

UNIVERSITY OF KWAZULU-NATAL

**VALUATION OF INDIRECT USE BENEFITS OF
WOODLAND RESOURCES, CASE STUDY: HLABISA
AREA, KWAZULU-NATAL**

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2005

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WOODLAND RESOURCES, CASE STUDY: HLABISA
AREA, KWAZULU-NATAL**

by

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PREFACE

The work described in this dissertation represents a full research Master of Science and was carried out part time from August 2001 to December 2004 in the School of Environmental Sciences, Howard College Campus, University of KwaZulu-Natal, under the supervision of Dr. Helen Watson.

This study represents original work by the author and has not otherwise been submitted in any form for any degree or diploma to any tertiary institution. Where use has been made of other studies, it is duly acknowledged in the text.

Mbaqosela

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ABSTRACT

Many rural households in southern Africa rely on a range of woodland resources for their livelihoods. In addition to direct use values, rural households also obtain indirect use benefits from the woodlands resources. These include ecological services such as soil protection and nutrient cycling; and social values such as shade and aesthetic values.

The value of woodland resources to rural households in southern Africa has been researched extensively. Most of these studies assess direct use values, which are expressed in monetary terms. In contrast, there are fewer studies that assess indirect use values of woodland resources, and even fewer studies that assess non-monetary values. Non-monetary valuation is important to add to the knowledge gained through monetary valuation studies.

This study was undertaken as part of a national investment by the Department of Water Affairs and Forestry (DWAF) on Sustainable Woodlands Utilization and Management in the country. The aim of this study was to establish monetary and non-monetary values associated with indirect use benefits of woodland resources in three rural villages in northern KwaZulu-Natal. A pilot study was undertaken to pre-test the data collection techniques before the main survey. The Contingent Valuation Method (CVM) and Participatory Rural Appraisal (PRA) were used to investigate monetary and non-monetary values during the pilot study. Data collection techniques involved interviews using semi-structured questionnaires, direct observation, group discussions and resource mapping.

The pilot study established that, due to its inherent properties, CVM was not the best method for this particular context (rural area in a developing country). In comparison, PRA techniques were more useful in obtaining meaningful data on the value of indirect-use benefits of woodlands.

The main survey was undertaken using PRA techniques that included, in addition to the techniques used during the pilot study, contingent ranking. Interpretive categorization was used to analyze qualitative data. Quantitative data analysis involved the description of data, and results presented using descriptive statistics, tables and graphs. Excel spreadsheets were used for data storage and processing.

The study established that rural households were acutely aware of the indirect-use benefits of woodland resources. Respondents were able to describe indirect use benefits in terms of social functions and ecological services provided by woodlands. Age, gender and remoteness of village seem to influence the value assigned to the identified woodland benefits. Ranking of the indirect use benefits revealed higher values for ecological services compared to social functions. Female respondents generally assigned greater values for both ecological and social services, compared to their male counterparts. All respondents concurred that the contribution that woodlands make to their livelihoods is significant.

The aim of the study was to investigate monetary and non-monetary values of indirect use benefits of woodland resources. The first part of the aim was not achieved, due to the incompatibility of the CVM to the study area (illiterate and semi-literate respondents in a rural setting). In terms of non-monetary values the study succeeded in demonstrating that rural households value woodland services highly, through their contribution to their livelihoods and well-being. The study concluded that the entire contribution of woodland resources to rural households is still not fully comprehended. To ensure the sustainability of woodland resources, the need to fully understand their contribution to rural livelihoods remains.

TABLE OF CONTENTS

PREFACE	i
ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
LIST OF ABBREVIATIONS	x
CHAPTER 1: INTRODUCTION	1
1.1 Woodland resources	1
1.2 Valuation of woodland resource benefits	2
1.3 Rationale for the study	4
1.4 Motivation for study area	8
1.5 Aim of study	9
1.6 Objectives	9
1.7 Structure of dissertation	10
CHAPTER 2: WOODLAND RESOURCES AND RURAL LIVELIHOODS	12
2.1 Introduction	12
2.2 Defining woodland	12
2.3 Factors affecting the sustainability of woodlands	13
2.3.1 Legislative and policy framework	13
2.3.2 Social and Economic activities	16
2.3.3 Land tenure systems in rural areas	18
2.3.4 Commercialization of woodland products	19
2.4 Sustainable Rural Livelihoods	20
2.4.1 The vulnerability context	23
2.4.2 Livelihood assets	24
2.4.3 Institutional structures and processes	25
2.4.4 Livelihood strategies	25
2.5 Rural livelihoods diversification	26
2.5.1 Reasons for diversifying livelihood strategies	28
2.6 Chapter conclusions	30

CHAPTER 3: VALUATION OF ENVIRONMENTAL RESOURCES	31
3.1 Introduction	31
3.2 Monetary valuation of woodland resources	31
3.2.1 Direct use value	33
3.2.2 Indirect use value	37
3.2.3 Option and Non-use values	41
3.3 Non-monetary valuation	41
CHAPTER 4: DESCRIPTION OF STUDY AREA	44
4.1 Introduction	44
4.2 Location of study area	44
4.3 Situational analysis of the study area	46
4.4 Livelihood capital	47
4.4.1 Natural capital	48
4.4.2 Human and social capital	51
4.4.3 Physical and financial capital	52
4.5 Institutional structures	55
4.5.1 Political structures	55
4.5.2 Land tenure	55
4.5.3 Management of conservation parks around the study area	56
4.6 Livelihood strategies	57
4.6.1 Traditional land-use	58
4.6.2 Income-generating livelihood strategies	61
4.6.3 Conservation areas	63
4.6.4 Commercial agriculture	64
4.6.5 Remittances and grants	65
4.7 Chapter conclusions	65
CHAPTER 5: APPROACH AND METHODOLOGY	66
5.1 Introduction	66
5.2 Background to methodological approach	66
5.2.1 Monetary valuation	68
5.2.2 Non-monetary valuation	71
5.2.3 Limitations associated with this study	74

5.3	The pilot study	75
5.3.1	Access to the study area	76
5.3.2	The CVM pre-test	77
5.3.3	The PRA pre-test	81
5.3.4	Pilot study findings and conclusions	83
5.4	The main survey	83
5.4.1	Sampling technique	84
5.5	Field activities	85
5.5.1	The opening meeting	85
5.5.2	Participatory mapping	87
5.5.3	Transect walks and discussions	87
5.5.4	Contingent Ranking	87
5.5.5	Personal interviews	88
5.6	Data analysis	89
5.7	Chapter conclusions	90
CHAPTER 6: RESULTS AND DISCUSSION		91
6.1	Introduction	91
6.2	Personal interview results	91
6.2.1	Socio-economic profile of the respondents	91
6.2.2	Length of stay in the village	101
6.2.3	Reason for residing in the area	102
6.2.4	Pros and cons of living in the study area	103
6.3	The PRA results	105
6.3.1	Participatory mapping	106
6.3.2	Group discussions	111
6.3.3	Contingent ranking	123
6.4	Summary of findings	127
6.5	Chapter conclusions	132
CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS		133
7.1	Introduction	133
7.2	Overview of the study	133
7.3	Conclusions	134

7.4 Recommendations 137

REFERENCES 139

LIST OF FIGURES

Figure 2-1: Properties of a sustainable livelihood.....21

Figure 2-2: The Sustainable Livelihoods Approach22

Figure 3-1: The Total Economic Value of a woodland.....33

Figure 4-1: Location of study area45

Figure 4-2: View overlooking Hluhluwe Dam in KwaNompondo50

Figure 6-1: Age distribution of respondents92

Figure 6-2: Educational level of respondents.....93

Figure 6-3: Educational level according to gender94

Figure 6-4: Occupations of respondents per sector.....96

Figure 6-5: Household income estimates for the three villages99

Figure 6-6: Household monthly income per village..... 100

Figure 6-7: Length of stay in the study area 101

Figure 6-8: No. of people who participated in the PRA activities..... 105

Figure 6-9: Map of KwaNompondo drawn by adult male group..... 107

Figure 6-10: Map of KwaNompondo drawn by the adult female group 108

Figure 6-11: Map of KwaNompondo drawn by children’s group 109

Figure 0-1: Map of Machibini village drawn by adult female group 150

Figure 0-2: Map of Machibini village drawn by children’s group..... 150

Figure 0-3: Map of KwaMduku village drawn by adult female group 151

Figure 0-4: Map of KwaMduku village drawn by the children’s group..... 151

LIST OF TABLES

Table 2-1: Tenure systems and their impacts on natural resources	18
Table 4-1: Spatial coordinates of study area	46
Table 4-2: Demographics of the study area	51
Table 4-3: Physical infrastructure in the study area	53
Table 4-4: Political institutional structures in the study area	55
Table 4-5: Land-use types in the study area	58
Table 4-6: Patterns of resource use in the study area	58
Table 5-1: Gender distribution of the respondents.....	77
Table 5-2: Research respondents.....	86
Table 6-1: Breakdown of respondents according to gender	93
Table 6-2: Distribution of education levels per village	95
Table 6-3: Reasons for residing in the study area.....	102
Table 6-4: Results indicating positive aspects of life in the study area	103
Table 6-5: Comparison of PRA maps from KwaNompondo.....	110
Table 6-6: Ranking of nutrient-cycling across the three villages.....	113
Table 6-7: Ranking of aesthetic value across the three villages.....	116
Table 6-8: Ranking of cultural activities across the three villages	117
Table 6-9: Ranking of recreational benefits across the three villages	118
Table 6-10: Ranking of shade across the three villages.....	119
Table 6-11: Ranking of privacy across the three villages.....	121
Table 6-12: Ranking of windbreaks across the three villages.....	122
Table 6-13: Ranking of lightning function across the three villages	122
Table 6-14: KwaNompondo results from PRA activities	124
Table 6-15: KwaMduku results from the PRA activities.....	125
Table 6-16: Machibini results from PRA activities	126
Table 6-17: Average ecological and social values per group per village	128
Table 6-18: Ecological and social values according to gender	129
Table 6-19: Ecological and social values obtained per village	130
Table 6-20: Examples of common plant species with indirect-use benefits.....	131

LIST OF APPENDICES

Appendix 1:	Illustration of sketches drawn during mapping exercise	150
Appendix 2:	Wealth indicators used for household socio-economic profile.....	152
Appendix 3:	Questionnaire used for personal interviews.....	154

ABBREVIATIONS AND ACCRONYMS

AIDS:	Acquired Immune Deficiency Syndrome
CBD:	Convention on Biodiversity
CBO:	Community Based Organization
CCD:	Convention to Combat Desertification
CITES:	Convention on Trade in Endangered Species
CSIR:	Council for Scientific and Industrial Research
CVM:	Contingent Valuation Method
DALA:	Department of Agriculture and Land Affairs (National)
DEAT:	Department of Environmental Affairs and Tourism (National)
DFID:	Department for International Development (UK)
DME:	Department of Minerals and Energy (National)
DPLG:	Department of Provincial and Local Government (Provincial)
DTI:	Department of Trade and Industry (National)
DWAF:	Department of Water Affairs and Forestry (National)
EEP:	Environmental Economics Programme
FAO:	Food and Agricultural Organisation
FCCC:	Framework Convention on Climate Change
GSLWP:	Greater St. Lucia Wetlands Park
IDP:	Integrated Development Plan
HIV:	Human Immune Virus
HUP:	Hluhluwe-Umfolozi Park
IUCN:	International Union for the Conservation of Nature
km:	Kilometre
KZN:	KwaZulu-Natal
NEMA:	National Environmental Management Act
NFA:	National Forests Act
NFAP:	National Forestry Action Programme
NGO:	Non-Governmental Organization
NPB:	Natal Parks Board

NTFP:	Non-Timber Forest Products
MEAs:	Multilateral Environment Agreements
PRA:	Participatory Rural Appraisal
RCM:	Replacement Costs Method
RDP:	Reconstruction and Development Programme
RRA:	Rapid Rural Appraisal
SEED:	Social, Environmental and Economic Development
SLA:	Sustainable Livelihoods Approach
TEV:	Total Economic Value
UNDP:	United Nations Development Programme
UNESCO:	United Nations Educational, Scientific and Cultural Organization
WTA:	Willingness to Accept
WTP:	Willingness to Pay

CHAPTER 1: INTRODUCTION

1.1 Woodland resources

Woodlands are one of the world's major terrestrial ecosystems. They form one of the most extensive vegetation types in South Africa, and cover approximately one third of the country (Shackleton *et al.*, 1999). The communal areas of KwaZulu-Natal (KZN) and the Limpopo Province mostly consist of woodland areas.

Woodland resources, sometimes termed non-timber forest products (NTFPs) or veld products, are forest resources with biological origin that are harvested for purposes other than primary management objectives of the ecosystems in which they occur (Dovie *et al.*, 2001). Shackleton and Shackleton (1997) define them as a range of products from indigenous resources (both plant and animal) that are harvested and utilized by rural communities either on a subsistence or commercial basis, or both. They provide food, fuel, building materials, medicines and other such uses that contribute to rural livelihoods (Campbell, 1987; Shackleton, 1993; Campbell *et al.*, 1997; GWAAI Working Group, 1997; Shackleton and Shackleton, 2000; and Dovie *et al.*, 2001). These are termed consumptive direct use benefits since their use involves physical consumption of the resource. Non-consumptive direct use benefits include recreational activities, research and education, which involve direct use of a resource but do not involve consumption. In addition to direct uses, woodlands also provide indirect use benefits such as the protection of watersheds, cultural and spiritual benefits. These goods and services obtained from woodland resources are discussed in more detail in Chapter 2.

Hassan and Haveman (1997) assert that the availability of woodlands in South Africa has declined, and that the quality of the remaining woodlands has generally been degraded. This has been attributed to a number of factors, which include mismanagement and numerous socio-economic factors (enumerated in Chapter 2.3). This decreasing availability is a cause for concern, particularly in the developing world where many rural households rely on these resources for their livelihoods.

1.2 Valuation of woodland resource benefits

Valuation of woodland resource goods and services is a process of expressing the value or worth of the resource benefits as perceived by the beneficiaries. Valuation is largely an anthropocentric process, determined by people's perceptions of the importance of the good being valued at that particular time. The value assigned is purely a measure of the importance and necessity that people place on a particular resource.

Valuation of resources is important for a number of reasons. Cavendish (2002) argues that having a certain 'value' assigned to environmental goods and services is essential because it aids in the decision-making process regarding that particular good or service. For instance, providing valuation information on woodland resources may be useful in setting development priorities and evaluating different projects and programmes at a local or regional level. Valuation can be useful for decision-making in terms of weighing trade-offs of competing land-uses. For example, the value of a woodland may assist in deciding on whether transforming the woodland into another land-use activity would yield optimal benefit. The goods and services that a community may be getting from the woodland may far outweigh the benefits of the proposed land-use activity. It is only once all the benefits from the woodland are known, that the decision-maker can be able to determine the true costs and benefits of development.

At a country level, incorporating the value of natural resources in the economy is essential for the sustainable management of these resources (Lange *et al.*, 2003). This is particularly critical in developing countries where natural resources are the main source of livelihood for many communities. The process of valuation also provides an opportunity for scientific observation and measurement of the resource being valued (Farber *et al.*, 2002). Through valuing a resource it becomes possible for a country to assess the condition of the resource being valued and trends in terms of its quality and quantity. Such trends are important determinants of the sustainability of resources.

Two types of values of environmental resources are generally recognized; intrinsic values and instrumental values. Gilpin (2000) defines intrinsic value as the value of a resource unto itself, regardless of its value to humans. It is considered as the ethical value of a resource, or the right of the resource to exist. Instrumental value refers to the value of something in the service of people, in terms of production and consumption opportunities (Fromm, 2000 cited in Nunes and van den Bergh, 2001). Farber *et al.* (2002) define instrumental value as a reflection of the difference that a resource makes to the satisfaction of human preferences. Instrumental value is thus an anthropocentric value that human beings place on a resource in order to demonstrate the importance of the resource to their lives and livelihoods. Ways of capturing instrumental value include the use of monetary measures and non-monetary measures.

Monetary valuation involves the use of a monetary measure to ascertain the value of a resource. It is part of economic valuation which, according to Brown and Moran (1993), refers to the measure of people's preferences for an environmental good or against an environmental bad. The economic value of a resource is people's willingness to pay to conserve it or people's willingness to accept the loss of that particular resource. Economic valuation therefore aims to put a 'market price' on an environmental good or service which is then used to extrapolate or infer its value or worth to people. Monetary values are widely used to provide information that will assist good policy-making by governments and agencies, and good decision-making by individuals (GWAAI Working Group, 1997).

Non-monetary valuation involves the same principle of establishing the importance of a resource to people. The difference between monetary and non-monetary valuation is that non-monetary valuation is a subjective process that involves the use of non-monetary indicators of value to ascertain value. Campbell (1993) identifies such indicators to include the frequency of collection of a resource, the frequency of consumption, and the percentage of household time-budgets devoted to using the resource. The reliance of resource users on goods and services provided by a particular resource can be used as another indicator of the non-monetary value of the resource in question.

Compared to the extensive research into direct use benefits of woodlands, fewer studies have attempted to illustrate the value of indirect use benefits of woodland resources. This deficiency in valuation raises a major concern that policy-makers and other decision-makers have to make decisions based on limited information. This study is an attempt to providing a more reasonably complete picture in terms of the value of indirect use benefits of woodland resources in three rural villages in northern KwaZulu-Natal. This research builds on the work of Magasela (2001) who investigated direct use values of woodland resources in the study area. This study assesses the indirect use values of woodland resources, and attempts to illustrate this value in monetary and non-monetary terms.

1.3 Rationale for the study

There is an urgent need to ensure the sustainability of woodland resources in South Africa, particularly in rural areas where people rely extensively on communal woodlands for their livelihoods. An important aspect of sustainability of a resource is the governance and management of the resource. Under the previous political dispensation, woodland resources in communal areas were not considered to be important in comparison to indigenous forests. This was evident from the absence of policy and government programmes that would have promoted good management. Furthermore, there were uncoordinated and sporadic efforts from the different structures responsible for their management.

After democratisation in 1994, the new government became committed to improving the quality of life of the previously marginalized population groups, thereby empowering the general population and increasing their involvement in decision-making. The government recognized with concern the vulnerability of rural livelihoods to decreasing availability of woodland resources. With the aim to address past injustices posed by the former government, a plethora of policies and legislation was promulgated, mainly in an effort to create enabling conditions to correct the past injustices and stop any trends that increase the vulnerability of rural livelihoods to poverty.

The White Paper on Sustainable Forest Development in South Africa published in 1996 observed that South Africa's rural communal areas were generally in poor condition, and concluded that this was a direct result of the apartheid government's policies (DWAF, 1996). The apartheid resettlement programmes brought about forced relocations of certain groups of people to marginal areas. This created a lot of resentment, apathy and other social ills such as the erosion of regulatory control mechanisms that were previously well recognized (Grossman and Gander, 1994). All these factors exerted substantial pressure on woodlands particularly in communal areas.

Prior to 1996, woodlands in communal areas were not recognized as a distinct entity under the jurisdiction of a specific government department. The 1996 White Paper signified a distinct paradigm shift from the Department of Water Affairs and Forestry (DWAF) being responsible for indigenous forests and exotic plantations to being required to sustainably develop forests of all kinds, including woodlands (DWAF, 1996). The White Paper defined woodland as a type of natural forest, and placed them under the responsibility of DWAF's Community Forestry sector. This sector is mandated to create enabling conditions for communities to manage their resources in a sustainable manner (DWAF, 1996).

In addition, the White Paper realised that the majority of poor rural communities rely heavily on woodland resources, and recognized the significance of these resources to them (DWAF, 1996). As a result the new government embarked on an initiative to attempt to address the issue of relationships between rural people and woodlands, and the sustainability of their livelihoods. After having assumed the responsibility for woodland management and establishing policy to enable that, the government devised plans and programmes for implementation. The White Paper committed government to prepare a strategic plan for the implementation of the policy (DWAF, 1996). This plan culminated into the National Forestry Action Programme (NFAP), which was published in 1997. The NFAP is a programme for implementing the policy set out in the White Paper. Its main aim is to investigate the necessary means that can ensure the sustainable development of forests and woodlands.

The promulgation of the new National Forests Act (NFA), Act No. 84 of 1998, provided more legislative support necessary for the implementation of the forest policy. The NFA also defines woodlands as a forest type, and recognizes the significant role that woodlands play in sustaining rural communities' livelihoods (DWAF, 1998a).

In 1999, DWAF embarked on a national initiative to secure the sustainability of woodland resources in communal areas. The Department established a research programme on forests and communities in order to generate knowledge that could be used to support the implementation of the NFAP. This programme involved, among other aspects, an attempt to establish the value of woodland resources. Through this valuation exercise, DWAF intends to improve the understanding of the role of woodlands in contributing to sustainable rural livelihoods in South Africa.

This dissertation is partly based on research undertaken as part of the investment in sustainable management strategies for woodlands in the country. The research programme was initiated in 2000, and involved the collaboration of the Council for Scientific and Industrial Research (CSIR) together with the Universities of Durban-Westville, Natal¹, Rhodes, Witwatersrand and Venda. The research plan outlines the scope of the research as follows (adapted from CSIR, 2000):

Phase 1 (2000/2001):

- Determination of the direct use value of woodland resources in three study areas in KZN, Eastern Cape and Limpopo; and
- Policy and strategy review.

¹ In January 2004 the Universities of Durban-Westville and Natal merged to form the University of KwaZulu-Natal.

Phase 2 (2001/2002):

- Determination of the indirect and non-use value of woodland resources in the same study area; and
- Investigation of the links between household poverty and reliance on local woodland resources.

Phase 3 (2002/2003):

- Investigation of the loss of values due to unsustainable use; and
- Investigation of urban-rural links and the role of non-local demand.

This dissertation is based on Part 1 of Phase 2, which involved the determination of indirect use values of woodland resources. The study focuses on two aspects; the first being the monetary valuation of indirect use benefits of woodland resources, and the second being the non-monetary valuation of the same. The monetary valuation exercise built on the outputs of Phase 2 of the research programme. The non-monetary values of indirect use benefits of woodland resources were assessed in the same study area.

The motivation for investigating both monetary and non-monetary values of woodland resources is the question of the relevance and the comprehensiveness of monetary valuation. The study area being a rural area with limited economic activity meant that there was a risk that some of the households do not actively participate in a cash-economy that is the norm in urban areas. The relevance of monetary valuation in such an area is questionable. In addition, the many shortfalls of monetary valuation have been highlighted. It has become evident that monetary valuation does not capture the total value of woodland resources to resource users, and as such cannot or should not be used on its own to portray this value. Consensus is yet to be reached on the most appropriate approach that can be employed to demonstrate the numerous values of environmental resources, and how they can be summed up in a valuation study so as to present the most comprehensive picture of the benefits to human beings.

1.4 Motivation for study area

This study was carried out in KwaNompondo, KwaMduku and Machibini villages in northern KZN. The study area is bordered by the Phinda Game Reserve to the north, the Mfolozi River to the south, the Greater St. Lucia Wetland Park (GSLWP) to the east and the Hluhluwe-Umfolozi Park (HUP) to the west. The location of the study area is shown in Figure 4-1.

The choice of study area was motivated by two main factors. Firstly, as this study was part of a research programme, it was necessary to utilize the same study area selected in the first phase of the research programme for continuity. The selection of the study area in Phase 1 of the research programme was facilitated by a decision of the Steering Committee of the research team to use the methodology developed by Shackleton *et al.* (1999) for the assessment of direct use values of woodland resources. The methodology required data to be collected from villages that displayed a trend between the level of development and the utilization of woodland resources, hence the need to find a study area where this variation in level of development was present. This information pertaining to the socio-economic characteristics of the study area is discussed in Chapter 4.

