEW SCHEDULE FOR FOCUS GROUP DISCUSSION

1. Have households benefited by taking part in timber farming? Why do you say so?
2. Do you think timber farming is profitable? Why?
3. From your perspective, have there been shortfalls in community forestry (small-scale timber farming)? What are the shortfalls, can they be rectified, and how?
4. Why do you think people sell to timber agents?
5. What skills are essential to ensure success in small-scale timber farming?
6. What contribution can forestry companies make to ensure sustainability in small-scale timber farming?
7. What contribution can government make to ensure sustainability in small-scale timber farming?

Appendix C: HOUSEHOLD LIVELIHOOD QUESTIONNAIRE

Code:	
Name of interviewer:	
Date of interview:	
Time of interview:	[:] **to** [:]
Name of respondent:	
House number:	
Language used during interview:	

Please tick where appropriate

1. HOUSEHOLD INFORMATION

1.1 How long have you lived in the village? _____

1.2 How many household members participate in timber farming? _____

1.3 Please provide the following information on household

Names of people who usually live in your household	Relationship to the head of the household	Age in years	Sex **M F** **1 2**	Employment status	Type of employment	Education level
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Relationship

1. Wife / Husband
2. Son / Daughter
3. Grandchild
4. Parent
5. Brother / Sister
6. Adopted / Stepchild

Employment status

1. Full-time
2. Part-time
3. Seasonal
4. Unemployed
5. Student
6. Pensioner
7. Housewife

Education level

1. nursery school / day care
2. R-3 Foundation phase
3. 4-6 Intermediate
4. 7-9 Senior phase / OBE certificate
5. 10-12 FET (further education and training)
6. Training certificate / short course
7. Some tertiary education
8. Tertiary education

7. Son- / Daughter- in-law
8. Parent-in-law
9. Nephew / niece
10. Other relative
11. Not related
12. Head of the house
98. Don't know

Employment type
1.TP - Timber permanent
2.TC - Timber casual
3.O - Other

9. Other
98. Don't know

1.4 How many household members contribute to household income? _____

1.5 Contribution of other forms of income in relation to timber farming

Forms of income	Tick	Average monthly income
Full-time employment		
Part-time / seasonal employment		
Pension		
Government grants		
Donations		
Begging from streets		
Stockvel		
Sale of assets (e.g cattle)		
Income from selling, trading		
Rental income		
Timber farming		

If other, please specify: _____

2. ACCESS TO INSTITUTIONS AND SERVICES

2.1 What services do you use?		2.2 What services are provided by these?
Health centre		
Extension		
Co-operatives		
Other		

If other please specify: _____

2.3 Does any member of the household participate in local institutions?	Yes / No	2.4 What social benefits do you obtain by being members of these institutions?
Forestry committee		
Sugar cane committee		
School committee		
Credit schemes		
Other		

If other, please specify: _____

3. HOUSEHOLD ASSETS

3.1 Type of housing (Observation)

Hut / traditional house	
Detached house	
Semi-detached house	
Other	

If other, please specify: _____

3.2 What kind of building material is the house made of? (Observation)

Roof	Walls	Floor

3.3 What kind of toilet facilities does your household use?

Flush to piped sewage system		Bucket toilet	
Flush to septic tank		No facility/bush/field	
Ventilated improved pit latrine (VIP)		Other	
Open pit		If other please specify:	

3.4 Checklist of household assets

3.4.1 Do you have access or possess any of these?

	Access	Possess
Animals		
Trees		
Sugar cane		
Banana		
Amadumbe		
Mealies		
Cabbage		
Spinach		
Land		

3.5 Information on access to land

	Type and tenure	Land use
Renting		
Owner		
Permission to use land		
Other		

If other, please specify: _____

Size of holding? _____

4. FORESTRY/FOREST INFORMATION

4.1 Do you have access to forestry/forest resources? _____

4.2 If yes, what resources do you have access to? _____

4.3 Where do you get permission to access forestry/forest resources? _____

4.4 Do you pay anything for using forestry/forest resources? _____

4.5 If yes, to whom and what? _____

4.6 Timber farming

4.6.1 Do you practise timber farming on your own or rented land? _____

4.6.2 Number of years owning / using this land

less than10 yrs	
between 10 to 20 yrs	
more than 20 yrs	

4.6.3 What is the size of your plot?

less than 0.5 ha	
between 0.5 to 2 ha	
larger than 2 ha	

4.6.4

Product	Do you sell the following products from your plot? **Yes / No**	At what interval do you sell the product	At what interval do you earn income?	What is your average income from the sale?
Droppers / household fencing				
Firewood				
Construction material				
Agriculture packaging				
Implement tools				
Timber logs				
Ad hoc selling				
Other				

Selling intervals
1. Daily
2. Weekly
3. Monthly
4. Annually
5. 3 years
6. 6 years

If other, please specify: _____

4.6.6 What are your total timber expenses?

	Daily	Weekly	Monthly	3 years	6 years	End of rotation
Labour						
Fertiliser						
Planting material						
Equipment						
Transport						
Other						

If other, please specify: _____

4.6.7 Contribution of other forms of income in relation to timber farming
(Indicate contribution in percentage)

Forms of income	Tick	Average monthly income
Full time employment		
Part-time / seasonal employment		
Pension		
Government grants		
Donations		
Begging from streets		
Stockvel		
Sale of assets (e.g cattle)		
Income from selling, trading		

Rental income		
Timber farming		

If other, please specify: _____

4.6.8 Do you see financial value in timber farming? Why? Yes / No

_____

_____

4.6.9 Do you think households can live from timber farming only? Explain your choice. Yes / No

_____

_____

4.6.10 Should the area planted to forestry trees in the Sokhulu area be expanded? Yes / No
If yes, what type of expansion? _____

_____

_____

If no, why? _____

_____

_____

5. LIVELIHOOD STRATEGIES

5.1 Main activities of household members

5.1.1 What are the activities enacted by members of your household

Timber farming		Timber harvesting	
Agricultural farming		Timber transport	
Livestock farming		Other employment	
Forestry labour		Other	

If other, please specify: _____

5.1.2 How often do your fell your trees? _____
Estimated production costs of last production _____
Revenues from timber farming _____
At your last harvest, how much tonnage did you produce? _____
How much of your harvested tonnage did you manage to sell? _____
What quantity of the harvest was used in the household, e.g for firewood? _____
How much did you earn for the proportion sold? _____

5.2 Farming production

5.2.1 Do you practise farming? _____
5.2.2 Over the past year, what has been the revenue from

Banana		1. R0 - R999	8. R7000 - R7999
Sugar cane		2. R1000 - R1999	9. R8000 - R8999
Amadumbe		3. R2000 - R2999	10. R9000 - R9999
Mealies		4. R3000 - R3999	11. R10000 - R10999
Cabbage		5. R4000 - R4999	12. R11000 - R11999

Spinach	
Other	

6. R5000 - R5999
7. R6000 - R6999
13. R12000 and above
98. Refuse to answer
97. Don't know

If other, please specify: _____

5.2.3 What proportion of your crop did you manage to sell? _____
5.2.4 What proportion did you consume? _____
5.2.5 Do you keep seed? _____
5.2.6 How much crop did you lose post harvest? _____

5.3 Marketing information

5.3.1 How do you sell your timber and/or crops?

To community member	
To company	
To organisation	
To scheme	
Other	

If other, please specify: _____

5.3.2 Who in your household is responsible for selling timber/crops? | |

6. ACCESS TO NATURAL RESOURCES

6.1 Have you planted any trees in the past 12 months? _____
6.2 Can you drink safe and potable water? _____
6.3 Do you go hunting? _____

7. HOUSEHOLD EXPENSES

7.1 What are the most **important expenses** you have incurred into over the past 12 months?
7.2 How much (indicatively) did you **spend** for each category over the past 12 months?