The second criterion for the choice of study area was the availability of literature on woodland availability and utilization. Numerous studies such as Infield (1986), Watson (1996), Magasela (2001), Watson and Madonsela (2002), Zungu (2003), and others, have been undertaken in the study area. Perhaps the key study on woodland availability, distribution and trends of utilization in the study area was the one undertaken by Watson (1996). Through the analysis of sequential aerial photographs, Watson (1996) observed a trend in the availability and distribution of woodland in the study area. Before Zulu peasants were forced to settle in part of the study area in 1958, woodlands covered approximately 70% of the land. Within two years of settlement they had decreased to 50% due to clearance associated with the establishment of homesteads and cultivated fields. By 1983 they had decreased to 40% as a consequence of fuelwood harvesting, veld

burning and overgrazing. In the 1980s there was influx of people to the area around Mtubatuba due to it being declared a 'Growth Point' (Watson, pers. comm. 2002).

Magasela's (2001) study included a village near Mtubatuba as well as two villages along the road between Hluhluwe and the north entrance to HUP. The majority of her respondents in all three villages concurred that the woodlands had decreased over the past decade, and attributed this to land clearance associated with increased population. Watson *et al.* (2002) raised the alarm that the continued loss of woodlands from the areas surrounding the Park would ultimately threaten the Park's woodland resources.

It was believed that research in an area where the availability of woodland resources had declined could potentially reveal insights on the utilization and the value of woodland resources, and the implications to the park in terms of the Neighbour Relations Policy of the Ezemvelo KZN Wildlife, and the needs and aspirations of surrounding communities for resources in the Park. It is because of these two main reasons that the study area was selected.

1.5 Aim of study

The aim of this study was to investigate monetary and non-monetary values associated with indirect use benefits of woodland resources, in three rural villages in northern KZN.

1.6 Objectives

The study is characterised by immediate and long-term objectives. The immediate objectives of the study were to:

- Identify the range of indirect use benefits provided by woodland resources;
- Investigate the livelihood strategies and options available to the rural households;
- Identify factors that influence the community's perceptions of indirect use benefits of woodlands;

- Establish monetary values that the households place on the various indirect use benefits;
- Establish non-monetary values that the households place on the same woodland benefits;
- Investigate the socio-economic profile of the study area;
- Establish if there is a relationship between the monetary values obtained and the socio-economic status of the households;
- Compare variations in value attached to different benefits by the different age groups, genders, and among the three villages;
- Investigate factors that have been responsible for the change in availability of woodland resources over time and if so, and the communities' ideas on what should be done to remedy the situation; and
- Assess whether the communities' perceptions and needs have any implications for the neighbouring parks and DWAF.

1.7 Structure of dissertation

This dissertation consists of eight chapters. Chapter 1 is the introductory chapter and presents the background to the study. The motivation for the study together with the aims and objectives of the study are presented in this chapter. The rationale for selecting the study area is also presented in Chapter 1.

Chapter 2 describes woodland resources and identifies factors that impacts on their sustainability. These factors range from social, socio-political, environmental, micro and macro-economic factors. The Sustainable Livelihoods Approach (SLA) is thereafter defined and briefly discussed. The chapter ends with a discussion on the characteristics of rural livelihoods.

Chapter 3 is a review of studies that have been undertaken to value woodland resources. This includes monetary and non-monetary values. Monetary values are explained using the concept of 'Total Economic Value' (TEV), which describes resource values according to

their use, option and non-use values. The second part Chapter 3 explores non-monetary valuation of woodland resources, and discusses some of the non-monetary values of woodland resources.

Chapter 4 is a detailed description of the study area. The chapter first describes the location and boundaries of the study area. This is followed by a description of the study area's environmental attributes in the context of rural livelihoods.

The methodology used to collect data is presented in Chapter 5. The Contingent Valuation Method (CVM) and Participatory Rural Appraisal (PRA) were used to assess monetary and non-monetary values, respectively. Data collection involved a pilot survey which aimed to test the data collection techniques. These were subsequently refined for the main survey. The collected data were transcribed and analysed using both qualitative and quantitative techniques.

The findings of this study are presented and discussed in Chapter 6. The first part of the chapter discusses background information of the respondents to contextualize the valuation results that were obtained. The latter part presents the findings of the study. The findings are presented under two categories: ecological services and social benefits. The study established that both ecological services and social benefits realised from woodland resources are perceived to be of importance to rural households. Ecological services were perceived to be of slightly greater value compared to social services by all three categories of respondents: male, female and children groups. Children generally ranked both ecological and social services higher than male respondents. The values obtained across the three villages varied, with the most developed village assigning greater values to ecological services than the other two villages.

Chapter 7 is the conclusions and recommendations chapter. First, a brief overview of the study is outlined together with a summary of the key findings. Thereafter, conclusions are drawn and recommendations for future studies are made.

CHAPTER 2: WOODLAND RESOURCES AND RURAL LIVELIHOODS

2.1 Introduction

Chapter 2 defines the term 'woodland', and describes impacts and threats to the sustainability of woodland resources in rural areas. This is followed by a discussion on rural livelihoods; their nature and how they rely to a great extent on woodland resources. Diversification of rural livelihoods is described as one of the strategies that are employed by many rural households in an effort to enhance their livelihoods. The SLA is briefly described in this chapter. Chapter 2 ends with a brief overview of the SLA, and the reasons for its application in the description of the study area.

2.2 Defining woodland

The NFA defines woodland as "a group of indigenous trees which are not a natural forest, but whose crowns cover more than five percent of the area bounded by the trees forming a perimeter" (DWAF, 1998a:14). In his review of South African woodlands in the context of the NFA, Shackleton (2000) highlighted a major shortcoming of this definition in that it overlooks the dynamic nature of forest canopies. Forest canopies are subject to alteration by anthropogenic factors such as subsistence harvesting and livestock grazing, and natural forces (e.g. wild fires caused by lightning). As a result of this limitation, Shackleton proposed a more appropriate definition, which incorporates vegetation structure, distribution and climate. Shackleton (2000) uses the terms 'savanna' and 'woodland' synonymously to mean a group of tropical and subtropical vegetation types in which herbaceous and woody indigenous plants experience seasonal growth patterns relative to precipitation received during hot summer months that are followed by cooler but warm dry winters. The herbaceous and woody strata are fire adapted, co-dominant, and may be continuous or discontinuous (Shackleton, 2000).

Shackleton's definition incorporates three factors that are considered to be important determinants of woodlands; the vegetation structure, distribution and climatic conditions. In addition to these three factors, Shackleton draws attention to the issue of disturbance, whereby he noted the role that fire plays in the structure and distribution of available vegetation types in a woodland. For the purposes of this dissertation, 'woodland' means open groups of indigenous trees which have a herbaceous field layer and are found in subtropical climates.

2.3 Factors affecting the sustainability of woodlands

Numerous studies have been undertaken on threats to the sustainability of woodlands. These include Young and Solbrig (1992), Grossman and Gandar (1994), Ellis (1999) who mainly identified socio-economic factors, and more recent studies by Willis *et al.* (2000), Obiri and Lawes (2002), Twine and Siphugu (2002), Watson (2002), Zungu (2003), von Maltitz and Shackleton (2004), which include micro and macro-economic and political impacts.

2.3.1 Legislative and policy framework

Young and Solbrig (1992), Grossman and Gandar (1994), Ellis (1999) and Evans *et al.* (1999) identify political and institutional factors that pose a threat to woodlands in southern Africa. Such threats include political instability, land-right conflicts and land disputes, as well as decentralization of government in South Africa. South Africa's political history has been fairly remarkable, with different impacts and threats evident in different political eras.

Erosion of traditional rules and regulations

Von Maltitz and Shackleton (2004) established that during the pre-colonial and leading to the colonial era, the use and management of woodlands occurred through various ways. These included:

- Formal rules set by chiefs and their tribal councils;
- Religious beliefs instituted by local traditional healers;
- Taboos and superstition within certain clans; and
- Indigenous knowledge and practical reasons in specific localities.

The study by Watson (1991) illustrates how such factors contributed to woodland management. King Shaka of the Zulu nation reserved part of central Zululand as his hunting grounds. Due to this reservation, the area remained unoccupied around 1818, and was only subjected to a limited amount of hunting. This provided protection of the woodland resources from exploitation.

The colonial era, however, saw the weakening and erosion of Traditional Authority structures (Obiri and Lawes, 2002). Traditional Authorities slowly evolved from being guardians of the land and its resources, to being colonial representatives. This was to be further entrenched during the subsequent apartheid era. Ntsebeza (2000, cited in von Maltitz and Grundy, 2000) describes how the authority and legitimacy of traditional leaders was further degraded during the apartheid era. Traditional management systems were done away with and replaced by apartheid systems. The state modified locally-evolved tenure system, which disrupted what was previously an efficient system of management (Shepherd, 1992 in Grossman and Gandar, 1994). Twine (2004) asserts that the system under Traditional Authorities was generally effective in managing the use of woodland resources, and that changes in the political environment contributed to increased harvesting of resources.

Forced removals into homeland areas

Widespread division of land according to race took place during the colonial period, and this continued into the apartheid era (Willis *et al.*, 2000). Land was divided into African communal areas, European settlements, and conservation forestry areas belonging to the state. Indigenous Africans were uprooted from their land to create reserves and settlements for the Europeans, and were crowded into approximately 13% of the land of

South Africa. Most of the 'homelands' as they were termed, were overpopulated and were on marginal land that could not support the livelihoods of the new inhabitants.

As a result of these factors natural resources in the homelands were extensively degraded (Willis *et al.*, 2000). The relocation of people is also thought to have led to weakening of the social cohesion of rural societies, and selfish attitudes among people in communal areas, which resulted in the widespread degradation (Grossman and Gandar, 1994).

Exclusion from protected areas

Before the reserves were established the natural resources belonged to the surrounding communities. The use of these resources was governed by traditional regulations (Infield, 1986). The proclamation of the reserves resulted in fencing off from neighbouring communities, which resulted in the people losing the access and rights they previously had to the resources in the reserves. This exclusion or 'preservationist' approach created socio-economic hardships for the people living around the parks. Infield (1986) and later Zungu (2003) point out that by alienating local communities from the process of conservation and expropriating their land and resources, the state and the conservation bodies created a situation whereby the conservation areas were no longer of value to the people around them, which is widely believed to have resulted in animosity, resentment and conflict. These negative emotions manifested in widespread poaching of resources and uncontrollable destruction (Infield, 1986).

The pressure on woodlands surrounding protected areas mounted due to a number of compounding factors. These factors include the loss of access to resources in the protected areas by the surrounding communities, coupled with population growth and as well as their location on marginal land. Magasela (2001) and Watson *et al.* (2002) established that indeed the demand on woodland resources increased in such areas. The respondents perceived that the woodland resources such as thatch grass and fuelwood were inadequate to satisfy the demand, and they associated this to the establishment of the Park.

Post-apartheid socio-political threats

The post-apartheid era has seen radical political changes which have altered the legislative and policy environment. There has been a definite move from 'preservation' by excluding people to 'conservation' and sustainable utilization of resources through diverse stakeholder participation (Zungu, 2003). New forms of institutional structures and management practices for sustainable management of woodlands have since evolved. However, Twine (2004) cautions that the changes in the political arena can also be viewed as major threats to woodland resources. Government's devolution of management over land from the State to communities is regarded as posing a threat to woodland resources because of the ambiguity in rule enforcement (Evans *et al.*, 1999; von Maltitz and Flemming, 1999). Harvesting by outsiders (Zungu, 2003) and the general competition between different users is another cause of over-harvesting. In addition, widespread misconceptions about democracy have resulted in many people mistaking democracy to mean entitlement and uncontrolled access to resources (Twine, 2004). This, coupled with other factors such as unemployment, has led to increased harvesting of resources.

2.3.2 Social and Economic activities

Most of the woodlands in the country have been disturbed to some extent (Shackleton *et al.*, 1999; Watson, 1996; Shackleton, 2000; Willis *et al.*, 2000). For instance, in the study area, Watson (1996) established that over a period woodland availability had declined at an alarming rate. This decline was associated with the influx of people into the area after the nearby town of Mtubatuba was identified as a 'growth point'. Woodlands were also transformed to other land-use activities such as plots for subsistence farming. Magasela (2001) observed that apart from clearing communal woodlands for settlements and fields for subsistence farming, woodlands under private ownership were also being cleared for the establishment of plantations. There are at present extensive forest plantations and private commercial plots in parts of the study area (Magasela, 2001; Watson and Madonsela, 2002; Zungu, 2003).

Bush encroachment is a common phenomenon in communal woodlands in southern Africa, where there are high population densities of humans and livestock. In an assessment of the impacts of cattle on rangelands, Grossman and Gandar (1994) concluded that the presence of cattle on rangelands contributes to an increase in bush encroachment. The woody component increases due to the lack of high intensity fires that normally kill the seedlings of the woody layer (Grossman and Gandar, 1994). Watson's (2002) review of literature on factors that affect the sustainability of savanna resources in southern Africa also established a correlation between heavy grazing and bush encroachment. Overgrazing of the grass layer in a woodland has been said to result in the woody component failing to sustain high intensity fires, which results in the expansion of the woody layer at the expense of the grassy layer. In this way the structure and the primary productivity of woodlands is altered.

An opposing school of thought asserts that heavy grazing is not the only cause of bush encroachment (Ward, 2002). In his assessment of the causes of bush encroachment in African savannas, Ward (2002) found out that bush encroachment is widespread in areas where grazing is infrequent and light (Ward, 2002: 189). He concluded that the need to understand the causes of bush encroachment remains, and that modelling instead of observational studies would be more useful in providing answers to this phenomenon.

Fire is another factor that is largely associated with bush encroachment (Trollope, 1999; Ward, 2002) Trollope (1999) studied the effects of fire in southern African Savannas. Fire is widely used as a range management practice. However, Trollope argues that the practice of burning rangelands during summer, late autumn or late winter to stimulate the growth of new grass is unacceptable as it has numerous drastic results, including increased runoff of rain water and increased soil erosion.

2.3.3 Land tenure systems in rural areas

Land tenure concerns the relationship between humans and the land upon which their survival and well-being depend. Land tenure plays an important role in the management of woodland resources as it impacts on the utilization and ultimately management of resources in woodlands. Different systems of land tenure result in people having different attitudes towards the land and its natural resources. At present there are three basic tenural categories in South Africa; state land, private land and communal land. State land is legally owned by the state, which is the decision making authority (through a designated department). Woodlands in state land are generally used for conservation purposes. Private land is privately owned by an individual, a group of individuals or a company. Approximately 65% of the woodland biome in the country is privately owned (Shackleton *et al.*, 1999; Cawe and Mckenzie, 1989). Communal land is legally owned by the state, or is in a trust to the community. In this case the Tribal Authority (chief) is the decision-maker. Communal land is mainly used for subsistence. The Land Reform Policy recognises that the land effectively belongs to the people occupying it.

Table 2-1: Tenure systems and their impacts on natural resources

Community-owned land	Trust Land
Leadership elected by the community members	Leadership appointed by Tribal Authority Office
Common vision for the whole community	Apathy from some community members towards communal natural resources
Rules for resource utilization well known and adhered to	Little or no commitment to resource management issues
Clear enforcement procedures for rules	Many not adhering to procedures administered by Tribal Authority
Woodland resources well protected	Woodland resources clearly over-exploited

[Adapted from Willis *et al.* (2000)]

Table 2-1 clearly illustrates the different attitudes that can be brought about by the different tenure arrangements in different communities. The impact of tenure systems is evident in the former 'homeland areas' in South Africa. Because of the country's history of apartheid policies that resulted in the overcrowding of marginal homeland areas, there was uncontrolled utilization and over-exploitation of natural resources in these homeland areas (Willis *et al.*, 2000). However, democratisation saw an introduction of numerous policies that aimed to redress the inequalities of the past. One of these is the Land Reform Policy.

The Land Reform Policy aims to address the land reform issues through land tenure reform, which includes land redistribution and land restitution (DALA, 1997). Through this policy the Land Tenure Reform Programme was initiated with the aim of improving the tenure security of all South Africans, and to accommodate diverse forms of land tenure including communal tenure. The programme provides for secure forms of land tenure and help resolve tenure disputes. Willis *et al.*'s (2000) review of policies that may impact on woodlands concluded that the Land Tenure Reform pose a negligible impact on woodland resources since most of the land which was previously under woodland has already been converted to other land uses.

2.3.4 Commercialization of woodland products

Twine and Siphugu's (2002) opinion on the increased demand of woodland resources is consistent with the findings of Sekhwela (1990) and Grossman and Gandar (1994). Sekhwela conducted a similar study conducted in Botswana and found that the utilization of woodland products by rural communities was no longer dependent on their needs alone, but was also trying to satisfy the demand created by external markets. The commercialisation of resources such as fuelwood was seen as exerting pressure on woodlands. Previously people collected dead wood for fuel. However, due to high demand for selling, people started to cut live trees to satisfy the market. Resource harvesting by outsiders also increases the pressure on woodland resources, and raises the demand to exceed supply. All these factors have a negative impact on woodlands and pose a huge

threat to their sustainability. It is from these findings that Sekhwela (1990) concluded that the pressure of overpopulation on woodlands is minimal compared to the impact of commercialising woodland resources.

Commercialization brings about selective harvesting of a certain species. Watson (2002) identifies excessive selective removal of certain resources such as preferred wood species and medicinal plants as a threat to the sustainability of woodland resources. Over-harvesting of selected species has led to their scarcity in some areas. Likewise, the increased demand for traditional medicines, which is driven partly by population increase and urbanization, is responsible for the increasing scarcity of these resources.

2.4 Sustainable Rural Livelihoods

A livelihood is not just about production, employment and income, but is a more holistic view that embraces social, economic and institutional dimensions. It is the way on which people combine their capabilities, skills and knowledge with the resources available to them to create activities that will enable them to make a living (Khanya-mrc, 1999). Carney (1998) defines a livelihood as comprising the assets, activities and access that jointly determine the living gained by an individual or a household. A livelihood is considered to be sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, while not undermining the natural resource base (Scoones, 1998). Chambers' (1995) definition of a sustainable livelihood also incorporates the vulnerability factor. He defines a sustainable livelihood as a living which is adequate to satisfy basic needs and is secure against anticipated shocks and stresses.

A sustainable livelihood is one that can be carried now as well as in the future

- Without depleting the resources it depends on;
- Without depriving current and future generations of a livelihood option; and
- Can be carried on in spite of shocks and stresses, i.e. is resilient.

Figure 2-1: Properties of a sustainable livelihood

[Adapted from: Scoones (1998)]

Authors such as Carney (1998), Scoones (1998), Ellis (1999) and organizations and development agencies like Department for International Development (DFID), the Food and Agriculture Organization (FAO), the World Bank and Khanya-mrc in South Africa discuss sustainable rural livelihoods and review the SLA. A SLA is a way of understanding the needs of the poor and setting objectives for development so that they respond effectively to those needs. This approach takes into consideration the different types of capital and assets necessary for a household to make a living, the vulnerability context of the community, and the institutional structures and policies that govern access and use of these assets, livelihood strategies and the anticipated livelihood outcomes in trying to understand how rural households survive and secure a living, often in relatively adverse circumstances.

The SLA is used by development agencies as a way of looking at how to respond to the needs of poor people (Khanya-mrc, 1999). This approach aims to make development more effective by putting people at the centre of the analysis, rather than basing the decision-making on resources and technology like it often was in the past. Apart from being applied in rural development and poverty reduction programmes, the SLA is also increasingly being applied in environmental management (Scoones, 1998). The sustainable livelihoods framework is outlined in various ways, depending on the need. This study adopts the SLA framework as described by Carney (1998). This is illustrated in Figure 2-2.

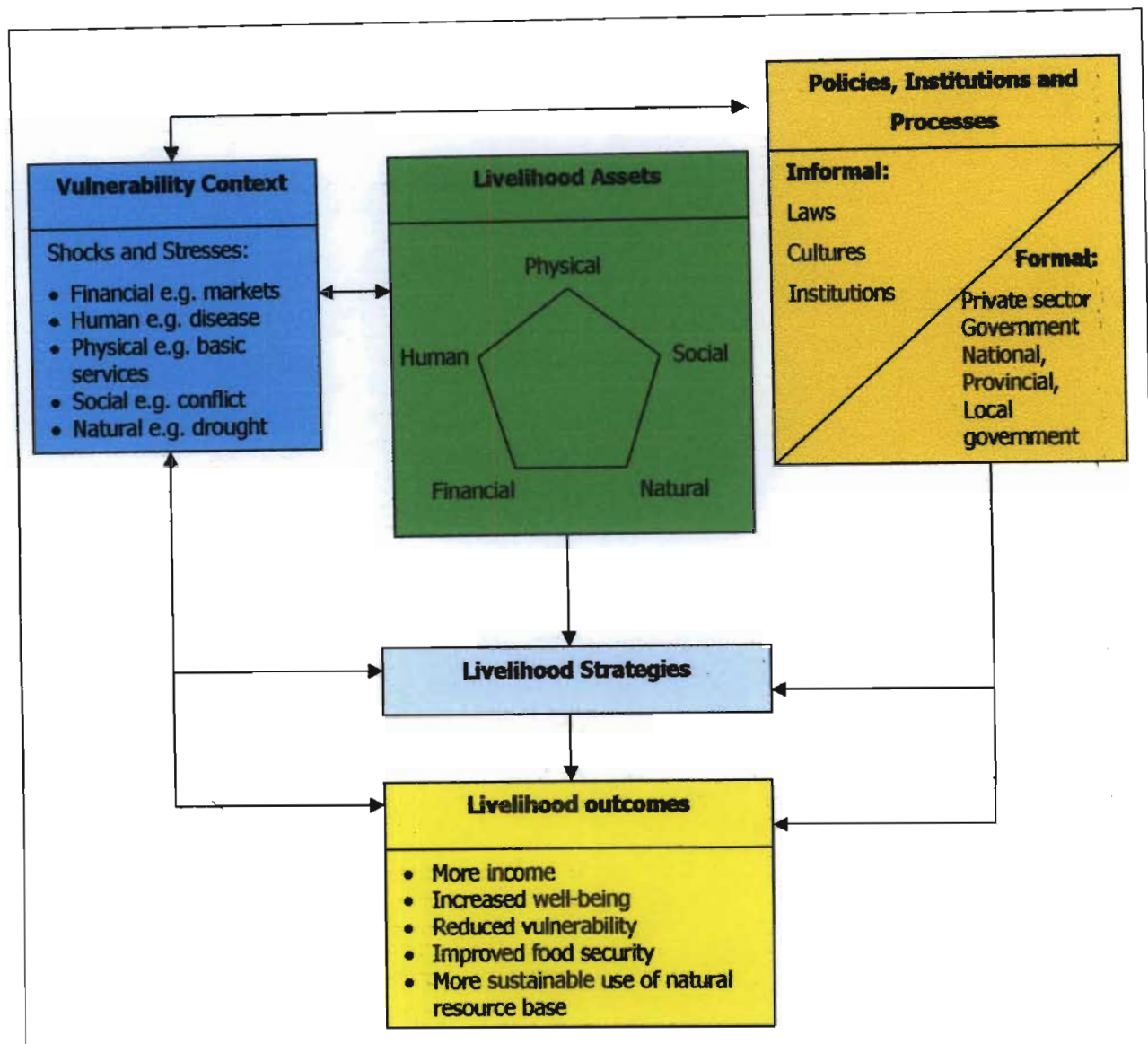


Figure 2-2: The Sustainable Livelihoods Approach

[Adapted from: Carney (1998)]

The SLA framework can be used in understanding the role that woodland resources play in the lives of rural households in the context of this study. As already mentioned, one of the indicators of a sustainable livelihood is the sustainability of the natural resource base on which households rely for their livelihoods. In addition to that, an understanding of the livelihood assets that are available to households within the study area, as well as the livelihood strategies employed will enable one to get a better appreciation of the value of

woodland resources to these communities. Clarke and Grundy (2004) assert that the growing understanding of the role woodlands play in the lives of rural people will continue to yield important information into the role and the significance of woodlands to vulnerable communities.

2.4.1 The vulnerability context

The vulnerability context is the external environment in which the household exists (Carney, 1998 and Khanya-mrc, 1999). This external environment has a direct impact upon the assets available for households, which in turn affects the livelihood options available to them. Chambers (1995) and Allison and Ellis (2001) recognise two aspects of vulnerability; internal and external vulnerability. Internal vulnerability refers to a household's internal coping capability or lack of means to cope through a situation without damage or loss. This is often determined by assets, food stores, as well as community support and government safety net policies. External vulnerability refers to external threats to livelihood security due to risk factors such as:

- **Trends** e.g. climatic, population, resource, economic and governance trends;
- **Shocks** e.g. human health, natural disasters, conflict and economic shocks;
- **Stresses** e.g. a persistent drought; and
- **Seasonality** e.g. of prices, production, employment opportunities and time.

The significance that people attach to their vulnerability has a bearing on their decision-making in terms of resource use. Households may be compelled to make trade-offs in certain areas in an effort to deal with the challenges facing them. For example, a persistent drought might drive people to abandon cultivation or livestock farming and resort to unsustainable harvesting of resources in an effort to survive. It is important for decision-makers to understand such dynamics to be able to effectively respond to them.

2.4.2 Livelihood assets

Within the vulnerability context that they live in, people seek and gain access to a number of assets or different forms of capital in an effort to make a living. Such assets (or capital) include natural, human, social, physical and financial assets.

Financial Capital: Financial capital is the capital base and other economic assets which assist in pursuing livelihood strategies. These include banks, credit facilities, co-operatives and government grants. Financial capital also includes financial resources such as lobola, savings, supplies of credit or regular remittances and pensions, that are available to people and are readily convertible to liquid capital to provide people with different livelihood options (Carney, 1998).

Human Capital: The education, skills, knowledge, nutritional levels, good health and the ability for people to make a living (Carney, 1998). The human capital each household has determines the household's ability to pursue different livelihood strategies.

Social Capital: The social resources which people draw from to expand their livelihood options (Carney, 1998). These resources include social networks, membership of groups, relationships of trust, kinship, as well as access to wider institutions of society. People draw from these resources to expand their livelihood options.

Physical Capital: The publicly-owned economic and social infrastructure and privately-owned production equipment and means that can be used to increase labour and land productivity. Social infrastructure includes transport, shelter, water, energy, schools, hospitals and communications. Privately owned equipment includes farm animals, tools and machinery used for productivity.

Natural Capital: The natural resource base from which environmental goods and services important for livelihoods are derived. Environmental resources include soil, air, water, wildlife and bio-diversity. Environmental services include mainly ecological functions such as pollution sinks, circulation of nutrients and the hydrological cycle.

Households sustain their livelihood through access to one or more of these capital assets. However, access to these assets is often guided by institutional structures and processes. These are context-specific and vary from one area to the next.

2.4.3 Institutional structures and processes

As already mentioned above, access to livelihood capital assets is a function of a variety of institutional structures, policies and laws (Carney, 1998 and Khanya-mrc, 1999). These structures, processes and laws influence the manner in which people combine and use their assets in pursuit of beneficial livelihood outcomes. Examples of institutional structures include government, community-based organizations (CBOs), non-governmental organizations (NGOs), the public and the private sectors. Institutional processes are the different rules and regulations that influence people's ability to use their assets effectively. These might include government policies and legislation, or they might be derived from the market or from the people themselves. An example of such processes includes traditional regulations that may be applicable in one village, as well as provincial and national legislation applicable at a wider area. It is these structures and processes that determine people's access to the assets they require to make a living.

2.4.4 Livelihood strategies

Poor people adopt strategies to cope with their lives, based on the awareness of livelihood outcomes they aspire to, livelihood assets available to them and the institutional structures and processes guiding their use (Khanya-mrc, 1999). Carney (1998) defines livelihood strategies as the range and combination of activities and choices that people make to

achieve their livelihood goals. The combination of these activities and choices is often a dynamic process aimed to meet a range of different needs at various times. Shackleton *et al.* (2000a) recognise the critical role that woodland resources play in the provision of products that contribute to the livelihoods of rural households. The next sub-section expands on this role.

2.5 Rural livelihoods diversification

To be able to understand the role and value of woodland resources to rural households, Campbell and Luckert (2002) recommend that we need to first understand the nature of rural livelihoods. To sustain their livelihoods, many rural households engage in different strategies which often involve a range of activities undertaken by different members of the household at different times of the year (Chambers, 1995). Most rural households located in woodland areas harvest one or more woodland resources, either for subsistence or commercially to generate income (Willis *et al.*, 2000). Dovie *et al.* (2001) define woodland resources as all products, whether biotic or abiotic, found in and around woodlands and utilized by communities in various ways in their daily lives. These resources include those derived from trees as well as NTFPs. Estimates suggest that at least one quarter of the world's poor depend directly or indirectly on woodlands for their livelihoods (Ellis, 1999 and World Bank, 2000 in Warner, 2000). Shackleton *et al.* (1999) assert that poor households tend to be more dependent on natural resources, and that they use a greater variety of these resources than their richer counterparts, who often have access to other livelihood options.

To obtain income, poor households are more likely to rely on informal jobs, social welfare grants and the sale of resources. Woodland resources such as wild fruits, herbs, honey and traditional medicines are often traded locally on an opportunistic basis, or they are sometimes transported to more distant (often urban) markets for sale. Zungu (2003) observed that traders adopt various strategies in order to extend the availability of their products, and overcome seasonality. Such strategies include drying and preserving some of their wares, such as food items and traditional medicines. However, on top of all the

above, Ellis (1999) estimates that rural households rely approximately 80% to 90% on off-farm income sources. This process of “constructing a diverse portfolio of activities and social support capabilities for survival, in order to improve the standard of living” by households is termed ‘livelihood diversification’ (Ellis 1999:2). The range of activities that rural households typically engage in includes the following (in Campbell and Luckert, 2002):

Chambers (1995) described the activities to include crop production, harvesting communal resources and livestock keeping.

- Employment:
 - Formal employment;
 - Self employment – typically small-scale enterprises such as craft making for sale, traditional beer brewing, medicine-making;
 - Informal (wage) employment;

- Natural resource use:
 - Resource harvesting – harvesting of NTFP as well as other natural resources available to them;
 - Agricultural production – typically livestock rearing and crop production;

- Remittances and grants:
 - Pension;
 - Social welfare grants (old-age grants, disability grants and grants for orphaned children).

2.5.1 Reasons for diversifying livelihood strategies

Many rural households are increasingly diversifying and adopting an array of activities for their livelihoods (Ashley *et al.*, 2002). Livelihood diversification comes about as a product of a range of factors. Shackleton *et al.* (1999) observed that woodland resources are particularly important to rural households who lack other livelihood options. According to Ashley *et al.* (2002), households who have more diverse income portfolios tend to be better off than those who rely on a smaller range of activities.

The main factor that determines the options for diversification is access (or lack thereof) to livelihood assets. Rural households pursue a range of livelihood strategies to achieve the outcomes they desire, based on the assets they have available to them (Ellis, 1999; Campbell and Luckert, 2002). According to Carney (1998), the desired outcomes often include improved food security, reduced vulnerability, increased household income, improved health of household members, and enhanced social networks and savings.

Diversification of rural households may be determined by factors such as:

- Access to communal land;
- Climatic conditions;
- Degraded land;
- Poverty; and others.

Access to communal land

Access to communal land and the resources in it is essential for the survival of many rural households, particularly the poorer households who rely on communal resources for their livelihoods. Shackleton *et al.* (1999) observed that remote areas and under-developed villages tend to rely more on communal resources than villages closer to urban centres, often due to the abundance of natural resources. The opportunities for diversification to other activities increase as one moves towards urban areas. Areas closer to urban centres have better access to employment in the urban centres, than those in remote rural areas.

Poverty

Ellis (1999) described poverty as one of the main causes of the diversification of rural livelihoods. Poverty, particularly income poverty, results in the affected households being unable to secure financial capital (such as loans) for farming and / or other livelihood options. Poverty also increases the inability to secure sizable loans that could be used to improve the household financial situation. In many cases, poor people do not have access to financial institutions such as banks to obtain loans. They rely on social networks such as stokvels, a unique South African saving scheme, and other micro-lenders. The household head interested in crop production might decide to purchase only the critical material required for cultivation (e.g. seeds) using the small loan obtained, forfeiting the rest of the materials, such as fertilizers and machinery. Because of the limited resources invested in the activity, the harvest obtained at the end of the season will not be sufficient to repay the loan. In this way the poverty cycle continues with no end in sight.

Land degradation

When the productivity of land declines many poor households tend to increase their reliance on harvested woodland resources, or diversify their livelihood options to include off-farm activities (Ellis, 1999). Affected households are inclined to engage in a range of off-farm activities to close the gap left by farming.

Unfavourable climate conditions

Ellis (1999) observes that although many rural households depend on farming for their livelihoods, in many instances, due to factors such as unfavourable climatic conditions, farming alone does not provide sufficient means of survival. Prolonged droughts, floods, and other conditions often destroy crops, leading to poor harvests. Decreasing availability of fodder and natural water sources eventually results in the starvation and death of game and livestock. In extreme events such as these, rural households tend to purchase food items and utilize other resources to supplement what they would normally obtain from their subsistence farming and resource harvesting.

Other factors

In some cases rural households diversify and change their livelihood strategies in response to pressures and changing circumstances that they may be facing. Such pressures include the HIV/AIDS pandemic, which has had a large impact on the livelihoods of many poor households (Clarke and Grundy, 2004). The manner in which HIV/AIDS is transmitted makes it a pandemic that largely affects the economically-active members of many households. This has compelled the economically-inactive members of many households to begin looking for ways for survival, which mainly involves diversification into other activities that were not considered as options before.

2.6 Chapter conclusions

The government's need to understand the role of woodland resources to the livelihoods of the rural poor in an effort to contribute to the sustainable utilisation and management of these resources was the main motivation for this study. Chapter 2 provided a review of woodland resource uses and rural livelihoods. Factors that have been identified as having an impact on the sustainability of woodland resources include socio-political factors, social as well as socio-economic factors. Rural livelihoods were investigated using the SLA framework, which simply outlines the key elements required in understanding the issues that affect people's livelihoods, how the people respond to these issues, as well as the institutional processes that guide the use of and access to resources. A comprehension of these interlinked factors will assist in creating a better understanding of the role played by woodland resources in the lives of rural people.

CHAPTER 3: VALUATION OF ENVIRONMENTAL RESOURCES

3.1 Introduction

Chapter 3 explores the valuation of environmental resources, more specifically woodland resources. Monetary and non-monetary values of woodland resources are outlined and discussed. Lastly, the different techniques for valuation are explored, through a review of similar valuation studies.

3.2 Monetary valuation of woodland resources

The value of woodland resources has been traditionally determined by using their market prices as a guide, or by using the price of the next best available alternative to that particular woodland product or service (Turner, 1993; Emerton, 1996). For example, fuelwood is a commonly traded product and often has a general price attached to it. In areas where fuelwood does not have a market price, the closest alternative that is well known and relevant to the area is used to estimate its value. Kerosene has been used as a proxy for fuelwood, particularly in poor urban areas (Emerton, 1996).

Through interactions with different resources, human beings develop a sense of the significance of the resource and as such hold certain values. It is these values that are assigned to resources when they are being valued (Turner, 1993; Turner *et al.*, 1994; Beder, 1997). Traditionally, economists distinguish user values from non-user values, and aggregate these to obtain the 'total economic value' (TEV) of a resource (Turner *et al.*, 1994). Use values are the values that accrue from the physical use of an environmental resource. They include direct use values and indirect use values.

Extensive research has been done on the different types of value, including studies by Pearce (1993), Turner *et al.* (1994), Gilpin (2000), Pearce and Pearce (2001), Farber *et al.* (2002), among others. Direct use values can either be consumptive or non-consumptive. For example, consumptive uses of woodland resources are those resources that are harvested. They include fuelwood, construction timber, medicinal plants, thatch grass and fodder. A non-consumptive use of woodland resources is when the resources are not consumed but used directly. Non-consumptive uses include recreational activities such as bird-watching, hiking, as well as educational activities and research.

Indirect use values of woodland resources mainly consist of ecological functions such as watershed protection, nutrient cycling, climate regulation and soil formation; and social functions including aesthetics, privacy, cultural and spiritual functions (Pearce and Pearce, 2001).

Option value involves the option to use resource at a future date. Non-use values, also termed 'passive use values' refer to the benefits individuals may obtain from woodlands without directly using or visiting them (Turner *et al.*, 1994). Non-use values comprise bequest values, the welfare that the current generation obtains from preserving it for future generations; existence values, the welfare obtained from the knowledge that a resource exists.

The TEV model is presented in Figure 3-1.

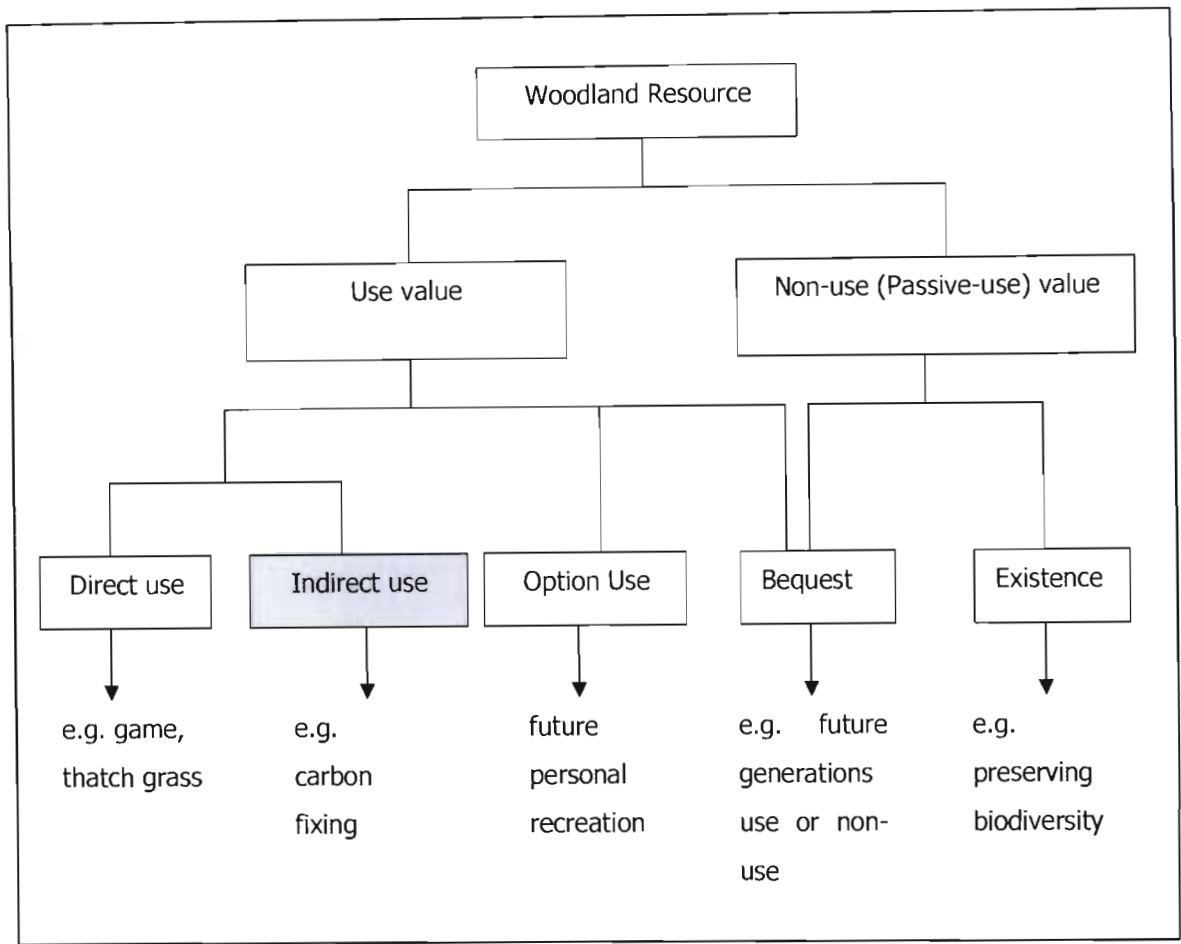


Figure 3-1: The Total Economic Value of a woodland

[Source: (Turner *et al.*, 1994)]

3.2.1 Direct use value

Direct use values are values derived from the direct use of a resource, which can either be for subsistence or commercial purposes. Direct use values can be readily captured in the pricing system. The fact that they are traded in markets (formal or informal) makes it easy to measure their value in economic terms.

In an attempt to analyse the strengths and weaknesses of the various methods used to calculate monetary values, Gram (2001) used a combination of a range of methods in a study to assess the monetary value of direct use resources. Using structured and unstructured interviews, direct observation, and recording in diaries, Gram (2001) observed the market prices of goods sold at the local markets. This study spanned over a year. Calculations of the value of goods produced were based on the quantities of the harvested goods, subtracting the costs of harvesting and processing. Subsistence goods were valued based on observations of local exchanges and substitution with other goods. Seasonal variations in the subsistence activities of locals were taken into consideration.

The findings of this study illustrated the shortcomings of the different methods, and how these methods can be used to compliment each other. For instance, where interviews failed to yield results, direct observation was found effective. Gram (2001) recommended that the study be repeated after a certain period (ideally after five to ten years) to confirm the initial findings. The major limitation of this approach however, is the time required to complete the study. Observation alone is a time-consuming activity and should rather be used to supplement other methods.

Direct use values of woodland resources in southern Africa have been well documented over the years. Research on direct use values in southern Africa includes the works of Campbell (1993), GWAAI Working Group (1997), and others. Shackleton *et al.* (1999), Shackleton and Shackleton (2000), Dovie *et al.* (2001), Magasela (2001), Dovie *et al.* (2003), among other authors, provide comprehensive reviews of the use of woodland resources by rural communities in South Africa. This dissertation does not replicate these works. The direct use benefits of woodland resources are outlined briefly to contextualize the entire benefits realized from woodland resources in terms of the TEV model, and to determine their significance to the livelihoods of many rural households.

In his valuation of woodland resources in Zimbabwe, Campbell (1991, cited in Campbell 1993) used the CVM and the Replacement Costs Method (RCM) to estimate the value of the miombo woodlands goods and services. For the CVM, the researcher did not ask direct

questions about the value of tree resources because he considered such questions to be inappropriate in that particular situation due to the "inexperience of most respondents in dealing with monetary valuations" (Campbell, 1993:4). Instead, he used commodities such as boreholes and a well known design of a latrine to derive values of the tree resources. The CVM revealed high estimates of direct use values such as fuelwood and animal feed, compared to indirect use values such as ecological services and other intangible benefits.

The second approach used in Campbell's (1993) case study was the RCM. Using this method, the researcher attempted to value the miombo tree resources by assessing their replacement cost, i.e. the cost one would pay to replace the resource (Campbell, 1993). This approach yielded high values of direct use benefits such as fruits and other wild food, fuelwood and construction wood, compared to the values obtained for indirect use benefits. Although this study recommended that the estimates obtained be used cautiously because of what was termed 'a poor database', the study succeeded in illustrating how a rural community values direct use benefits of woodland resources versus indirect use benefits of the same woodland. The study concluded that because of the knowledge gaps, further research needed to be undertaken to allow the valuation studies to contribute meaningfully to decision-making.

The GWAAI Working Group (1997) investigated the value of woodlands in a study in Zimbabwe. They attempted to integrate three different disciplines (sociology, ecology and economics) in the valuation. PRA techniques such as resource maps, transect walks and seasonal calendars were used to try and understand resource availability and patterns of resource use. In addition to PRA, CVM was used to value non-market direct use benefits based on individual preferences and group exercises. This research revealed that rural communities valued the land for growing crops more than land under woodland, which is used for grazing, timber extraction and other woodland products and services. The authors concluded that the high values attached to the cultivated land were more of an indication of a shortage in communal land that could be used for agricultural purposes, than a sign a lesser value of woodland resources to the local communities.

Shackleton and Shackleton (1997) conducted a comprehensive assessment and valuation of woodland resources in Bushbuckridge in the Limpopo Province. The study assessed the utilization of what was termed 'veld products', a term used synonymously with NTFPs, and describes the range of products from indigenous resources that are harvested by rural communities. Although the study acknowledged that rural households collect and utilize a wide range of products for their daily livelihoods, it only concentrated on the following key products: edible herbs, fruits, reeds for construction and weaving, twigs and grass sweepers, thatch grass and woodroses.

This study established that NTFPs are widely used in the province and throughout the country. Although resources such as thatch grass and reeds for construction and weaving are available throughout the year, they are mainly harvested in the winter months. Other resources such as wild herbs, and non-edible resources like clay, are harvested throughout the year as they are not seasonal. The harvesting of seasonal resources such as wild fruits is mainly during the summer season.

Shackleton *et al.*'s (1999) study attempted to estimate direct use values of woodland resources by households in three villages in KZN and Limpopo Province (known as the Northern Province at that time). Using a case study approach, they conducted household interviews, PRA sessions and key informant interviews to establish the types of resources used, quantities and frequencies of use, and monetary values for resources that were traded locally. This study revealed that rural households utilize a wide range of resources, and the patterns of use vary in different areas. The total gross value of resources consumed by the households ranged from approximately R2 800 to R7 200 per household per annum. According to Shackleton *et al.* (1999), this value represents a significant contribution to rural households.

This study concluded that the woodland contributions were almost irreplaceable to most of the households. In addition, the study established that woodland resources were traded at lower prices in the poorer villages compared to the more affluent villages. The study concluded that the difference in price obtained between villages of different socio-

economic profiles highlighted the fact that people in more affluent villages had greater opportunities for other livelihood options such as employment, compared to the poorer villages.

Another study that demonstrates the significance of woodland resources to rural households was conducted by High and Shackleton (2000) in the lowveld of South Africa. This study established that NTFP contributed a significant value (31% of total value) to the diet of the local households, and to income generation and cash savings. The study concluded that the assessed NTFPs are of great significance to the livelihoods of rural households.

In 2001, Magasela conducted a similar study to assess direct use values of woodland resources in three villages in northern KZN (which form part of the study area for this dissertation). Again, a range of techniques were employed, including PRA techniques, household interviews and key informant interviews. The study revealed that all the households that participated in the research utilize at least one of the range of woodland resources available in the area. The most commonly used resources were fuelwood, grass hand brushes and wild fruits and herbs. However, the quantities used by the households and values assigned to these resources were substantially lower than those observed in similar studies by Shackleton *et al.* (1999) in other parts of the country. This study concluded that this difference was caused by the variation in the availability of the resources in the different provinces. The findings of Magasela's (2001) study are discussed in more detail in Section 4.6.

3.2.2 Indirect use value

Indirect use benefits are derived from the indirect uses or functions of woodland resources. Although not utilized directly, indirect use values support a number of socio-economic activities which often have direct measurable market benefits (Turner *et al.*, 1994). Kaiser and Roumasset (2002) argued that monetary valuation of ecological services and other indirect use benefits is complicated by the lack of markets for these benefits. In

an attempt to measure monetary values of indirect ecosystem services of a tropical watershed, the monetary value of the contribution of these ecosystem service benefits to the production of directly used goods was used. The limitation with this approach in terms of applicability to developing countries is its sophistication as well as its requirement for large amounts of data. These two aspects render the methodology inapplicable in a rural setting of a developing country economy.

The IUCN (2002) concurs with Kaiser and Roumasset (2002) that the valuation of indirect use benefits of environmental resources is often complicated by the absence of a market price (hence the term 'non-market resources'). Unlike direct use benefits, the indirect use benefits are often not traded in markets. There has been little research on the valuation of indirect and non-use benefits of woodland resources in the developing world, compared to studies undertaken on direct use values of the same resource.

The scarcity of studies on indirect use benefits belies the importance of this kind of assessment. Howarth and Farber (2002) stress the importance of assessing non-market ecosystem services and incorporating their value into the TEV of an ecosystem. These authors believe that the TEV reflects the social costs of environmental degradation as close to the truth as possible, and as such should include the various aspects of goods and services. Howarth and Farber (2002) give examples of such services to include environmental amenities and health services such as clean air and water.