Expense	7.1 NB expenses	7.2 Amount spent
Food		
Medicines		
Doctors' fees		
Fees for traditional healers		
Hospital		
School fees		
School uniforms		
Other school expenses		
Clothes		
Vehicle		
Vehicle maintenance		
Petrol / diesel		
Public transport		

Cell phone		
Other		

If other please specify: _____

8. CREDIT AND SAVINGS

8.1 Savings

8.1.1 Do you have any savings? _____

8.1.2 Are your savings individual or group savings? _____

8.1.3 Did you use your savings over the past 12 months? _____

8.1.4 If so, how did you use your savings? _____

8.2 Credit

8.2.1 Did you obtain credit over the past 12 months? _____

8.2.2 How long was the credit for? (In weeks or months) _____

8.2.3 What was the rate you obtained? _____

8.2.4 What was the source of that credit?

Forestry schemes	
Sugar cane schemes	
Informal credit schemes	
Formal credit schemes	
Post office	
Bank	
Other	

If other, please specify: _____

8.2.5 How did you utilise your credit?

Food	
Health	
Clothing	
Education	
Rent	
Agriculture	
Forestry	
Other	

If other please specify: _____

9. VULNERABILITY

9.1 Crises faced during the past 12 months

What kind of crises did you have to face over the past 12 months?

Food shortage	
Financial	
Disease and pest	
Fire	
Drought	
Flood	
Other	

If other, please specify: _____

9.2 Coping mechanisms

How did you cope with the crises mentioned?

Harvested trees	
Harvested crops	
Sold timber plot	
Sold animals	
Obtained credit	
Migrated	
Other	

If other, please specify: _____

9.3 FOOD SECURITY

9.1 Number of months/year when all household members have sufficient food to eat. _____

9.2 Number of months for which household was self-sufficient. _____

9.3 Which were the most difficult months to obtain food? _____

9.4 How many meals a day could you consume during the most difficult period? _____

9.5 How many times a day could you eat the following foods over the past month?

Meat	
Rice	
Bread	
Porridge	
Vegetables	
Fruits	

1. Never
2. Everyday
3. 1-3 times a week
4. Once a month
5. Once a year

10. HEALTH

10.1 How often did people in your household suffer from

Malnutrition	
Flu	
Skin disease	
Bone disease	
High blood pressure	
Diabetes	
Other	

1. Very often
2. Often
3. Sometimes
4. Never

If other, please specify: _____

Appendix D – LETTER OF INFORMED CONSENT

Letter of informed consent

Title: **THE CONTRIBUTION OF SMALL-SCALE TIMBER FARMING IN ENHANCING SUSTAINABLE LIVELIHOODS AT SOKHULU**

Department: **Agriculture, Animal Health and Human Ecology**

Researcher(s): **Ms Zanele Jele**

Supervisor(s): **Dr M Mearns**

1. The main purpose of this study:
Households in the Sokhulu area have participated in timber farming dating back to the 1970s (Personal communication: T Mfekayi, August 2007). The researcher aims to determine if households in the Sokhulu area have benefited from taking part in small-scale timber farming and whether their livelihood has been sustainably enhanced. The researcher further wants to compare the livelihood level of those that sell to forestry companies versus those that sell to timber agents and the livelihood of timber suppliers. If timber farming has contributed to improving household lives, there is a need to pay closer attention to ensure that it continues. Where this income method has resulted in no improvements in household lives, its existence should be questioned, problem areas highlighted and attention paid.

The overall study design will require that I participate in an:
Interview-based questionnaire _____
Focus group discussion _____ (Mark where applicable)

2. Confidentiality:
I understand that the information presented in this study may be used for research purposes, including publications in research journals. All individual information will be coded and at no time will my personal identity be revealed. Audio recordings are used only to assist the researcher in capturing what I say in context and everything I say will remain confidential and used in the research only.

3. Voluntary participation:
The purpose of the study has been explained to me. I understand that participation in this study is voluntary and that refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. I may terminate my participation at any time I wish to do so, without being subject to a penalty. I understand that I may withdraw from participation at any point in the study, with no penalty involved.

4. Benefits of participation:
The benefits of participating in this study are to further research only. UNISA will not receive any moneys for this study. My participation will make a contribution to a further understanding of whether households in the Sokhulu area have benefited from engaging in small-scale timber

farming and whether their livelihood have been sustainably enhanced. The researcher further wants to compare the livelihood level of those that sell to forestry companies versus those that sell to timber agents and the livelihood of timber suppliers.

5. Remuneration: I understand that I will not receive money or any other reward for participation.

Research participant's initials_____