Recent studies of indirect use valuation in South Africa include those by Netshiluvhi *et al.* (2000), Fox (2002), Netshiluvhi *et al.* (2002) and Watson and Madonsela (2002). The last three studies were undertaken as part of the DWAF research programme on the role of NTFPs in rural livelihoods. Prior to this research programme, Netshiluvhi *et al.*, (2000) undertook an assessment of the value of indirect use benefits of biodiversity and ecosystems functions in the Marakele National Park in the Limpopo Province. This study specifically assessed the monetary value of two ecosystem services; carbon and nitrogen fixation.

The RCM was used to value both services. Carbon values were obtained by using the international estimates for trading in carbon rights, and the market price of nitrogen fertilizers was used as a proxy for the nitrogen values. A scenario was outlined, whereby vegetation in the park was cleared for agricultural purposes. The values of the park in its current vegetated state were then compared with the values after the park had been degraded, and the difference between the values taken to be the estimated value of each ecological service. The results from this study indicated high total annual value of carbon, compared to nitrogen. The authors concluded that the reason for the higher carbon values was because the proportion of carbon is always higher than nitrogen in carbon:nitrogen ratios for trees, grass and soil (Netshiluvhi *et al.*, 2000:5). Carbon sequestration was therefore found to contribute approximately 60% of the total annual indirect use value, whereas nitrogen contributed only 31%.

Fox's (2002) study aimed to establish the cultural values of woodland resources in three rural villages in the Kat River valley in the Eastern Cape Province. The study recorded the significance of a number of sites and species of cultural value to many households in the villages. The research findings established that more often than not, the value of several cultural sites and species exceeded sites and species of known direct use value. However, because of competing demands between cultural values and direct use values, the study cautioned that direct use values are often the ones recognized because of people's need to survive.

Netshiluvhi *et al.*'s (2000) and Fox's (2002) studies, and other similar studies that single out and value specific benefits of a resource may be seen to be limited in a way. By isolating and valuing specific benefits, the findings do not contribute to the comprehensive understanding of the resource being valued, and may be under-valued when compared to other resources. This research, however, assists in generating useful information on the specific benefits that are assessed, and can be used for illustrative purposes, rather than for decision-making.

Netshiluvhi *et al.* (2002) attempted to estimate the value of a wider range of indirect use benefits in three villages in the Limpopo Province. Initially the study attempted to establish monetary values using CVM and PRA. However, due to a number of limitations, CVM was not used, and instead a range of PRA techniques and household interviews were used to identify and rank indirect use benefits. At least 16 indirect use benefits were identified in this study in the three villages. Once identified, the benefits were subsequently valued by comparative ranking against direct use benefits. Although there were variations in the ranking of these benefits, shade, sacred sites, soil erosion and preservation of springs were ranked highly. Comparative ranking of the direct and indirect use benefits indicated that windbreaks, shade and ceremonies were more significant than edible fruits and construction poles (direct use benefits), contrary to the common perception that the absence of a market price renders indirect use benefits to be of lower value or worth than direct use benefits (Netshiluvhi *et al.*, 2002).

Watson and Madonsela (2002) conducted a similar study in three villages in KZN. Using the same methodology (PRA techniques, including household interviews,) as well as CVM, they attempted to establish the economic or monetary value of indirect use benefits as perceived by the local communities. The CVM questionnaire was pre-tested and revised extensively in an effort to overcome its inherent limitations (discussed in Chapter 5). The findings from the PRA sessions indicated that the rural communities place a high value on indirect use benefits associated with woodlands. These communities perceive these benefits to be of great significance to their livelihoods. However, the monetary values obtained using CVM were unreliable and could not be validated. The study concluded that the PRA findings were more useful and informative, compared to the monetary values obtained through the CVM. The PRA values revealed that the local people value woodlands in totality not just the direct benefits but also in terms of social and ecological service provision. This study provides the basis for this dissertation. Through this dissertation, the author sought to investigate the values of ecological and social benefits of woodlands in more detail.

3.2.3 Option and Non-use values

Little research has been done on option and non-use values. In her review of methodologies for valuing option and non-use values, Ballance (2000) evaluated the suitability of CVM, PRA, Hedonic Pricing, Expenditure on Conservation and Potential Use Value to establish the value of option and non-use benefits. In conclusion, Ballance (2000) suggested that CVM may be the best method to extract option values. However, the author cautioned that CVM would require what was termed 'radical adaptations' so that it can be suitable for the context in which it is to be applied. One such adaptation would be to use different PRA techniques for a practical application of CVM.

3.3 Non-monetary valuation

Studies on non-monetary valuation of woodland resources are almost non-existent, compared to the abundance of monetary valuation studies. A majority of the valuation studies attempt to establish monetary values, using both qualitative and quantitative methods. Chambers and Mayoux (2003) recognise that quantitative methods are generally considered to be inherently superior to qualitative and participatory methods. In their paper, Chambers and Mayoux (2003) attempt to illustrate how qualitative methods can also be used with some rigour, robustness and credibility.

In the context of woodland resources and rural livelihoods, non-monetary valuation of woodland resources aims to establish the significance or worth of the resources being valued to the livelihoods of rural households. The significance in this case is established without the use of money as a measure.

Livelihood is not just concerned about food production, employment or income. It is a more holistic view that embraces the triple bottom environmental dimensions:

- Socially: livelihood is concerned about decreased vulnerability;
- Economically: livelihood is concerned about production; and
- Biophysically: it looks at the sustainability of the biophysical environment.

Livelihoods are defined as “the means, activities, entitlements, assets by which people make a living through natural or biological means, or social or human means” (Dovie *et al.* (2001:5). The SLA focuses on the different types of capital and assets necessary for a household to make a living, vulnerabilities under which they live, and the institutional structures that influence them. The SLA looks at the sustainability of well-being, security and capability of a household, as well as the sustainability of natural resources. It aims to be sensitive to poverty, vulnerability and resilience. This framework is used to understand how rural households and individuals survive and secure a living. It tries to understand the contribution that woodland resources make to the household economy, livelihood security and the broader local and national economies.

The ability to access various combinations of assets helps to determine how vulnerable or robust a livelihood may be. In order for rural livelihoods to be sustainable, they need to meet the following requirements:

- The livelihood should be resilient and possess the ability to cope in the face of shocks and stresses, including natural events such as drought and floods. Scoones (1998) concludes that resilience in the face of stress is key to livelihood adaptation, and that those who are unable to cope are inevitably vulnerable and therefore unlikely to achieve sustainable livelihoods;
- The dependence on external factors should be minimised. If it is unavoidable, that relationship itself should be economically and institutionally sustainable;
- The natural resource base such as soil and water quality should not be undermined. It should be protected such that it is not rendered unproductive in the long run. A sustainable natural resource base is one that is able to maintain productivity even when subjected to disturbing forces;
- Capabilities and assets should be maintained. It should not affect or weaken other livelihoods options, both current and future livelihood options; and
- The well-being of people should be maintained or improved. Well-being includes factors such as self-esteem, security and happiness.

Therefore, given a particular context (political, historical, socio-economic or otherwise), the SLA looks at a combination of livelihood capital assets and how they may result in the ability to follow a particular combination of livelihood strategies. The outcomes and institutional processes that enable one to carry out such strategies and achieve the intended outcomes are also investigated. Access to assets and the way they are utilised are influenced by social factors (such as social relations, institutions and organisations), by exogenous trends (such as economic trends) and shocks (drought, disease, floods and pests).

Sustainable livelihoods can be achieved by analysing the following factors:

- The context in which rural people live. This should include the effects of external trends such as economic, technological, political and natural or man-made shocks and seasonality;
- Their access to assets and their ability to put them to productive use;
- Policies and institutions which shape their livelihood; and
- The different strategies they adopt in pursuit of their goals or intended outcomes.

CHAPTER 4: DESCRIPTION OF STUDY AREA

4.1 Introduction

Chapter 4 presents a detailed description of the study area. First, the location of the study area is described, after which the environmental context is outlined using the SLA and the SRL framework. Emphasis is placed on the vulnerability context of the study area, livelihood assets that the local communities have access to, and the livelihood options available to them. Institutional structures and processes that have an impact on resource use are briefly described to contextualize access to resources and resource utilization. Chapter 4 ends with a description of the range of livelihood strategies that are employed in the area. An understanding of the livelihood options available to the respondents will help understand the attitudes and perceptions of woodland resource benefits, and ultimately comprehend the values they assign to these resources.

4.2 Location of study area

The study area comprises three villages: KwaNompondo, KwaMduku and Machibini. Boundaries of the study area extend from the HUP to the west, the GSLWP to the east, the Mfolozi River to the south and the Phinda Resource Reserve to the north.

KwaNompondo village is located in the hinterland of northern KwaZulu-Natal. It is 8 km west of the national road N2 north, and adjacent to the Memorial Gate entrance to the HUP. Machibini village is adjacent to the south entrance (the Nyalazi Gate), and approximately 20 kms west of the N2 north. KwaMduku village is in the coastal zone of northern KwaZulu-Natal, east of the N2 north. It lies adjacent to the GSLWP, with the Phinda Game Reserve and the newly established Makhasa Community Game Reserve to its north. Refer to Figure 4.1 for the location of the study area.

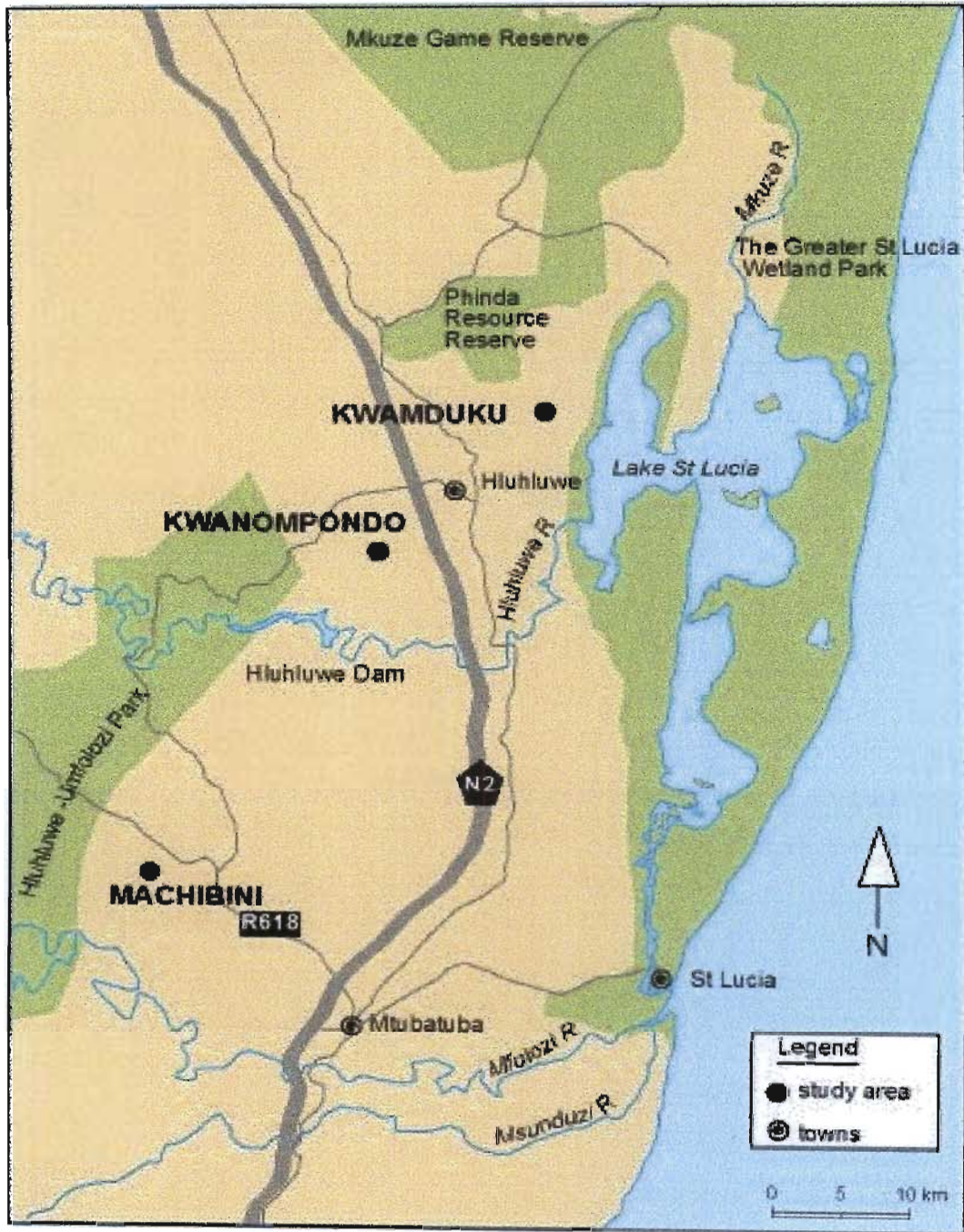


Figure 4-1: Location of study area

[Source: (CSIR, 2003)]

The spatial coordinates of the study area are presented in Table 4-1:

Table 4-1: Spatial coordinates of study area

Village	Latitude	Longitude
KwaNompondo	28° 04' 10"	32° 10' 05"
KwaMduku	27° 51' 00"	32° 24' 00"
Machibini	28° 17' 00"	32° 02' 30"

[Source: 1:50 000 Topographical Maps]

4.3 Situational analysis of the study area

The study area has a mild arid to sub-arid climate. The climate of KwaMduku village is humid, with rainfall exceeding 1,000 mm. Further inland the mean annual rainfall ranges from 720 - 990 mm. Most of this rainfall is received during the summer months between October and April, with average temperatures ranging between 18 °C to 28 °C. The winter season is cooler with temperatures between 13 °C and 23 °C (Low and Rebelo, 1996).

The ability to access various combinations of assets helps to determine how vulnerable or robust a livelihood may be. The study area has been experiencing a severe drought over the past few years (Mkwanazi, *pers. comm.*). This persistent drought has resulted in low crop yields and the death of livestock, which is increasing the communities' vulnerability to starvation and malnutrition. The vulnerability is further exacerbated by the heavy reliance on natural capital for their livelihood. Most of the households engage in subsistence farming whereby they grow crops such as maize and beans, and also keep livestock and poultry.

The HIV/AIDS pandemic has not spared the community, as recent research has indicated that parts of the study area have a slightly higher prevalence compared to the rest of the country (Africa Centre, 2000). This has become an international concern because the majority of the people contracting the virus are economically productive and are breadwinners in their respective households. If the HIV/AIDS pandemic continues at the current rate, there will be a shortage of economically productive people and an increased dependency on government remittances, which places a major strain on the government's capability to serve the whole nation.

The combination of these factors places the communities in the study area in a highly vulnerable situation as they become susceptible to stresses and shocks that increase their vulnerability. Such stresses and shocks include natural disasters such as recurring droughts and floods that lead to continuous food shortages and the associated nutritional deficiencies, as well as and changes in economic policies and the global economy.

The importance of determining the vulnerability context of the study area is that it has a direct implication on the way the residents perceive and utilise natural capital such as woodland resources, which in turn is often an indication of the way in which the residents value these resources.

4.4 Livelihood capital

The livelihood capital assets available in the study area vary somewhat between the three villages. The households have varying access to the different forms of natural, social, human, physical and financial capital.

4.4.1 Natural capital

Figure 4-1 illustrates that the study area is surrounded by four conservation parks; the HUP, the GSLWP, the Phinda Game Reserve and the newly established Makhasa Community Game Reserve. These protected areas naturally contain a range of resources, including both plant and animal resources.

Background to the conservation parks surrounding the study area

The HUP was formed in 1989, and is made up of the Hluhluwe Game Reserve, the Umfolozi Game Reserve and the 'Corridor', a piece of state land that joins the two reserves. The HUP covers an area of approximately 96 456 hectares. According to Infield (1986) the Hluhluwe and the Umfolozi Game Reserves were declared with the primary intention of protecting the black and the white rhinoceroses. The HUP is now home to a wide range of both plant and animal populations.

The GSLWP is a World Heritage Site declared by the United Nations Educational, Scientific and Cultural Organization (UNESCO) protocol in 1999. It is known to be one of the most pristine ecosystems in southern Africa (Scott and Zaloumis, 2004). It covers 328 000 hectares, and encompasses five major eco-systems and has a vast mosaic of habitats that include marine (such as coral reefs; beach and coastal forests; salt and freshwater marshes and open estuarine waters), lush coastal plains and drier woodland areas. Lake St. Lucia is recognised as a Wetland of International Importance under the Ramsar Convention.

The Phinda Game Reserve was established in 1990. It is approximately 17 000 hectares in size. The reserve is located on a previously degraded farmland, which was rehabilitated and game re-introduced into it. Phinda Game Reserve has seven distinct ecosystems, ranging from palm savannah and mountain bush to rare sand forest and dense thornveld. The Makhasa Community Game Reserve was established through the efforts of the Phinda Game Reserve and the Makhasa Tribal Authority on land that was reclaimed as part of the land tenure reform process that is currently ongoing in the country (DAEA, 2002b).

Vegetation

The study area is predominantly covered by Savanna biome. Low and Rebelo (1996) describe the vegetation of KwaNompondo and Machibini as the Natal Lowveld Bushveld, whilst the vegetation of KwaMduku is described as Coastal Bushveld Grassland. The vegetation is a mix of scrub and savanna, and includes closed and open woodland communities, thicket, and grassland areas with scattered trees. The Coastal Bushveld-Grassland is well conserved along the coastal areas, but poorly conserved inland and exhibit signs of disturbance and invasion by alien plants (Low and Rebelo, 1996). Common plant species in the study area include *Ficus sp* (Umkhiwa), *Vangueria infausta* (Umviyo) and *Kigelia Africana* (Umvongothi).

Hydrology

Naturally available water is a key resource to rural communities, which often lack adequate potable water. The lack of water in an area that relies heavily on natural resources such as soils for farming and grasses for livestock increases the vulnerability of that community to food shortages, starvation and disease. This is the situation in the study area.

The study area lies within the Mfolozi-Msunduzi catchment. This is a relatively arid area, with a number of non-perennial pans and streams flowing through the study area. The study area is traversed by the Hluhluwe River just south of KwaNompondo and the Black and the White Mfolozi Rivers further south, below Machibini. The Hluhluwe River is the principal river in the area, and has the Hluhluwe Dam located on it approximately 6km south of KwaNompondo. The Black and the White Mfolozi Rivers converge on the eastern boundary of the HUP, and flow on an easterly direction towards the ocean. A number of smaller perennial streams flow through the area.

The Municipal IDP Documents describe groundwater in KwaMduku to be of good quality (DAEA, 2002a; 2000b). KwaNompondo has poor quality groundwater quality and is categorized for 'emergency use'. Groundwater in Machibini is unusable. Observations

during the field work were however contrary to this as numerous boreholes were observed in the villages. The residents who took part in the study revealed that they rely mostly on boreholes and streams for domestic use.

Geology and Soils

The KZN Province is characterised by intense fracturing and faulting. The study area is predominantly underlain by Beaufort shales and sandstones and Stormberg basalts of the Karoo sequence. The soils have inherent physical limitations including shallow depth, low moisture supply and high erosion hazard (DAEA, 2002a; 2002b). The soils of KwaNompondo and KwaMduku are black and red strongly-structured clayey soils which are typically shallow, with a low moisture storage capacity. Machibini has arenite soils which are deeper and more fertile. The Hluhluwe Dam is underlain by dolerite.



Figure 4-2: View overlooking Hluhluwe Dam in KwaNompondo

4.4.2 Human and social capital

Carney (1998) defines human capital as the skills and abilities that people have to pursue livelihood strategies, and social capital as the social resources that assist people to expand their livelihood options.

Table 4-2: Demographics of the study area

Factor		KwaNompondo	Machibini	KwaMduku	Average
No. of Households		1 399	1 013	663	1 025
Population		10 043	8 136	4 846	7 675
Literacy		26%	22%	22%	23.3%
Gender distribution	Male	45%	44%	44%	44.3%
	Female	55%	56%	56%	55.6%

[Source: Statistics South Africa (2002)]

Table 4-2 indicates that KwaNompondo village has the highest population, followed by Machibini village. KwaMduku is the least populated of the three. The gender distribution in all three villages indicates a slightly higher percentage of females than males, which is associated with migration of the male household heads to urban areas in search for employment. However, during the fieldwork the researchers made efforts to get a somewhat balanced distribution of male and female respondents because of the belief that the different genders might have different views about the indirect use benefits they obtained from the woodlands, and as such value them differently.

In line with Statistics South Africa's (2002) observations, migration was identified as a prominent phenomenon in the study area, like in most other rural areas in the country. Male household members and the youth (mainly male) are known to relocate to nearby urban centres in search for employment. Africa Centre (2000) reports that approximately 32% of the breadwinners in the study area do not reside in the area, but live in their

places of employment. Unfortunately, by migrating, these people take with them their skills and expertise, leaving behind a huge gap of skilled people who can contribute to development in the area.

The HIV/AIDS scourge that is being experienced mainly in Southern Africa is also evident in the study area. According to research undertaken by the Africa Centre, the prevalence of HIV/AIDS in parts of the study area (KwaNompondo and Machibini) is slightly higher than the average for the country (Africa Centre, 2000). In addition, the average life expectancy in South Africa is decreasing while the number of HIV/AIDS orphans and other people affected by HIV/AIDS is increasing at alarming rates. This is resulting in less productivity and a higher dependency on government grants and other remittances as breadwinners are incapacitated. No HIV/AIDS statistics for KwaMduku were located, and as a result it was assumed that the same pattern is also experienced there.

In terms of social capital, no organized social structures and human resource development initiatives were observed in the study area, although they may exist on a small scale. Low literacy levels evident within rural communities may be one of the causes for the limited social structures in these communities. In addition, provision and, perhaps more importantly, the maintenance of educational infrastructure and health services is very limited compared to the nearby urban areas. All these factors undermine the sustainability of the human capital in the study area.

4.4.3 Physical and financial capital

Physical capital includes basic socio-economic infrastructure such as energy, transport, communications, shelter, water, schools and hospitals, as well as privately owned farm animals, tools and machinery that can be used to increase labour and land productivity. Financial capital, on the other hand, includes economic assets such as banks, credit facilities, and cooperatives, as well as resources such as lobola, savings, supplies of credit or regular remittances and pensions, which assist in pursuing livelihood strategies.

Infrastructure and service facilities

The three villages in the study area represent a low-income rural area (Statistics South Africa, 2002). Physical infrastructure in the area was observed to be poorly developed, and respondents indicated that there has been little infrastructural development over the last decade or so. Table 4-3 depicts the types of physical infrastructure available in the three villages. The availability of services such as electricity and telephones within the villages varies, with the households along the main roads having a wider electricity and telephone grid than the more inland areas. Potable water availability is limited in the three villages, and households rely mainly on natural surface and ground water sources. The respondents indicated that the Department of Health has been providing water by trucks to the villagers since an outbreak of cholera in 1998.

Table 4-3: Physical infrastructure in the study area

Sector		KwaNompondo	KwaMduku	Machibini
Education	Primary schools	10	15	12
	Secondary schools	1	3	1
	Satellite library	1	-	-
Safety & Security	Police station	-	1	-
	Emergency call out	1	-	-
Telecommunications	Post office	-	1	0
	Telephone at residence	2%	5%	8%
Community facilities	Community centre	1	-	-
	Tribal court	1	1	-
Energy	Electricity	1%	1%	25%

Sector		KwaNompondo	KwaMduku	Machibini
	Gas and paraffin	2%	20%	4%
	Biomass	97%	79%	71%
Sanitation	Ablutions	25%	17%	32%
	Piped water to dwelling	1%	2%	5%
	Boreholes	50%	6%	5%
Health facilities	Clinics	1 clinic	-	1 clinic
	Hospitals	-	-	-

[Source: DAEA (2002a; 2002b)]

Financial capital

Magasela (2001) reports that most households in the study area have at the least one family member who is employed either on a part-time or permanent basis. Self-employment is also widespread with people working as seamstresses, taxi-owners, builders and handy men. Many of the households also depend on old-age pensions, disability grants and other government grants to supplement their household income.

Another important financial asset is livestock and poultry. Most of the households in the area keep cattle, goats, pigs, donkeys, sheep and poultry. Magasela (2001) estimates that at least 40% of the households own cattle, while fewer own donkeys and sheep. Livestock in rural areas is considered to be a sign of wealth and has a number of uses around the homestead. Such uses include for ploughing, transporting fuelwood, and fetching water from distant sources using large containers. Cows also provide milk and meat, as well as fresh cow dung, which is used for cementing huts and dry cow dung is used as manure in the gardens and fields. In times of need livestock can be converted into cash. The socio-economic profile of the study area is discussed in more detail in Section 6.2.

4.5 Institutional structures

The national policy and legislative framework that guides the use and management of woodland resources is discussed in section 2.5, and is not repeated in this section. Instead, this section describes the demarcation of the area as well as land tenure to provide an understanding of the context in which resources are accessed and used in the area. In addition, this section includes a brief evaluation of the nature conservation authorities that manage the conservation parks surrounding the study area.

Table 4-4: Political institutional structures in the study area

Village	Local Municipality	Councillor	Tribal Authority	Inkosi
KwaNompondo	Hlabisa	Mr. H Mkwanzazi	Mdletshe TA	Mdletshe
KwaMduku	The Big Five False Bay	Mr. C Khumalo	Makhasa TA	Gumede
Machibini	Hlabisa	Mr. Hlatshwayo	Mpukunyoni TA	Mkwanzazi

[Source: personal interviews]

4.5.1 Political structures

The study area is in the Umkhanyakude District Municipality (DC 27). Following the 2000 demarcation process, KwaNompondo and Machibini villages were placed under the Hlabisa Local Municipality (KZ274), whilst KwaMduku falls under the Big Five False Bay Local Municipality (KZ273), as illustrated in Table 4-4 above.

4.5.2 Land tenure

Most of the land in the study area is under the Zulu traditional communal land tenure; the Ingonyama Trust. In this type of land tenure the resources on the land are the common property of the tribe. Each household is allocated a plot of land, part of which is for residential purposes and the other is used for farming. Tribal chiefs (inkosi) and several

headmen (izinduna) have jurisdiction over the land. The inkosi is the main leader of the tribe. Under the inkosi is one or more izinduna, who act as an intermediary between the population and the inkosi, and are responsible for a particular ward. The izinduna are answerable to the chief.

Apart from the communal land, there is also state land and land under private ownership. The HUP and the GSLWP are in state land, while the Phinda Game Reserve is under private ownership. There are also patches of private farms in the former Natal areas. The Makhasa Community Game Reserve in KwaMduku is on communal land and is jointly owned by the community. The state-owned conservation areas are managed by the provincial conservation authority, the Ezemvelo KZN Wildlife, and the newly established GSLWP Authority which manages the GSLWP.

4.5.3 Management of conservation parks around the study area

The conservation parks around the study area are located on state land, communal land and private land. As a result access to woodland resources in the parks and general management of the three parks differs considerably.

Ezemvelo KZN Wildlife

Ezemvelo KZN Wildlife The purpose of the Ezemvelo KZN Wildlife is to protect and maintain conservation areas for future generations, while giving current generations the chance to benefit from them. They interfere as little as possible with nature and apply management only to counteract human influences. Other management duties include controlling invading plants that compete with indigenous flora, controlled burning for grassland maintenance and efforts to prevent overgrazing.

The GSLWP Authority

The GSLWP Authority was established in November 2000 in terms of the Regulations published under the World Heritage Convention Act (Scott and Zaloumis, 2004). It was created to manage the St Lucia region in line with international best practice, and more particularly the stringent requirements of UNESCO. The primary purpose of the Authority is to manage the region in the most sustainable manner, through achieving a balance between commercial development and environmental protection. It reports to the national minister of DEAT.

4.6 Livelihood strategies

Livelihood strategies vary widely in rural areas. Households in the study area employ a variety of strategies to survive, the most common being agriculture, resource harvesting, formal and informal employment, receiving remittances and grants, and production of goods. Migration to nearby urban areas is also a common phenomenon in the area, whereby males and young educated family members migrate to seek jobs in towns and cities as far away as Johannesburg.

The observation by Ellis (1999) that rural households rely on between 80% and 90% on off-farm income sources may be determined by the local context. Reliance varies widely between households and different villages due to a number of factors. One of these factors is land ownership, which determines access to assets. Land ownership gives access to farming, resource harvesting and other strategies. Magasela (2001) made the same observation during an investigation of direct use values of communal woodland resources. Many of the households were observed to rely on a range of income generating activities. This habit, termed 'diversification' is said to put these households in a better position than relying on one activity (Ellis, 1999).

The major land-use activities that are taking place in the study area are outlined in the following table.

Table 4-5: Land-use types in the study area

Land-use	Proportion of land under this use
Conservation	48
Forestry	24
Traditional	13
Agriculture	15
TOTAL	100

4.6.1 Traditional land-use

Many households harvest a range of woodland resources mainly for subsistence but also for sale. Magasela (2001), who conducted an assessment of the direct use value of woodland resources in parts of the study area, reported on the proportion of households that utilize woodland resources in the area, and the resources they utilize.

Table 4-6: Patterns of resource use in the study area

Resource	Households using resource (%)
Bushmeat	96
Clay	41
Construction reeds	24
Fencing poles	52
Fish	65
Fuelwood	99
Grass hand brushes	100
Grass for livestock	4
Honey	68
Household furniture	17
Household utensils	97

Resource	Households using resource (%)
Housing poles	90
Insects	47
Mushrooms	29
Muthi (medicinal) plants	92
Palms for weaving	68
Plant dyes	0
Reeds for weaving	81
Thatch grass	93
Tree leaves for livestock	1
Twig hand brushes	100
Wild fruit	100
Wild herbs	100

[Source: Magasela (2001)]

From Table 4-6 it is evident that twig hand brushes, grass hand brushes, wild fruit and herbs are the most widely used resources, with 100% of all households in the area using them. Fuelwood is also another widely used resource, with 99% of the households relying on it as an energy source. Most of the households gather the fuelwood themselves, and very few reported that they buy fuelwood. Often fuelwood is purchased for ceremonies such as weddings and funerals, otherwise households gather it from the veld for daily use. Residents of KwaNompondo also reported that once a year, usually in winter, the HUP provides them with tractors to gather fuelwood from the reserve.

Woodland resources are also commonly used as building material. Indigenous poles are widely used for housing, although most households reported that they often combine it with commercial species such as gum. The main reason for this is the declining availability of indigenous poles in the area as the population continues to grow. Indigenous poles are also used for fencing and building kraals. For the traditional huts thatch grass is widely used as a roofing material. This is sometimes used in conjunction with reeds. Thatch grass is collected from communal rangelands, along field boundaries and around residential kraals. Reeds are less widely used for construction, with only 24% of households having

reported use in the area. Infield (1998) reports the GSLWP as an important source of thatching reeds to the surrounding communities.

Indigenous wood is also widely used to make household utensils, farming implements and furniture. Almost all the households reported that they purchase household and farming implements such as cooking spoons, hoe and pick handles from nearby markets. Fewer households reported that they make these utensils and sell them. Other households reported that they buy furniture and ornaments carved from wood. Commonly used household furniture and utensils includes benches, stools, tables, walking sticks and headrests.

Other widely utilized woodland resources are wild herbs, fruits, mushrooms and bushmeat. Magasela's (2001) research in parts of the study area revealed that all the households that participated in the study reported that they harvest wild herbs for household use, and that fewer households sell them. They harvest wild herbs in both summer and winter seasons, with a peak supply in the wet season between October and January. They also harvest wild fruits on an opportunistic basis. Wild fruits are normally harvested mainly by herders, fuelwood gatherers and field workers. This in most cases includes children. Magasela's respondents reported a decrease in the availability of wild fruits in the study area, which has forced them to grow exotic fruits which are mainly sold (Magasela, 2001).

Edible mushrooms are also gathered for subsistence consumption, although they are less commonly used compared to wild herbs and fruits. Magasela (2001) noted that there was no sale of mushrooms in the study area. The households reported that edible mushrooms have become a scarce resource, and there is an increase in the availability of poisonous varieties. Again, mushrooms are gathered opportunistically by those respondents who spend most of their time in the veld (herders, fuelwood gatherers and others). Wild honey was reported to be more commonly used than mushrooms. Households indicated that herders gather wild honey from the veld and surrounding forests, for both household consumption and for sale locally.

A large proportion of households that participated in Magasela's (2001) study reported to consume bushmeat on a regular basis. However, the research revealed that the main bushmeat consumers were those located near the HUP, although they were reluctant to disclose any further detail, for example, the patterns of consumption. The respondents nevertheless stated that bushmeat was no longer as easily available compared to the past. The HUP and the prohibition of hunting were cited as the main cause for this scarcity. In spite of that, Magasela reported a well established trade of bushmeat within the villages.

In addition to resource harvesting, most of the households in the study grow subsistence crops for household consumption. Some grow sugarcane and bananas on a small-scale commercial basis. In addition to crops, most of the households rear livestock and poultry, mainly for subsistence.

4.6.2 Income-generating livelihood strategies

Income-generating activities observed in the study area include formal employment, informal employment and self employment). Government grants and remittances also play a large role in the availability of income in many of the households. The occupations of household members in the study area are presented in Figure 6-4. A large proportion of employment opportunities in the area are from the conservation parks and tourism-related activities.

The Working for Water Programme

In the 1990s Kader Asmal, former Minister of DWAF, initiated an innovative programme called the 'Working for Water Programme'. The aim of this programme is to clear alien invader species from watercourses, wetlands and other natural water storage facilities (DWAF, 2002). It is a labour-intensive programme and employs local communities, with a bias towards the vulnerable and disadvantaged, such as the extremely impoverished and female-headed households.

The Working for Water Programme began in the GSLWP in 1995, and has now become a significant employer in the communities around the GSLWP. Over 626 people are employed by this programme to clear alien vegetation along the reserve. More than 8 500 hectares has been cleared on the eastern shores of the GSLWP and 10 000 hectares on the western shores. In areas cleared of plantations, indigenous grassland and forests species have returned.

The Social, Environmental and Economic Development Programme

The GSLWP Authority introduced a Social, Environmental and Economic Development (SEED) programme in areas surrounding the park. The aim of this programme is to ensure that local people benefit from the removal of alien vegetation and from nature-based eco-tourism. The SEED programme runs courses for local communities, teaching tourism management skills and how to turn traditional activities such as art, craft-making, story-telling and dancing into saleable commodities.

Craft Markets

Formal craft market centres have been developed in the area, particularly adjacent to the St Lucia Estuary and next to the Memorial Gate of the HUP. The HUP is heavily involved in a number of partnership programmes with the surrounding local communities, one of which is the Vukuzame Community Craft Market situated next to the Memorial Gate entrance to the park. According to Zungu (2003), the craft market was built mainly by local women using local woodland resources from the HUP. Handcrafts such as beadworks and baskets woven by local women are sold to tourists at the curio stalls. This community craft market also doubles as a co-operative, and people sell their wares collectively. A portion of the profit is used to maintain the market, and the rest is shared among the members.

Community-based tourism

Community-based tourism is another emerging employer in communities surrounding conservation parks, including this study area. The land restitution programme has resulted in a number of communities surrounding conservation areas being compensated for the land from which they were removed in the previous political dispensation. The area adjacent to the GSLWP forms part of this resettlement process. As part of the resettlement the affected community benefits from jobs created in the parks and other park-related opportunities. The Makhasa Community Game Reserve is located on land that was reclaimed through the land tenure reform process. This reserve, like the other three reserves, provides employment to a number of people from locally.

The Phinda Game Reserve employs approximately 300 people from the surrounding communities of KwaMduku, Nibela and Mngobokazi on its eco-tourism ventures. According to the Sunday Times (2003), the establishment of the Phinda Game Reserve saw the community of KwaMduku starting to enjoy the benefits of their ecosystem. It is estimated that the average household income for the KwaMduku community trebled from R450 to approximately R1 300 in 1998 (Sunday Times, 2003).

Other small-scale enterprises

Like many rural areas, many people are involved in small scale traditional beer brewing. The beer is mainly sold locally. There are numerous spaza shops in the study area, and people sell a variety of household goods to locals.

4.6.3 Conservation areas

Table 4-5 indicates that conservation parks are the main land-use activities in the study area. This presents opportunities for numerous livelihood options that benefit the surrounding communities as illustrated above. In the past there was animosity between conservation parks and the surrounding areas. Infield (1998) discusses the reasons for

this animosity and resentment. The expropriation of land from the local communities followed by the alienation of these communities resulted in a state whereby the resources which had previously belonged to the communities were no longer valuable to them.

Relationships between conservation parks management and adjacent communities have improved over the years (Magasela, 2001). For example, the HUP management (Ezemvelo KZN Wildlife) has made significant progress in attempting to include the adjacent communities in the process of nature conservation. As a result of the good relations that have developed, Ezemvelo KZN Wildlife has developed programmes which allow the adjacent communities to harvest certain resources from the park in a regulated manner. This is increasingly becoming a significant livelihood option in many parks around the country.

4.6.4 Commercial agriculture

Infield (1986) reported that sugar-cane and timber are the primary commercial agricultural crops in the area adjacent to the HUP. Commercial agriculture mainly takes place on private land, with very little on communal and state land. Pine plantations play an important role in the economic development of the St Lucia area. The main species grown are *Pinus elliottii*, *Pinus caribaea* and *Pinus oocarpa*. The pine is grown mainly for pulp wood.

Magasela (2001) reported that in addition to sugar-cane and timber, there is an increase in production of sisal crops and sub-tropical fruits in the area. Watson and Schoultz (2002) observed that most of the commercial sugar-cane farms are to the east of the study area, along the Mfolozi River and on the Mfolozi Flats.

4.6.5 Remittances and grants

Another important livelihood strategy is welfare grants that many rural households receive to supplement their household income. The Department of Social Welfare provides welfare grants to the vulnerable, particularly the elderly and orphaned children. Although the value of these welfare grants is not substantial, it has been reported that to many rural households it is the only source of income.

4.7 Chapter conclusions

This chapter has established the location of the study area and presented a detailed description of the environmental context in terms of the SLA. The area of study is located adjacent to two major conservation areas, the HUP and the GSLWP, and the smaller Phinda Resource Reserve and the Makhasa Community Game Reserve. These conservation parks contain a diverse range of woodland resources on which a large number of the households in the study area depend for their livelihoods. The parks also provide a number of other opportunities in the eco-tourism sector. Many households supplement this by off-farm activities, including income and remittances. The SLA succeeded in presenting the area's background environmental information which enables the readers of this dissertation to understand and contextualize the findings of the research, presented in Chapter 6.

CHAPTER 5: APPROACH AND METHODOLOGY

5.1 Introduction

The aim of this study was to investigate the value of indirect use benefits of woodland resources to three rural villages in KZN. Recognizing that there are numerous measures of the value of environmental resources, this study focused on monetary and non-monetary values.

This chapter presents the approach and methods that were used for data collection and collation. The first section of this chapter is a review of methods used for monetary and non-monetary valuation of environmental resources. The justification for the selected methods is presented, followed by methodological limitations and how they were overcome.

The latter sections of Chapter 5 are devoted to describing the collection of primary data, commencing with the pilot study, results obtained and the conclusions drawn from it. The main study is then outlined, starting with the sampling strategy and procedure. The description of field activities is followed by a brief overview of the methods used to analyse the collected data. The chapter conclusions end off Chapter 5.

5.2 Background to methodological approach

This study aimed to establish monetary and non-monetary values that rural households in KwaZulu-Natal attach to indirect use benefits of woodland resources. The value of a resource is taken to indicate the resource user's appreciation or perception of the worth of the resource. This study used the South African Rand (1 US\$ = 10.34 ZAR at the time of study) as a quantitative indicator of monetary value, and a more descriptive 'worth' or 'importance' assigned to woodland benefits as a non-monetary indicator of value.

Various approaches and methods can be used to ascertain monetary and non-monetary values. Monetary values can be investigated using direct or 'stated preference' methods, or by using indirect or 'revealed preference' methods. Reviews of the methodologies used to investigate values have been undertaken by Ballance (2000), Gram (2001), Boxall and Beckley (2002), EEP (2003), and many others. Stated preference methods are used in the valuation of non-market goods and services. Stated preference methods involve the use of surveys. Respondents are presented with a hypothetical situation and asked to state their preference in terms of their WTP for the conservation of a resource in order to continue realizing its benefits, or their WTA compensation for the loss of the resource and its associated benefits. There are a number of stated preference methods, but Boxall and Beckley (2002) identify CVM as the principle stated preference method.

The indirect or revealed preference approach entails deducing the value of a resource by observing the choices that people make in real life situations, from which the value of the marketed good is inferred (Boxall and Beckley, 2002). Hedonic Pricing and the Travel Cost Method are examples of revealed preference methods.

Apart from monetary values this study also investigated the non-monetary values associated with indirect use benefits of woodland resources. This required a more qualitative and descriptive approach. According to Ballance (2000), PRA is one of the main methods for eliciting non-monetary values. PRA is a set of tools that rely on the participation of local people to share their knowledge and expertise on a particular issue.

The historical background of PRA has been researched extensively by authors such as Denzin and Lincoln (1994), Chambers and Guijt (1995), Ballance (2000), Nemarundwe and Richards (2002). The PRA technique evolved from Rapid Rural Appraisal (RRA) during the early 1990s, with a considerable paradigm shift from top-down approaches involving the use of survey questionnaires to extract information from local people to a bottom-up approach that acknowledged and sought local knowledge.

RRA had developed in the 1970s in response to the perceived problems of outsiders miscommunicating with local people through the use of questionnaire surveys which were often costly and time-consuming. It later became evident that RRA had a number of shortcomings, the most obvious being that it was used by developers to rapidly implement and monitor development projects. It was slowly realized that the rapidity of this method was not always effective, and that a greater degree of participation of local people in the implementation of projects was necessary to ensure that these projects are well received and accepted by the whole community, and thus become a success (Chambers and Guijt, 1995).

PRA is widely used for carrying out qualitative research in both the developing and the developed world. It is a people centred approach and one of its fundamental traits is the empowerment of the respondents. PRA acknowledges that local people are knowledgeable about local natural resource availability and utilization (Chambers and Guijt, 1995). This trait enhanced its applicability in this study, which sought to investigate the value that local communities place on indirect uses of woodland resources. Moreover, with research having moved from a mainly extractive approach to being more participatory, PRA was seen as the most appropriate technique for use in this study.

5.2.1 Monetary valuation

Ballance (2000) asserts that the CVM is the principle method used in the valuation of indirect and non-use benefits of non-market resources. CVM involves the use of surveys to gather information directly from respondents. A hypothetical market in which the resource is traded is presented in a questionnaire. Respondents are asked to specify the amount of money they would be willing to pay (WTP) for the resource, or the amount they would be willing to receive as compensation for its loss (WTA). The WTP (or WTA) estimates are contingent on the researcher's description of the hypothetical situation, hence the expression 'contingent'.

In order to create a successful CVM questionnaire, Boxall and Beckley (2002) suggest that the best technique is to group the questions into four categories:

- Category 1: 'Warm up' questions, which are essential to place the respondent in an appropriate frame of mind.
- Category 2: The description of the hypothetical market where the specific resource will be traded.
- Category 3: The actual valuation questions which require the respondent to state monetary values.
- Category 4: Questions aimed at establishing the socio-economic status of the respondent or household in question.

However, Boxall and Beckley (2002) warn that the local context dictates the way in which the valuation questions are posed. Questions may be posed through way of close-ended questions, open-ended questions, the use of payment cards, and other techniques. The critical task in CVM is to provide the respondents with adequate information to allow them to make informed choices, and to give them enough reason or motivation why they should pay. In addition, it is crucial that the method of payment is clearly described to the respondents (Boxall and Beckley, 2002).

Rationale for choice of methodology

The choice of methods used for data collection and analysis was mainly influenced by the aim and objectives of the study (outlined in Chapter 1). Ballance (2000) and others regard CVM as the only method theoretically capable of estimating the full range of benefits from environmental resources. CVM is also able to obtain valuable information at the household level through the use of questionnaires.

Limitations of CVM

The success of CVM largely depends on the tool used to capture the data, i.e. the questionnaire. A poorly designed questionnaire may fail to capture the essence of the research, particularly in cases where the literacy levels are low. Furthermore, the method used to administer the questionnaire should be appropriate to the context of the study. Because of the complexity of the valuation questions, CVM is best undertaken through personal interviews or group discussions. Posted questionnaires or telephonic interviews are likely to have a high number of non-responses due to the complexity of the questions rather than because of people expressing unwillingness to pay.

Another critical limitation of CVM, as identified by Boxall and Beckley (2002) relates to the validity of the hypothetical markets created. Monetary valuation is largely based on the information available to both the researcher and the respondent. The researcher may influence the types of questions asked, while the respondent determines the responses obtained. If the researcher is not well-informed about the resource in question, this will be reflected in the way the questions are phrased or the hypothetical scenario created.

The fact that CVM is based on the preferences of individuals and not the collective community has a potential to pose a challenge to its applicability, particularly in a heterogeneous population. Large differences in the socio-economic profile of respondents will yield disparate results with no clear trends. Although the respondents in this study did not have largely different socio-economic backgrounds, there were some marked differences in terms of the socio-economic profile of some of the respondents. However, data analysis would have normalized those disparities.

5.2.2 Non-monetary valuation

The PRA methodology involves direct participation of various groups of people or stakeholders in the community, in the collection and analysis of data. PRA catalyses information-sharing among the various respondents participating in the exercise. In this way PRA contributes to awareness and empowerment by improving the state of knowledge and understanding of the issue of concern. Nemarundwe and Richards (2002) point out that PRA does not provide a blueprint for researchers to follow, which makes it a versatile and flexible methodology that can be applied through the use of a range of tools and techniques to suit the research context. The researcher decides on the appropriate tools and the sequence of their application in each particular context. Chambers (undated) outlines some of these techniques:

- Secondary data review:** To collect background information. This is often carried out before the actual fieldwork.
- Group meetings:** Held at the start of the study to introduce it and at the end for closure.
- Participatory mapping:** To allow the respondents to map the resource in question and/or environmental features as perceived by them.
- Semi-structured interviews:** To collect data using flexible checklists rather than structured questionnaires.
- Focus group discussions & observations:** To obtain more detail on certain aspects. This also allows the researcher to observe power relations among the respondents.
- Transect walks:** This allows the researcher to obtain first-hand information on certain aspects e.g. land uses in the study area.
- Contingent ranking:** To investigate the preferences of community members by comparatively ranking goods and services by the attributes for which they are most valued.
- Seasonal calendars / historical diagrams:** To illustrate the availability of different resources in different seasons and over the years.

Time-lines: To obtain verbal or visual chronologies of important trends or events that have occurred in the study area pertaining to the research topic.

Rationale for choice of methodology

The main factor that influenced the choice of PRA as a methodology for non-monetary valuation was the availability and accessibility of data as well as practical constraints imposed on the study. The PRA method relies not on an individual but a group of people e.g. a community to create local graphic representations using their local knowledge. It is widely acknowledged that local people have a wealth of information on local issues, even if they do not have a formal education. The study area, being a rural area in one of South Africa's poorer provinces, has low levels of education as illustrated in the last population census (Statistics South Africa, 2002). The PRA method does not strictly require formal education or highly skilled respondents. In addition, the group activities undertaken allow for an even distribution of the different skills that the respondents may possess. PRA, if done properly, has the potential to contribute to empowerment of the respondents through knowledge sharing. Participation and the use of local knowledge can also build confidence among the respondents.

The fact that a range of tools can be used in different combinations makes the PRA method to be easy to use to researchers from various disciplines, such as social scientists, administrators, natural scientists, among others. Nemarundwe and Richards (2002) suggest that the knowledge and values identified using PRA can be integrated with data obtained through other research methods. This study anticipated that the PRA findings would be complemented with the CVM findings to provide comprehensive information on the value of indirect use benefits in the study area.

Limitations of PRA

One of the main strengths of the PRA method is its flexibility in that different combinations of techniques can be used. This strength tends to become a limitation in cases where the techniques are not used to complement each other to allow the researcher to gather as much data as possible. It was crucial for this study to ensure that the different techniques used are able to gather a wide range of data, which, when analysed collectively, gives a comprehensive representation of the indirect use values of woodland resources in the study area.

Another limitation with PRA is that it can raise expectations among the respondents, particularly when the researcher fails to clearly state the purpose of the research upfront. Unfulfilled expectations can cause disillusionment amongst the respondents, frustration and mistrust in future (Nemarundwe and Richards, 2002). For the purposes of this study the researchers were aware of these possibilities and great caution was exercised to ensure that all research respondents understood the purpose of the research, and what they could expect from the study. The researchers stated upfront that the research would not improve the local communities in terms of development opportunities and infrastructure (which many of the respondents expected). However, it was hoped that through this study, respondents would be empowered by knowledge that would be shared amongst the different groups that participated. The long-term aspiration of the study is that the research findings would hopefully contribute to the recognition of the significance of woodland resources to rural livelihoods, and thus better decision-making by all stakeholders involved (including the resource users themselves and the authorities).

Lastly, the PRA method can be very time consuming and requires sufficient incentive for respondents to spend their time, otherwise they might see the exercise as a waste of time. This limitation was overcome by detailed explanations to the respondents of the importance of their participation. The researchers made them aware that as the residents of the area and the resource users, the respondents were best positioned to generate the knowledge sought by the study, and that researchers as outsiders did not have first-hand

experience of living in the area and therefore some of the facts could be distorted. In addition, respondents were informed that since the study was part of a wider research programme initiated by DWAF on the role of woodlands to rural communities, the findings would be eventually be submitted to the department. The knowledge they imparted could potentially contribute to decision-making in terms of the use and management of woodland resources. Lastly, the researchers stated that participation would potentially result in knowledge sharing and empower the respondents with insight on how other the other respondents view woodland resources. Snacks were provided at the meetings to ensure that hunger did not become a limiting factor in their participation.

5.2.3 Limitations associated with this study

Conventional methods used for resource valuation have certain limitations associated with them. In addition to that, the valuation of non-market resources presents various difficulties, some of which were experienced in this study. This sub-section presents an overview of the limitations encountered, and how they were overcome.

Challenges of non-market resource valuation

The valuation of non-market indirect use benefits is a challenge. The main complication in valuing non-market resources is the mere fact that the resources being valued do not have a market price, and yet most of the conventional methods used for resource valuation use the market price of a resource as a guide. For resources which are traded in formal markets it becomes easy to deduce their monetary value from their market price. Non-market resources however, lack that market price that can be used. In such cases, researchers often use a proxy to estimate the value of a resource. However, this technique is not always feasible in cases where there is no close substitute that can be used, or the substitute has other benefits that can influence the value that respondents give.

The second major limitation to valuing non-market resource benefits lies in the methods used and their applicability and relevance in the developing world. The CVM was developed by economists in the developed world and was initially applied in that context prior to being used in developing countries (Boxall and Beckley, 2002). This has rendered it to have a number of limitations associated with its application particularly in rural areas of the developing world. Firstly, many rural households in the developing world live a subsistence way of life in which formal markets do not feature prominently. In many cases in such communities goods are not sold in formal markets, but exchanged with neighbours and other villagers. Due to the lack of participation in the money economy, many of these people experience difficulty in conceptualising the value of money. In addition, the concept of WTP for resources that are perceived to be available freely to them is often another source of contention. Since monetary valuation is based on the concept of WTP, it becomes a challenge to apply it in such situations.

The last challenge concerned with monetary valuation is land ownership and the lack of property rights in many rural areas. Land in South African rural areas is largely tribal and is used communally, with all local households having equal access to the land and its resources. The valuation methods used require the research respondents to envision trading in these 'free' resources. This becomes a real challenge for such people and may fail a study.

5.3 The pilot study

The purpose of a pilot study is normally to pre-test the technique to be used during the main survey. Through the pilot study, potential problems that may arise can be identified and fixed before the actual survey. The research approach can then be revised according to the findings of the pilot study.

For this research, a pilot study was carried out for the following main reasons:

- To test the applicability of the CVM and the PRA methods that were to be used for data collection;
- To identify gaps and flaws in the techniques for data collection so that the researcher could devise ways of solving them before the main survey; and
- To allow the researcher to estimate the resources required and allocate them accordingly. Such resources included the need for research assistants, the time required to undertake the data collection activities e.g. administer and complete each questionnaire for the CVM and the time required to undertake participatory mapping exercises. The financial implications of the data collection were fully understood after the pilot study, and the researcher could plan accordingly for the main survey.

The pilot study was carried out by two black female researchers (aged 24 and 27) and a black male researcher (aged 27) on a small sample of the population. All three researchers were of Nguni descent (two Zulus and one Swazi), and thus knew the language, customs and the culture of the study area.

5.3.1 Access to the study area

First, a reconnaissance survey was undertaken in November 2001 with the aim of familiarising the research team with the layout of the area and delineating the study area using topographical maps. Permission to undertake the study was obtained from the community leaders, as is normal protocol for accessing rural areas. The izinduna of the three villages granted permission for the research to be undertaken. The KwaNompondo induna appointed two young men to accompany the researchers around the study area while conducting the study. The same happened in KwaMduku where the local councillors appointed residents to act as guides. Unfortunately there were no guides in the Machibini village, so the researchers relied on topographical maps only.

5.3.2 The CVM pre-test

A total of 45 semi-structured and open-ended personal interviews were conducted in the study area, using a draft questionnaire adapted from Ballance (2000). Twenty personal interviews were conducted in KwaNompondo, 15 in KwaMduku and 10 in Machibini. The number of respondents who took part in the pilot study as well as their distribution according to gender is illustrated in Table 5-1 below:

Table 5-1: Gender distribution of the respondents

	KwaNompondo	KwaMduku	Machibini	Total
Males	8	5	5	18
Females	12	10	5	27
Total	20	15	10	45

The draft questionnaire consisting of both open and close-ended questions and aimed to establish the following:

- The socio-economic profile of each household;
- A description of the status of woodland resources in the village;
- A description of the indirect use benefits realised from the woodland; and
- Monetary values (in Rand) stated as the respondents' WTP.

The findings of the CVM pilot are discussed under the four headings listed above.

The Socio-economic profile

The respondents were asked structured, close-ended questions on the demographics and socio-economic characteristics of each of their households. One of the questions asked the respondents to state the total income for each household. Whenever the respondent could not (or would not) respond, they were requested to state the number of household

members who brought an income, and the source of income (e.g. formal employment, self-employment or grant receivers). Wealth indicators were also used to obtain more information on the socio-economic status of the households (see Appendix 3). The wealth indicators consisted of various assets and appliances commonly used in rural areas, as well as descriptions of dwelling types in each household. The researchers mainly relied on observation but on several occasions would directly pose questions related to the wealth indicators.

Data on the socio-economic profile of the households was vital to this study because it allows for direct comparison of the monetary values obtained to the respondent's (and the respondent's household) actual ability to pay. This helped validate the responses obtained. The wealth indicators helped to validate the information provided during the interviews with actual evidence from observation.

Status of woodland resources

Although recent literature describes the availability of woodland resources in the study area, it was necessary to include this question as part of the CVM method. The aim of this question was to establish the respondent's general awareness of the subject matter, and to compare what the respondents thought the status of woodland resources was in their village to secondary sources.

Discussion of woodland benefits

The next set of questions on the CVM draft questionnaire prompted a discussion on woodland resources in general, and more specifically the goods and services they provide. The discussions aimed to determine the general awareness of the respondents regarding indirect use benefits from woodland resources. The researcher anticipated that the discussion of indirect use benefits of woodlands would stimulate the respondents to reflect on the value of these benefits in their lives and livelihoods thus enabling them to estimate their WTP.

Monetary value estimates

A hypothetical scenario was presented to the respondents, whereby woodlands were described as being under a threat of degradation. The respondents were asked to visualize a wasteland and, noting the difference in resource availability between the imaginary area and their village, ponder on how the absence of woodland resources would affect the quality of life in the village. The questionnaire proceeded to ask the respondents at what lengths were they prepared to go in order to conserve their woodland resources and prevent the imaginary scenario. This was achieved in two ways:

- Structured, close-ended questions were posed to elicit "Yes/No" responses. These questions aimed to establish at the outset whether the respondents would be willing to pay for the conservation of the woodland in their area specifically for indirect use benefits they realized from them. Respondents were also asked to state what would motivate them to join a drive to conserve the woodland. It was deemed important to determine the motivating factor in order to ascertain how they would respond if that factor were to be excluded from the equation. Respondents were asked if they would conserve the woodland for their personal gain or for the benefit of their children, or for the local community, for South Africans or for the benefit of the citizens of the world.
- Open-ended questions were posed to respondents to obtain estimates of how much they would be willing to pay for the conservation of the woodland resources in order to continue obtaining the benefits that they had listed. The researcher was aware that not all the respondents were employed. Considering that income levels have a bearing on people's WTP, and that unemployment was rife in the area, respondents were given a standard 'income' of R1 000 which represented each household's purchasing power. Respondents were asked to base their WTP on this amount. This income served two purposes: besides being a common denominator to cater for the unemployed respondents, it also helped in the analysis of responses as inter-household comparisons could be made within each village.

However, this income came with its own disadvantages, the main one being that it could introduce bias. To overcome this potential bias the researcher carefully explained the purpose of the amount and stressed the importance of considering it within the confines of the study.

The responses recorded on the questionnaire during the interviews were transcribed at the end of each day. A number of important outcomes emerged through the pilot study:

1. In most cases female respondents did not know their monthly household income mostly because they were unemployed and their husbands were the breadwinners. As expected, these respondents indicated that they never discussed financial matters with their spouses and therefore did not have something to base their WTP estimates on. When prompted to base their decision on the imaginary income of R1 000, the researchers realised that the respondents were struggling and could not conceptualise having that kind of money as income.
2. Many male respondents, particularly the older ones expressed uneasiness of revealing their income to researchers who were a) total strangers to them and b) were young enough to be their children, and c) were women. The respondents stated that is taboo for young people, let alone women, to ask such direct questions about income from their elders. Efforts by the researchers to explain the meaning and the relevance of the question to the study proved futile.
3. When asked about indirect use benefits of woodlands, all the respondents displayed eagerness to discuss direct use values. The researchers had to guide the respondents back to indirect uses whenever the discussion strayed.
4. Some of the respondents refused to state their WTP estimates, citing that these benefits were 'free' and belonged to the whole community. Once again, this presented difficulties and the researchers would explain more carefully the concept of WTP, in many cases with some success.

The CVM outcomes posed a potential major constraint to the study because the income question and the WTP was central to the valuation study and could not be excluded. The response to these findings in preparation for the main survey is presented in section 5.3.4.

5.3.3 The PRA pre-test

The PRA methodology was used to collect the non-monetary values. Due to time constraints which made it difficult to organise the PRA activities in all three villages, the PRA was only piloted in KwaNompondo and KwaMduku villages. This did not pose a major limitation to the study because it was expected that the findings obtained from the two villages would be representative of the three villages.

Three groups consisting of ten respondents each, i.e. ten female adults, ten male adults and ten children (below the age of 18) took part in the PRA. Adult males and females were separated into different groups to overcome the bias presented by gender and culture, whereby traditionally women cannot debate and engage with males as this may be interpreted as disrespectful. Furthermore, the different roles played by males and females in a rural setting would cause them to have different perceptions of woodland resources and their uses. School-going children were invited to participate in the study to present a different perspective which they obtained through education as well as the ingenuous views children normally bring to any situation.

The PRA piloting exercise involved the following activities:

- Focus group discussions about woodland resources and benefits from them;
- Transect walks on routes selected by the respondents;
- Group discussions on WTP; and
- Contingent ranking of woodland resource benefits according to their 'worth'.

Focus group discussions

Group discussions were held to determine the level of awareness regarding indirect use benefits of woodland resources. Posters with some woodland resources were displayed to facilitate the discussions. Respondents were requested to list all the woodland resources they had access to in their area, as well as the indirect use benefits associated with them.

Transect walks

Each group took transect walks around the villages. These walks lasted between 45 to 90 minutes. The PRA respondents jointly selected the routes. The purpose of the transect walks was to identify the resources villagers found important in their lives and their status in terms of quantity and quality, and their availability and location in relation to residential areas. Discussions were held during the walks. After the transect walks the respondents were asked, as a group, to list the resources and associated benefits that had been identified for the next task.

Contingent ranking

A matrix of the different benefits was drawn on the ground and on A3 sheets of paper and respondents were asked to prioritise the resources, and rank them starting with those they considered to be of high priority. Each indirect use benefit was allocated a 'box' for scoring purposes, and, using stones the respondents ranked the resources by scoring in the resource boxes. At the end of the exercise the stones were counted and the box with the most stones was regarded as one with the most highly valued service.

Group discussion on WTP

After the ranking exercise respondents were given the hypothetical scenario (similar to the one used during the CVM pre-test). The respondents were urged to discuss the amounts amongst themselves and agree on a single amount, which would be taken as the WTP for

the whole group. Again, respondents were required to base their values on a standard income amount of R1 000.

5.3.4 Pilot study findings and conclusions

The findings of the pilot study were analysed and from them it was concluded that the CVM did not produce data that could be used for analysis. Many respondents did not respond to the WTP questions, and those that did could not validate their responses. In addition, the researchers discovered that the PRA group discussions yielded more information than the CVM personal interviews. Although CVM is said to be more suitable for investigating monetary values and non-market benefits, in this case the exercise yielded little information. The researcher therefore did not have confidence in the monetary results obtained, and concluded that the possibility of repeating this study and obtaining similar results was limited, even if done with the same respondents. As such it was decided that during the main survey, only the PRA exercises would be undertaken.

The PRA pilot study yielded a substantial amount of information through the group discussions and transect walks. All the activities undertaken generated useful data on the worth and importance of indirect use benefits associated with woodland resources. It was because of these results that the main survey was undertaken using the PRA techniques alone, and focused on obtaining non-monetary values of indirect use benefits.

5.4 The main survey

The pilot study findings and conclusions were used to strategise and prepare for the main survey. Based on the pilot conclusions it was envisaged that the PRA method and personal interviews were the most appropriate methods for data collection. Primary data was supplemented with secondary data sources that included previous studies undertaken in the study area, and analysing topographical maps to explore the availability and distribution of woodland resources.

Background work undertaken in preparation for the fieldwork involved a literature review on the methodology and its application in the context of rural areas. The works of Chambers and Guijt (1995), GWAAI Working Group (1997), Dovie and Witkowski (1999), and Nemarundwe and Richards (2002) were reviewed for background information on the application of PRA in environmental valuation exercises.

5.4.1 Sampling technique

Purposive sampling was applied in this study. Patton (1990, cited in Leedy, 1997) declares that purposive or purposeful sampling is carried out to increase the utility of the information obtained from small samples. For the purposes of this study respondents who were most likely to be knowledgeable about woodland resource benefits were purposefully selected. Similar surveys often require that a sample be drawn from the target population. The main issue is that the sample should be representative of the target population. Resource limitations encountered in this study included time constraints, a limited budget and a limited number of research assistants available.

Definition of target population and sampling frame

The target population was defined spatially by the geographical boundaries of the three villages. Residents of KwaNompondo, KwaMduku and Machibini villages formed the target population.

Both male and female respondents were sought to obtain a balanced perspective on the research question. The study targeted school going children (up to 18 year olds) and the middle to old aged (18 years and above). The reason for targeting this range was the different perspectives that age and gender bring about. In addition, the different age groups represent different occupations, i.e. school children (including school leavers in this age group) and adults (including employed and the unemployed). The sample was spread geographically to the extent allowed by accessibility.

Sample size

The size of the sample was determined by, among other factors, the research design, as well as the homogeneity of the population. Leedy (1997) asserts that for a markedly heterogeneous population a larger sample size is required in order to decrease sampling error and increase the likelihood that the sample is representative. The study area consisted of three villages that displayed a range in the level of development, with KwaNompondo assumed to be the most developed, followed by Machibini and KwaMduku the least. KwaMduku village is the most remote village and KwaNompondo is closer to Hluhluwe town.

The research design required in-depth discussions with the respondents. As such a total of 92 people from the three villages were selected to participate in the study.

5.5 Field activities

Data collection techniques included group discussions, participatory mapping, transect walks and contingent ranking. These techniques are discussed in the next subsection.

5.5.1 The opening meeting

In all three villages the PRA sessions began with a brief opening meeting where the researcher and two research assistants (used in the pilot study) welcomed the respondents and thanked them for participating in the study. The researcher explained the purpose of the study and what was expected of the respondents. The purpose of the exercise was to investigate from the community members:

- What woodland resources are available in their villages?
- What indirect use benefits associated with woodland resources did they get from the available woodland?

- How important are these benefits to their livelihoods, i.e. what is their worth or value?

Respondents were grouped according to age and gender, each group consisting up to 12 respondents. The small size of the groups was to enable the researcher to facilitate the activities and also ensure that all the group members had an equal opportunity to participate. The structure of the groups is presented in Table 5-2 below:

Table 5-2: Research respondents

	KwaNompondo	KwaMduku	Machibini	Total
Adult female	10	9	10	29
Adult male	9	10	10	29
Mixed children	12	11	11	34
Total	31	30	31	

All the PRA exercises were explained in detail at the opening meeting and respondents were encouraged to ask questions for clarity. Exercises that were to be undertaken were the following:

- Mapping of the village landscape and available natural resources;
- Transect walks and discussions;
- Contingent ranking of woodland benefits; and
- Personal interviews to obtain household data.

Each exercise was estimated to last between 30 to 60 minutes. The groups were provided with chart paper, markers and pencils.

5.5.2 Participatory mapping

The second exercise involved identification and mapping of the general landscape of the study area, with particular reference to natural resources. Respondents were required to produce a visual representation of the three villages illustrating the natural resources and other landscape features. The purpose of this exercise was two-fold:

- To assist respondents to 'loosen up' and to begin to focus on the study; and
- To help the researchers to get the respondents' view of the study area and locally available woodland resources.

The respondents selected group leaders who assumed ultimate responsibility for drawing the maps, while obtaining input from all respondents. The maps were sketched onto large sheets of paper, and later transcribed by the lead researcher onto A4 size paper.

5.5.3 Transect walks and discussions

The mapping exercise was complemented by transect walks which were taken through the villages. The respondents chose the route. The transect walks helped to cross-check and verify the resource maps. The walks also generated discussions on the benefits of all the resources that had been identified. The walks lasted between 45 to 60 minutes. After the transect walks the groups were afforded an opportunity to modify their maps with any fresh observations they had made. The maps are presented in Chapter 6.

5.5.4 Contingent Ranking

The ranking of woodland benefits was the crux of the whole study. This exercise involved listing all identified resources, as well as all the indirect use benefits associated with them. These benefits were then ranked according to their value as perceived by the respondents. Respondents were encouraged to discuss and evaluate the benefits among themselves, and the motivation for each rank.

A scoring exercise was undertaken to rank the benefits according to their importance. Each identified benefit was given a score using stones; the one of highest importance being allocated more stones, and the least important one receiving the least number of stones. The results were recorded in a table, and are presented in Chapter 6.

5.5.5 Personal interviews

Personal interviews were conducted with adult respondents at the end of the PRA group activities. Refreshments were served during this time. The questionnaires administered aimed to establish the demographics and socio-economic profile of the households in the study area. The questionnaire contained 11 close-ended questions (refer to Appendix 3 for questionnaire) aimed to establish the following:

- Age of respondent;
- Gender of respondent;
- Education level of respondent;
- Occupation of respondent;
- Number of household members;
- Household income source;
- The income of the household;
- Length of stay in the village;
- Reason for staying in the village; and
- The pros and cons of life in the village.

The advantages of collecting the personal details at this point in the research process were twofold:

- There was already a rapport built after completion of the other activities and the respondents were already comfortable with the researchers; and

- The researchers were able to interview the respondents individually whilst they were enjoying the refreshments.

It should be noted that the respondents were not coerced into participating in the study through the provision of refreshments. Refreshments were served as a way of thanking the respondents for giving their time to participate in the study.

5.6 Data analysis

The analysis of qualitative data involved the extraction of meanings, and quantitative data were analysed using basic descriptive statistics. The data collected from all the field exercises were transcribed at the end of each day. This was done while the data were fresh in the researchers' memories and to allow interrogation at a later date. The maps drawn by the PRA respondents were sketched onto A4 sized paper. 1:50 000 topographical maps were used to verify the resource maps that the respondents drew as part of the PRA mapping exercise.

Qualitative data were analysed by categorisation and classification into 'themes'. Interpretive categorization was applied whereby the researcher considered the meaning behind the responses obtained during data collection. The researcher then constructed their version of what they thought the data meant.

Quantitative data analysis involved the description of data using tables, graphs and descriptive statistics. Analysis also involved the use of Excel spreadsheets into which the data were coded and entered into. Tables and graphs were produced using this program.

5.7 Chapter conclusions

The research methodology is very crucial in any research being undertaken. It is the vehicle with which a researcher can collect the data they require and analyse them in order to draw conclusions. This chapter outlined the background to the methods used to gather data, and the rationale for their selection. The actual data collection process is described, beginning from pre-field activities to the actual field work, and the transcription and analysis process on completion of the field exercises. The findings of this study are presented and analysed in the next chapter.

CHAPTER 6: RESULTS AND DISCUSSION

6.1 Introduction

Chapter 6 presents the research findings and a detailed discussion of the findings. The chapter is structured into two sections; the first section reporting on data obtained through personal interviews, and the subsequent section reporting on the group results obtained through the PRA activities. The findings are then summarised and the chapter ends with a chapter conclusion.

6.2 Personal interview results

A total of 92 people participated in the study. Out of these 58 (adult respondents) were interviewed using semi-structured questionnaires. The results from the personal interviews are presented in accordance with the way the questionnaire was structured.

6.2.1 Socio-economic profile of the respondents

Age distribution of respondents

The 58 adults who were interviewed ranged from 21 to 60 years old. Thirty three percent of the respondents were under 30 years of age. Respondents between 30 and 50 years constituted 53%. The balance (14%) was made up of respondents over 50 years old.

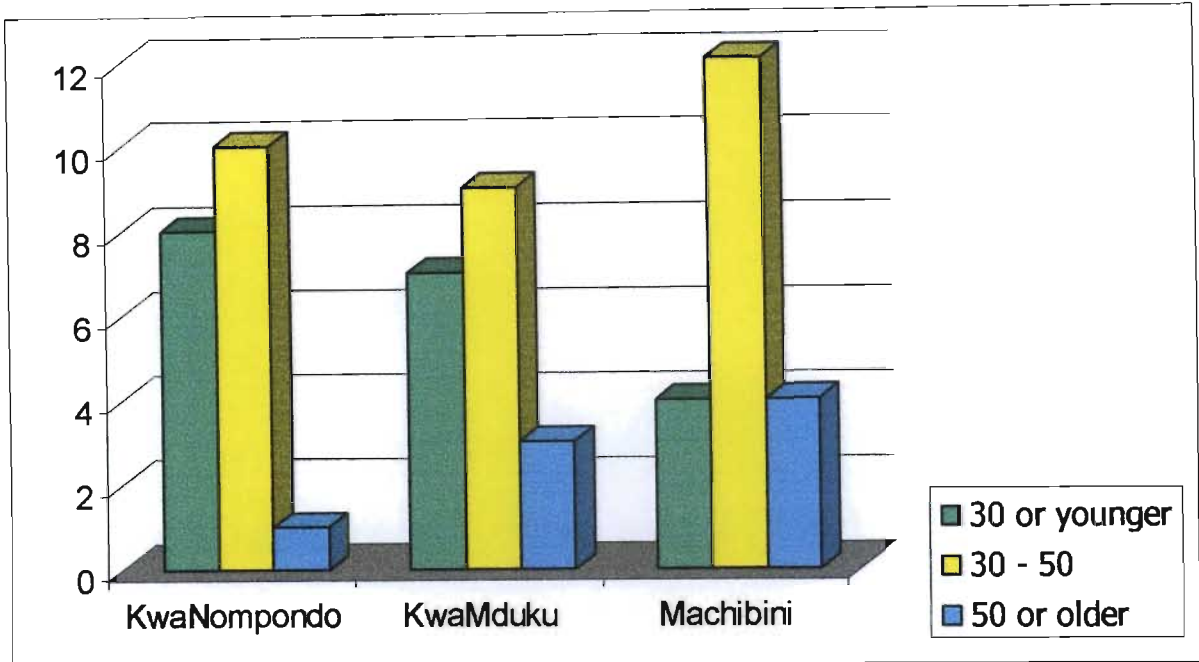


Figure 6-1: Age distribution of respondents

KwaMduku had an even age distribution, while the Machibini sample was largely made up of respondents between 30 – 50 years. The categories <30 years and >50 years consisted of the same number of respondents. KwaNompondo had only one respondent in the >50 years age group. It is noteworthy that the largest proportion of respondents (31 out of 58 respondents) was in the economically productive age group (30-50 years). The category <30 years consisted of 16 respondents who included school-going children and school leavers.

Gender of respondents

Table 6-1: Breakdown of respondents according to gender

	KwaNompondo	KwaMduku	Machibini	
Male	9	10	10	29
Female	10	9	10	29
Total	19	19	20	58

Table 6-1 reveals that the ratio of males to females amongst the interview respondents from the three villages was 1:1. Analysis of individual village results indicates that Machibini displayed the same ratio of males to females. In KwaNompondo ten female respondents were interviewed versus nine males, and in KwaMduku there were nine male respondents and ten female respondents.

Educational qualifications of respondents

98% of the respondents had a formal education, and only 2% had no formal education. The breakdown according to level of education is presented in Figure 6-2.

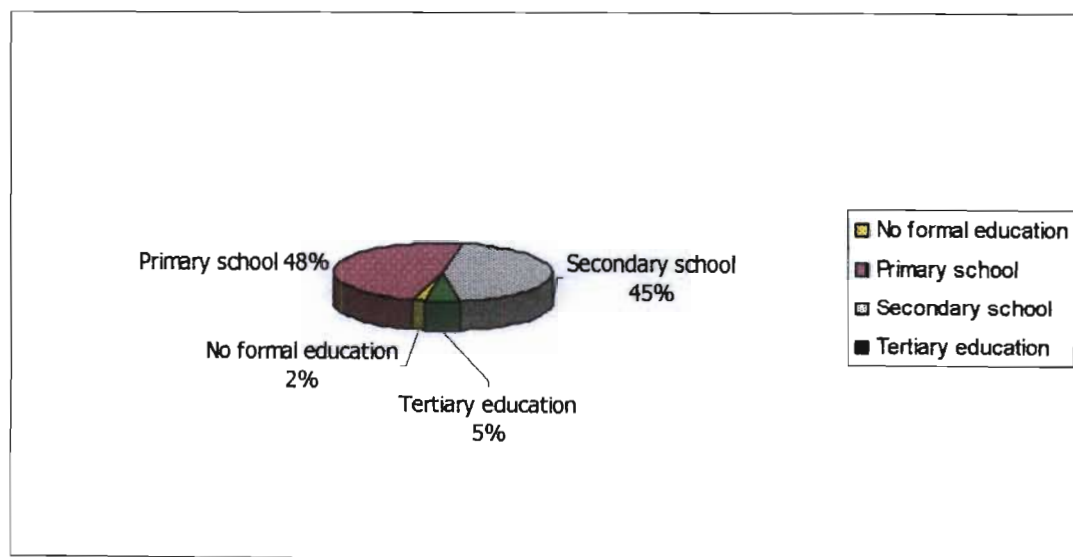


Figure 6-2: Educational level of respondents

Figure 6-2 reveals that almost half of the respondents had primary and secondary school education. A minority (5%) had tertiary level education. A further analysis of educational levels was done according to the respondents' gender and their villages.

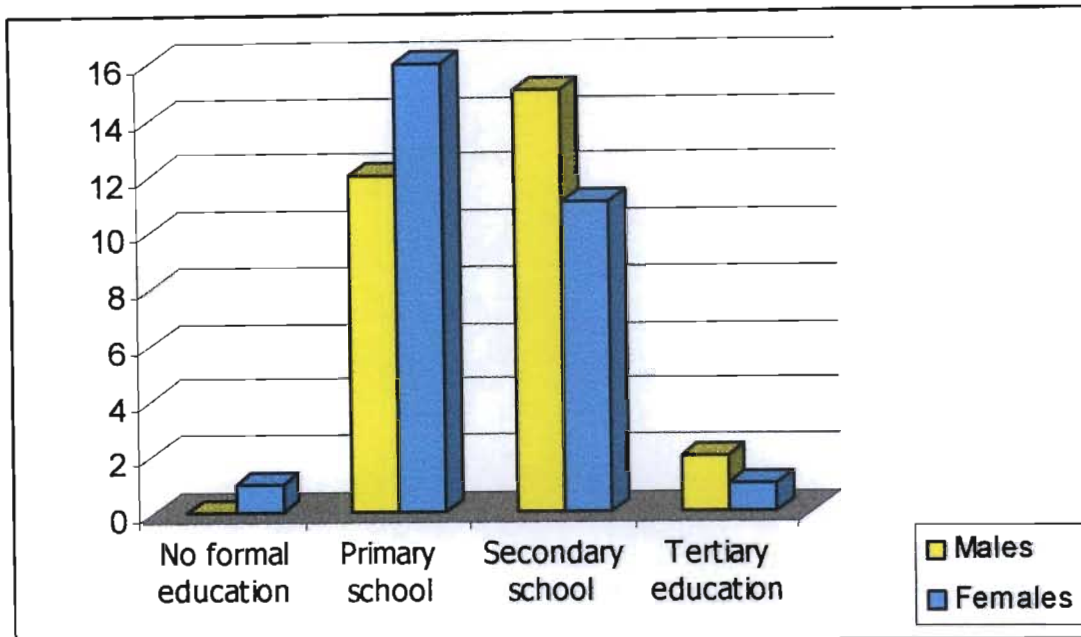


Figure 6-3: Educational level according to gender

The education–gender analysis revealed that slightly more male respondents had attained secondary and tertiary education than their female counterparts (Figure 6-2). Fifty two percent of the male respondents had secondary school education compared to 38% of the female respondents. Seven percent of the male respondents had tertiary education, compared to 3.5% of the female respondents. The tertiary qualifications were a nursing certificate held by the female respondent and an agricultural diploma and a finance management certificate held by the two male respondents. The results seem to indicate that males in the study area are more educated than their female counterparts. However, these results are not conclusive because of the small sample size.

The educational qualifications of the respondents were also analysed according to the respondents' residential area. The results are presented in Table 6-2.

Table 6-2: Distribution of education levels per village

	KwaNompondo	KwaMduku	Machibini	Total
No formal education	-	1	-	1
Primary school	7	9	12	28
Secondary school	10	8	8	26
Tertiary education	2	1	-	3
Total	19	19	20	58

Table 6-2 reveals that respondents from KwaNompondo had received a higher level of education, compared to the other two villages. Of the three respondents who had a tertiary education, two were from KwaNompondo. Ten out of the 26 respondents who had secondary school education were from KwaNompondo, and the rest (16) were evenly split between KwaMduku and Machibini. Machibini village had the highest number of primary level school leavers (43%), followed by KwaMduku (32%). Interestingly, all the respondents from Machibini had been to school, however, none of them had a tertiary level qualification. The only village with one respondent with no formal education was KwaMduku.

A comparison of the educational level of respondents against the availability of educational facilities in the villages reveals interesting results: KwaNompondo had the most primary and secondary schools (refer to Table 4-3). There are no tertiary education institutions in the study area. Informal discussions during the transect walks revealed that many of the school-going respondents attend school in the nearby urban centres of Hluhluwe and Mtubatuba. The general perception among the respondents was that the schools in urban areas were 'better' compared to those in the villages. The number of schools in the villages therefore cannot be used as an indicator of the levels of education, particularly for the elder residents as most of the schools were recently constructed.

Occupation of respondents

Four categories of occupations were presented in the questionnaire, and respondents were required to select amongst them:

- Formal employment: whereby the respondents receive income on a regular basis;
- Informal employment: whereby the respondents receive earnings on a wage-basis;
- Self-employment: where the respondents earn a living by using their skills and knowledge to sustain their livelihoods; and
- Unemployment: those respondents who do not have any form of earning, are in the economically productive age-group, and are searching for work.

The occupations of the respondents are presented in Figure 6-4.

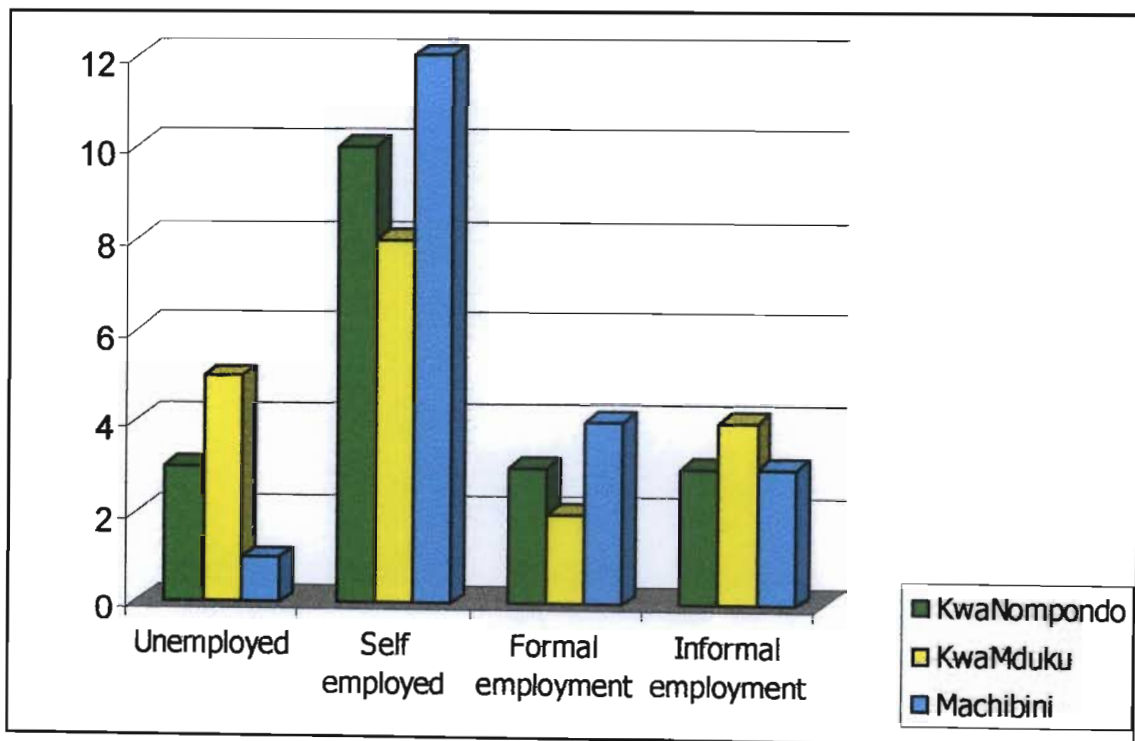


Figure 6-4: Occupations of respondents per sector

The interviews revealed that 52% of the respondents were self-employed. A majority of these respondents were involved in cash crop farming, and grow mostly sugar-cane and vegetables for sale. Some of the self-employed individuals were carvers and weavers, indicating that they harvested the raw materials from woodlands in the area and occasionally in the Parks. Some of these respondents pointed out that due to droughts and population increase, the availability of these raw materials had decreased. They then had to purchase the raw materials from other areas. These findings are in line with the works of Watson (1996) and Magasela (2001) who revealed a trend of decreasing woodland resources in the same area.

Ten (10) out of the 58 respondents (17%) were in the informal employment sector. A majority of these respondents worked as casual labourers in the plantations and the Parks on a seasonal basis, and some were domestic workers. During discussions the respondents indicated that they received cash earnings as well as payment in kind, depending on the employer and the type of job. Payment in kind included receiving food items such as maize and beans, and also clothing. This was an interesting feature because it is part of the livelihood options in the study area.

Sixteen percent (16%) of the respondents were unemployed. Some of these respondents were actively looking for jobs, while others stated that they had given up the search for jobs and depended on their families financially. This confirmed the findings of the pilot study, which revealed that a large proportion of the respondents, most of whom were unemployed, could not state their WTP in Rand values. The female respondents revealed that their spouses did not reveal household income to them.

Analysis per village revealed the following results:

- Machibini village had the most self-employed respondents (12), followed by KwaNompondo (10) and KwaMduku (8).

- KwaNompondo had three respondents in formal employment, three in informal employment and three unemployed respondents.
- KwaMduku had the highest number of unemployed (5) and Machibini had the least (1).
- 44% of those in formal employment were from Machibini, whilst 33% were from KwaNompondo and 22% from KwaMduku.

No relationship could be established between education levels and occupations of the respondents in each of the three villages.

Source of household income

Respondents were asked to state how their households obtained income. Forty three percent (43%) of the respondents indicated that they sold agricultural products such as poultry, livestock and crops, particularly after a good harvest. This was done as the main source of income for some and for other respondents this was to supplement the income they received. Forty percent (40%) stated that they obtained income from the sale of woodland products such as firewood, thatch grass, and wild fruits. Others sold processed woodland products which included mats, baskets, utensils and carved ornaments.

Remittances make an important contribution to household income, with 33% of the respondents supplementing their household income with pensions, child grants and disability grants from the Social Welfare Department. Wages accounted for 28% of the respondents' household income, while formal salaries accounted for 24% of the respondents' household income.

Estimates of total household income

The purpose of investigating household income was to establish if there was a relationship between the household income and the Rand values assigned to woodland benefits. However, the CVM was not used during the main survey, based on the findings and conclusions from the pilot study (section 5.3.4).

Nonetheless, the income question was still posed to respondents in order to ascertain the respondents' ability to pay, even though the respondents were not asked WTP amounts. The income amounts obtained from individual respondents were aggregated to characterize village averages. Figure 6-5 presents the results of estimates of the respondents' household income.

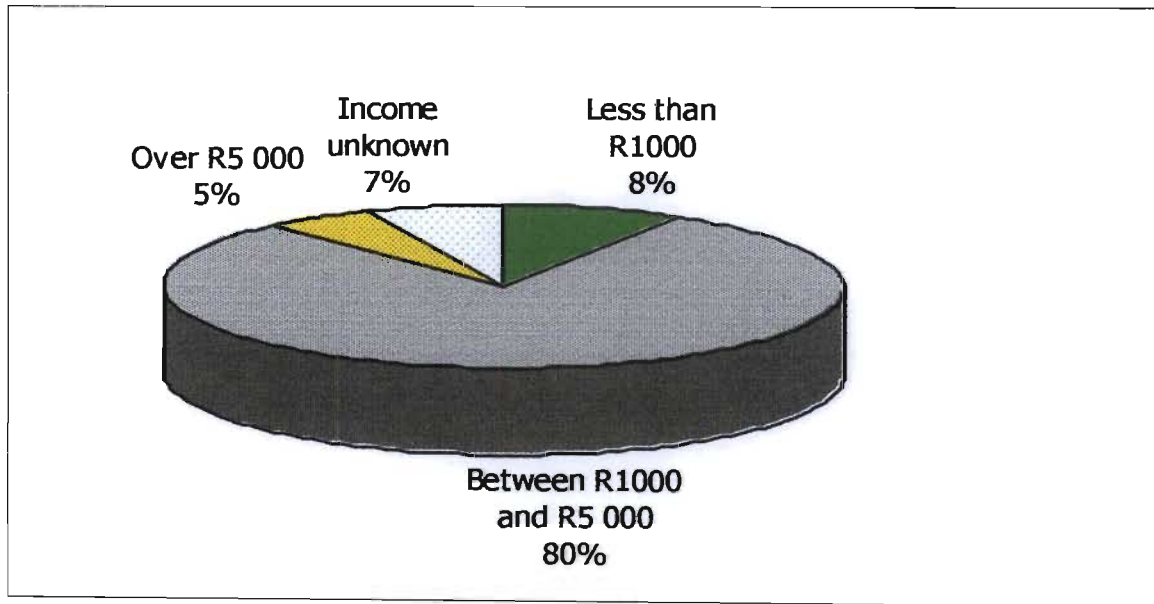


Figure 6-5: Household income estimates for the three villages

Eighty percent (80%) of the respondents' total household income ranged between R 1,000 and R 5,000. Eight percent (8%) of the respondents stated that their households received less than R 1,000 monthly, whilst 5% stated that their total household income was over R 5,000. Four respondents (7%) did not know their household income.

Further analysis of income per village was done (see Figure 6-6).

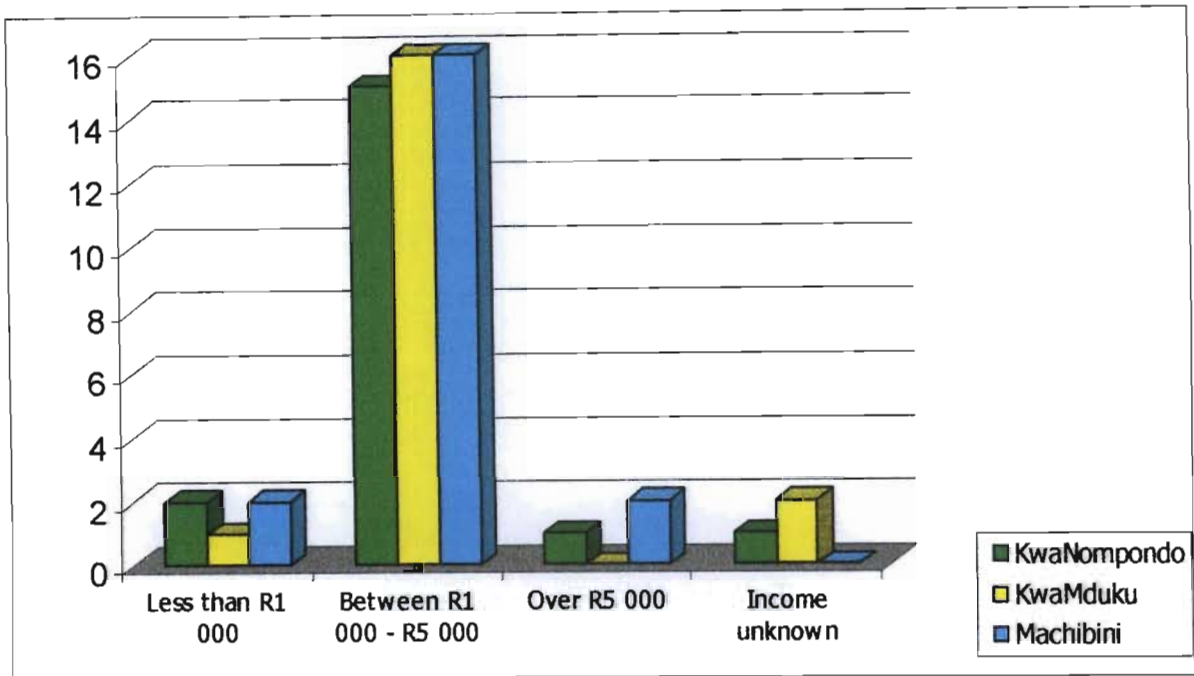


Figure 6-6: Household monthly income per village

This analysis revealed similar results in that the R 1,000 – R 5,000 income category was hugely populated: 16 respondents from KwaMduku and Machibini villages, respectively, and 15 respondents from KwaNompondo. This indicates that this category is the most common and that perhaps it should be split further to allow a clearer distribution in future studies.

The second heavily populated income category was the 'below R 1,000' income range. KwaNompondo and Machibini had two respondents each in this category, whilst KwaMduku had one individual. One respondent from KwaNompondo was in the category 'over R 5,000', two respondents were from Machibini and none from KwaMduku in this category.

6.2.2 Length of stay in the village

The period of stay in the study area was important to ensure that the respondents were familiar with the subject matter, and that they would reveal the perspectives of the wider population of the study area since they were affected by the same issues. Respondents were requested to state the period (in years) they had been living in the study area.

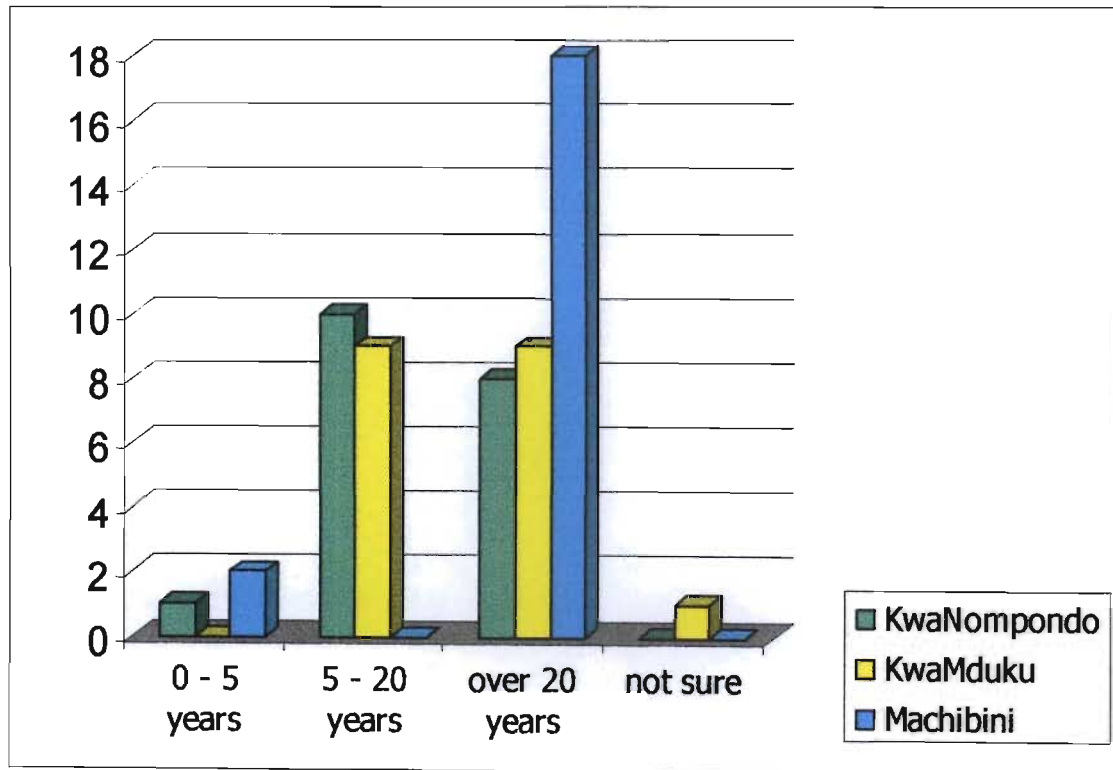


Figure 6-7: Length of stay in the study area

Sixty percent (60%) of the respondents stated that they had resided in the study area for over two decades. Of these, eighteen were from Machibini (31%), nine from KwaMduku (16%) and eight from KwaNompondo (14%). Thirty-three percent (33%) of the respondents had resided in the area for a period between five and 20 years. Five percent (5%) of the respondents had lived in the area for less than five years, and one respondent from KwaMduku stated that she could not remember.

6.2.3 Reason for residing in the area

From the previous question, and comparing that to the ages of the respondents, it was evident that over 40% of the respondents had not been born in the study area. Reasons for relocating into the area were enquired through an open-ended question, and the responses obtained are presented in Table 6-3.

Table 6-3: Reasons for residing in the study area

Reason	KwaNompondo	KwaMduku	Machibini	Total	%
Birth place	8	9	5	22	38%
Marriage	7	5	7	19	33%
Political violence	1	1	0	2	3%
Forced removals	0	4	2	6	10%
Job opportunities	1	0	3	4	7%
Study opportunities	1	0	1	2	3%
Better living conditions	1	0	2	3	5%
Total	19	19	20	58	100%

Less than two in five of the respondents (38% to be precise) were born in the study area. A large majority of these (91%) were males. Thirty-three percent (33%) had relocated because of marriage, and 100% of these respondents were females. Other reasons for living in the area included forced removals during the apartheid era (10%), better job opportunities (7%), better living conditions (5%), political violence in their places of origin (3%), and for study purposes (3%). Examination of the village results indicated that for those who were forcefully removed from their birth places, 67% of them were from KwaMduku village and the rest (33%) from Machibini. When interrogated further, the respondents stated that they were removed from their places of origin because of the abundance of natural resources that the previous government stole from them.

6.2.4 Pros and cons of living in the study area

Respondents were asked to state the good and the bad factors affecting their lives in the study area. Table 6-4 presents the results per village as well as cumulative results for the three villages. Nine possible responses were provided, based on the responses obtained during the pilot study. These responses can be broadly categorized as follows:

- Natural resources (e.g. land, woodland resources and favourable climate);
- Physical resources (service infrastructure and proximity to urban centres); and
- Emotional and physical well-being (low crime levels, tranquillity and aesthetics).

Table 6-4: Results indicating positive aspects of life in the study area

Advantages	Village						Cumulative frequency	
	KwaNompondo		KwaMduku		Machibini			
Good climate	7	37%	5	26%	3	15%	15	26%
Arable soils	2	11%	2	11%	3	15%	7	12%
Access to resources	5	26%	4	21%	5	25%	14	24%
Land for farming	6	32%	4	21%	6	30%	16	28%
Social infrastructure	8	42%	1	5%	11	55%	20	34%
Proximity to town	10	53%	3	16%	5	25%	18	31%
Peace / quite	1	5%	1	5%	0	0%	2	3%
Safety (low crime)	2	11%	3	16%	0	0%	5	9%
Aesthetics	2	11%	1	5%	1	5%	4	7%
No. of respondents	19		19		20			

An analysis of the cumulative responses indicates that the top four most common advantages mentioned included the availability of services and infrastructure (34%), accessibility of urban centres (31%), the availability of farming fields (28%) and access to natural resources (24%).

Service infrastructure was mentioned the most, contrary to literature sources such as IDP documents, and personal observations during data collection, which revealed very limited infrastructure in the study area. Analysis of the results per village reveals a large disparity in that 55% of the respondents who stated that service infrastructure was a positive factor were from Machibini, 42% were from KwaNompondo, and only 5% from KwaMduku. The individual village results are in line with literature and personal observations.

In terms of proximity to town, 53% of KwaNompondo respondents indicated that towns are accessible, possibly because of the relatively short distance to Hluhluwe town as well as the tarred road and the availability of public transport. For the same question, a much smaller percentage from Machibini (25%), and KwaMduku (16%) felt this contributed to life in the village. This corresponded with observations made during the transect walks, whereby the researchers observed that the main road leading into Machibini was tarred, but the tar was in a poor state and had numerous potholes. The main road into KwaMduku was in good condition, however, the minor roads within the village were not tarred and very sandy, which made it difficult to travel.

The availability of and access to natural resources was cited by most of the respondents as another positive aspect of living in the study area. Respondents cited fields for farming (28%), good climate (26%), access to woodland resources (24%), and fertile soils (12%). This corresponds with the livelihood strategies outlined in Section 4, which showed that livelihood activities comprised mainly of cultivation, livestock keeping and harvesting woodland resources. Results from the individual villages with respect to natural resource access and availability showed a higher average for KwaNompondo (27%), followed by KwaMduku (21%) and Machibini (20%).

The third category of positive aspects cited was that of emotional well-being. The average for the three villages was 6%; made up of absence of crime (9%), beauty of the area (7%) and tranquillity of the area (3%). An interesting aspect of the village results is that Machibini respondents did not cite 'no crime' and 'peace and quite' as advantages of their village. Respondents from KwaNompondo appreciate the intrinsic beauty of their village

and the absence of crime equally (11%). Absence of crime in KwaMduku was cited by 16% of the respondents. These results could be an indication that crime may be an issue in the study area. The only police station was in KwaNompondo, and there was an emergency call out point in KwaMduku.

6.3 The PRA results

As indicated in the previous chapter, the PRA respondents were grouped into three groups per village. Figure 6-8 displays the number of respondents grouped according to gender and age in the three villages.

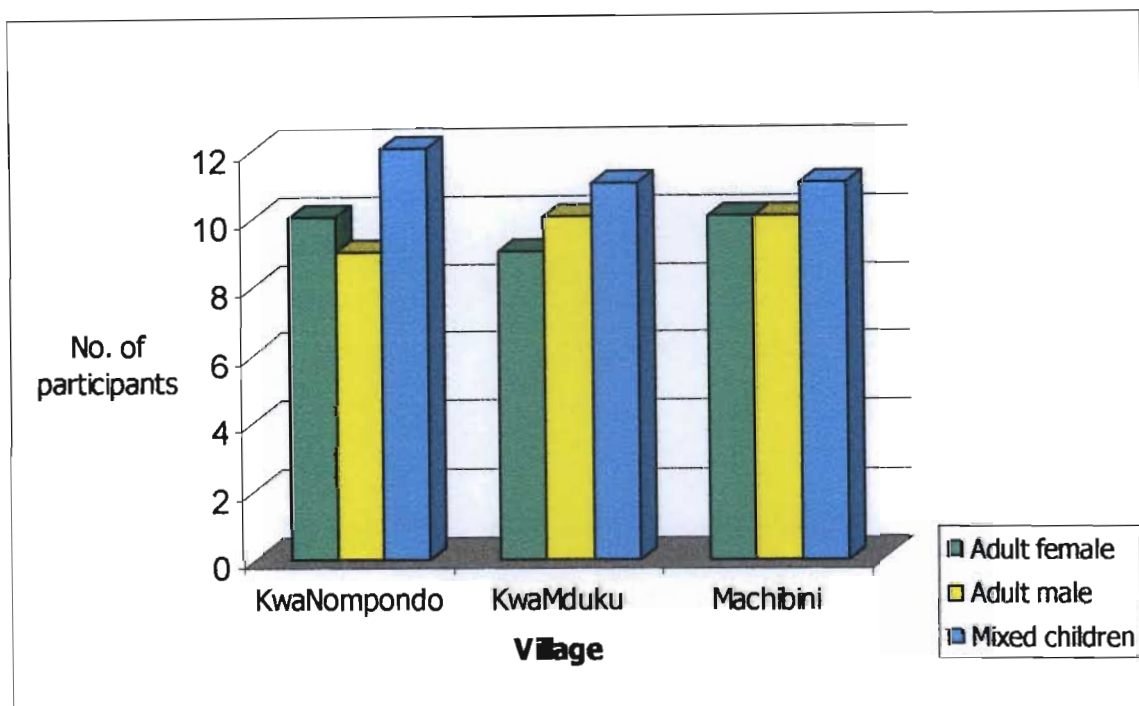


Figure 6-8: No. of people who participated in the PRA activities

Thirty-one respondents from KwaNompondo and Machibini villages, respectively, participated, and 30 respondents were from KwaMduku. There was a greater participation of children across the three villages, with a total of 34 participating. There were more

children from KwaNompondo than the other two villages. Coincidentally, the total number of adult males participated in the study equalled that of females, with 29 males and females participating. This is contrary to the gender distribution presented by Statistics South Africa (2002) as well as the gender distribution observed during the pilot study. During the pilot study 27 females participated compared to 18 males. The reason for this is unclear but it could be because of the random sampling that was undertaken during the pilot study, while for the main survey purposive sampling was conducted.

The findings of the PRA sessions are presented according to the mode of data collection. Data were collected using the following techniques:

- Participatory mapping undertaken by the respondents;
- Transect walks and discussions with notes recorded by the researchers; and
- Contingent ranking of woodland benefits carried out by the respondents.

6.3.1 Participatory mapping

Although the maps were drawn by semi-literate people who did not have formal drawing skills, they were very valuable in illustrating the resources in the study area relative to homesteads and the surrounding Parks. Map analysis involved exploring similarities and differences in the maps produced by adults versus children respondents and maps produced by adult male and female respondents across the study area. This type of analysis would identify if factors such as age and gender have an effect on the way in which different people perceive their environment.

It was anticipated that the maps produced would contribute to providing an understanding of the respondents' perception of the natural resources around them and how they value them in terms of their worth to their livelihoods. The maps would reveal insights on the respondents' awareness of the resources around them, and whether they are of value to them. The assumption was that the respondents would show or even exaggerate those

resources they benefit from (whether directly or indirectly), and would not focus as much on those that are perceived to be of no value.

Analysis of maps

Figure 6-9, 6-10 and 6-11 present the maps drawn by respondents from KwaNompondo village. The maps from KwaMduku and Machibini are included as appendices. It is believed that the analysis from the three areas would be comparable.

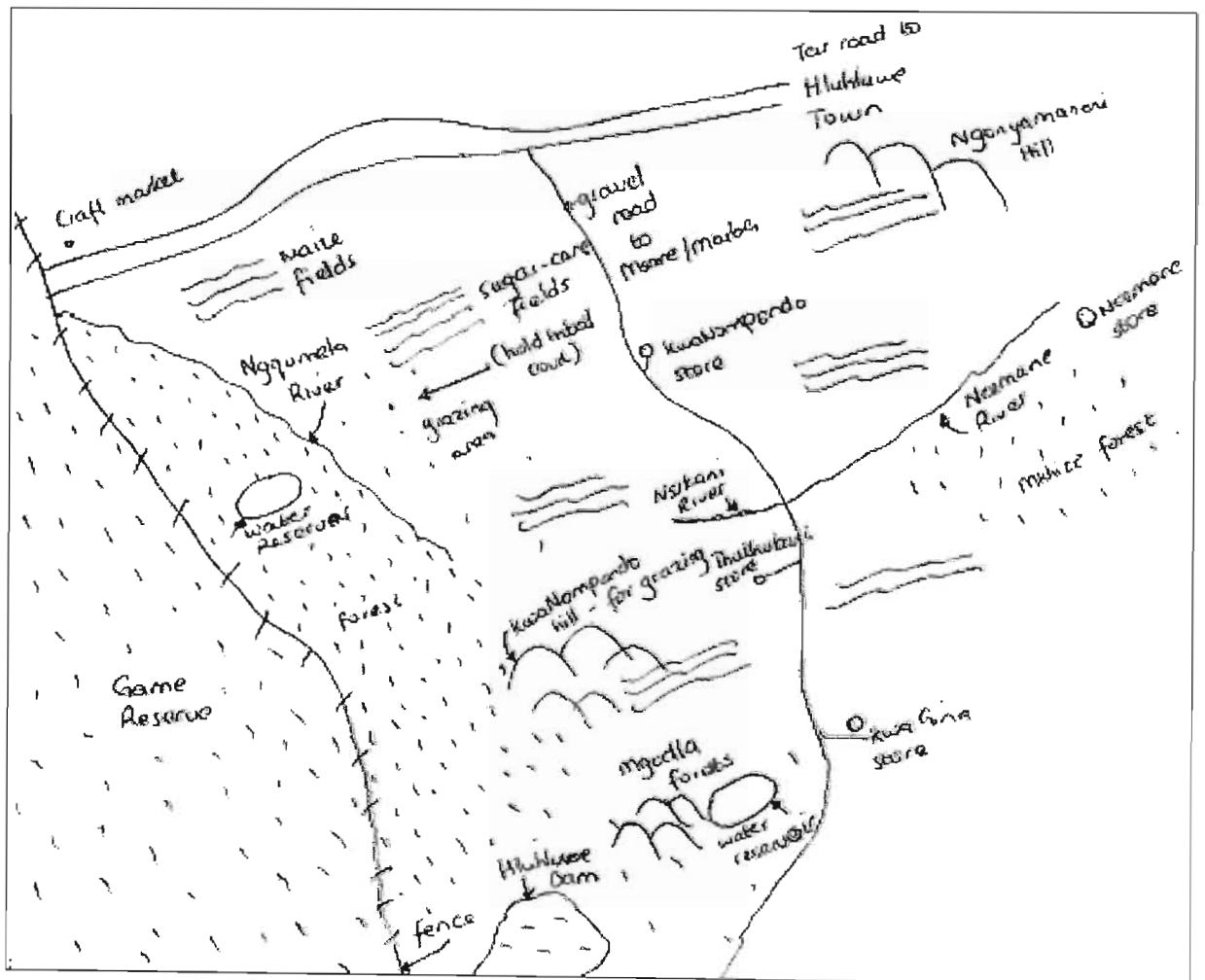


Figure 6-9: Map of KwaNompondo drawn by adult male group

The main features in the map produced by the adult male group include both natural features (woodland areas, cultivated plots, grazing land and rivers) as well as man made features (roads, KwaNompondo Dam, water reservoirs, etc).

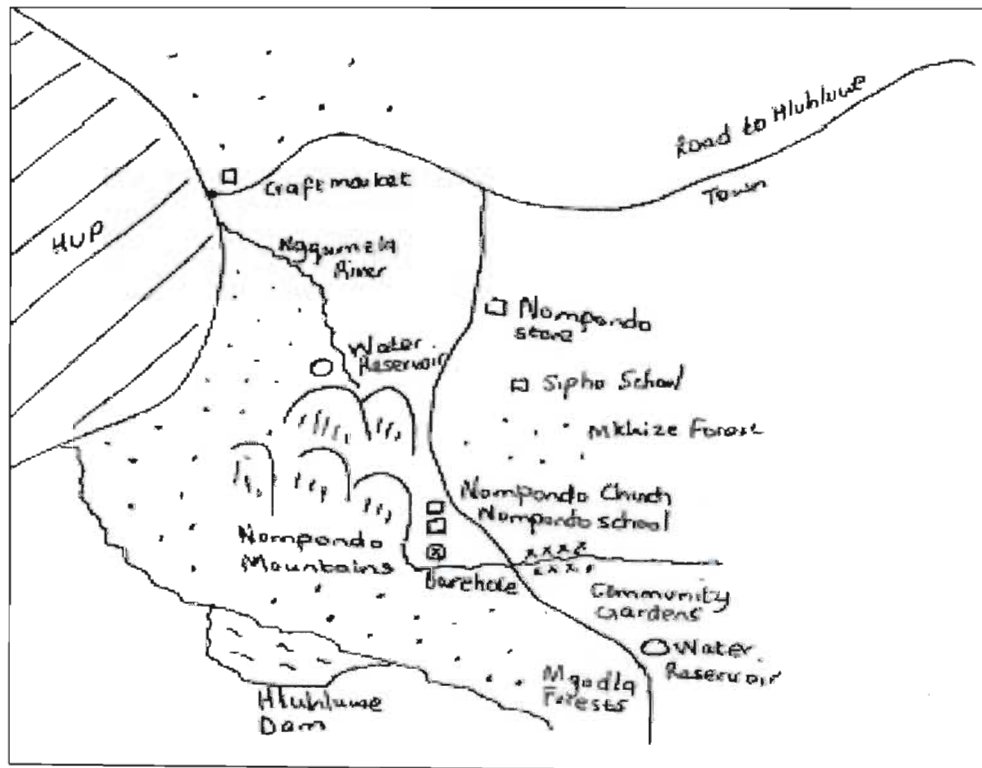


Figure 6-10: Map of KwaNompondo drawn by the adult female group

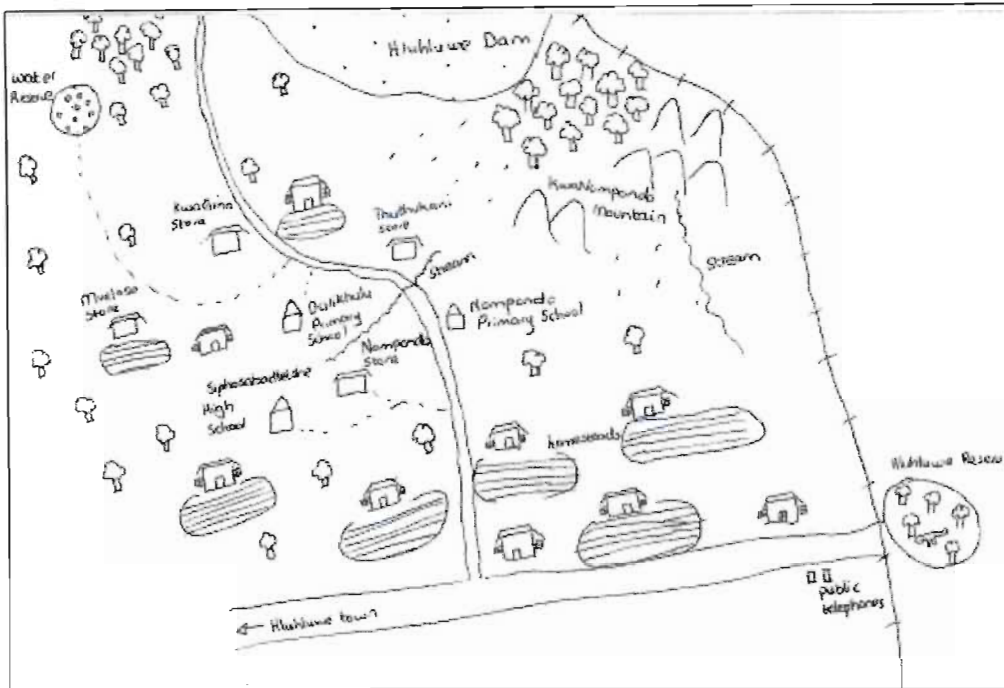


Figure 6-11: Map of KwaNompondo drawn by children’s group

A detailed analysis of the maps indicates differences between the maps drawn by the three groups. Although there are fundamental similarities, the maps portray different aspects of the landscape, and the areas of emphasis differ considerably. Table 6-6 below presents a comparison of the three maps.

Table 6-5: Comparison of PRA maps from KwaNompondo

Feature	Male group	Female group	Children
School	X	√	√
Church	X	√	√
Shop / spaza	√	√	√
Craft market	√	√	X
Public telephones	X	X	√
Homesteads	X	X	√
Tribal Court	√	X	X
Boreholes	X	√	√
Water reservoir	√	√	√
Streams / rivers	√	√	√
Community gardens	X	√	x
Cultivated fields	√	X	√
Grazing fields	√	X	√
Game reserve	√	√	√

From Table 6-6 and Figures 6-9 to 6-11, it can be safely deduced that the manner in which people perceive their environment varies, and that age and gender may be two of the factors that influence this perception. Maps drawn by the adult groups generally lacked detail, compared to the ones drawn by children. The sizes of certain features were exaggerated, and distance between them distorted in all the maps. For example, the size of the HUP varied from being almost a dot in the children's map, to almost covering the whole map in the male group's sketch. This could be an indication of awareness of the worth or significance of this particular resource. This would mean that males are extremely aware of the significance of the HUP to their livelihoods, whilst the female group and the children are aware of the presence of this resource but perhaps do not interact with it as much, and therefore do not find it as significant.

6.3.2 Group discussions

The results of the group discussions are presented in two categories: first the indirect use benefits of woodlands, which consisted of ecological services and social functions. The last part of the discussions revolved the availability of woodland resources, and their status.

Indirect use benefits of woodland resources

1. Ecological services

Air Purification

All three groups in the three villages displayed awareness of the role that vegetation in woodlands plays in terms of 'cleaning the air off dust and other pollutants'. Responses from the adult male and female groups were almost similar in the level of detail. Responses obtained included the following captions:

"Grass and trees hold soil particles together and prevent them from being blown away, which results in dust in the air. Where there are no plants the air is much dirtier because there is nothing to prevent dust from being blown away by the wind."

KwaNompondo Male group

"Woodland vegetation absorbs chemicals in the air that are released by industries and big trucks and buses. Trees absorb all these chemicals and break them down. Otherwise, they could be harmful to human health."

KwaNompondo Mixed children group

The results from the scoring and ranking exercise indicate that respondents from KwaNompondo scored an average value of 8.0 for this service, while in and KwaMduku an average of 7.7 was obtained, and in Machibini it was 7.0. In KwaMduku this service was ranked as the second highest value, whereas in the other two villages, it was ranked third highest.

Group results indicate that children generally ranked this service higher, followed by the female group. This could mean that children were more knowledgeable about the function of woodland in terms of it being a pollution sink. It could not be verified if these functions are taught at primary school as most of the children were in higher primary during the time the research was undertaken.

Climate and Air Temperature Regulation

The results obtained from the survey indicate that all three age groups of respondents were knowledgeable of the function of woodland in terms of regulating local and regional climate. The actual discussions amongst the various groups varied somewhat when they were elaborating on how woodlands regulate climate. Some of the discussions were as follows:

Female group: *"In a very hot day you find that the air in the woods is much cooler than where there are no trees. Trees also cool down the effects of the sun and keep soil moist, which contributes to water availability and cooler weather. That is why desert areas are so hot, it is the lack of trees that would otherwise cool down the hot air".*

Male group: *"Trees regulate climate by making rain when it becomes too hot and dry. Otherwise, without trees there would be no rainfall".*

Children (mixed): *"Trees cause it to rain by breathing out water vapour which forms clouds and then once the clouds are heavy it rains. Trees will then absorb the rain through their leaves and roots. They store it until it becomes too hot again and they release the vapour into the air to form clouds".*

From the scoring and ranking exercise the results obtained indicate that this function scored an average of 8.0 out of 10 in KwaNompondo; 7.7 in KwaMduku, and 6.7 out of 10 in Machibini.

When ranked against the other ecological functions, climate regulation was ranked the second highest in KwaMduku, the third in KwaNompondo and number 4 in Machibini. This would imply that even though in all three villages the benefit was deemed important, its importance in relation to other such benefits was not the same.

Nutrient cycling

Nutrient cycling was another ecological benefit that was identified, even though in all three villages it was termed 'soil enrichment' and 'soil fertility improvement'. Respondents discussed how woodlands have richer and moister soils than bare land or land that has been under cultivation for a period. They associated this 'richness' and 'moistness' with the presence of trees and other plants in woodlands. Some groups also mentioned that small animals and insects also contribute to the richness of soils, not just through their life activities but also when they die and rot, they become 'manure' to the soil.

The results of the scoring and ranking exercise (aggregated for all three villages) are presented in Table 6-7.

Table 6-6: Ranking of nutrient-cycling across the three villages

	Average per village	Score			Rank
		Male	Female	Children	
KwaNompondo	7.7	7	9	7	4
KwaMduku	7.7	7	9	7	2
Machibini	7.3	9	7	6	2
Mean		7.7	8.3	6.7	

Table 6-6 displays some interesting information on the perceived importance of nutrient cycling woodlands in terms of gender and village. Out of 10, this function obtained an average of 77% score in KwaNompondo and KwaMduku, and 73% in Machibini. When ranked against the other ecological functions though, it becomes apparent that even though the people of KwaNompondo gave it a high score, they did not rank it as high as those of KwaMduku and Machibini villages.

The average female score in all three villages is 8.3, followed by 7.7 for males and 6.7 for children. One would have expected that the males would value nutrient cycling more than women do because they are the ones more involved in crop production. However, it should be noted that some of the women in KwaNompondo had gardens where they grew crops for subsistence and also for sale.

Soil Protection

Soil protection was recognized as the most important of all the identified ecological functions of woodlands. The PRA results indicate that soil protection was ranked No. 1 (i.e. of the highest value) in all three villages. This result is in line with the fact that most of the respondents are involved in crop production, at some level. Many of them grow crops for home consumption, while there were others who grow crops like sugarcane and bananas for sale. Soil is therefore of utmost importance to the livelihoods of these people. In their responses, the respondents indicated that soil that has been eroded and degraded does not offer the nutritional content that is necessary for crop growth. They mentioned that soil erosion results in the loss of nutrients, which could lower the harvest they obtain. Nutrient loss was also associated with increased expenditure on fertilizers which would be required to enrich the poor quality soils.

The average score (out of 10) assigned to this function was 8.7, 8.3 and 7.7 in KwaNompondo, KwaMduku and Machibini. The male group in KwaNompondo scored a 10 for this function, followed by 9 (KwaNompondo and KwaMduku female groups). The lowest score was 7 (Machibini male group and children of KwaNompondo). The children's

group reiterated that soil protection is important, although when asked to rank it against the other ecological functions, it was not the highest priority to them.

Watershed Protection

The function of woodlands relating to watershed protection was also identified as an important ecological benefit by the PRA respondents. Watershed protection was said to comprise of water quality, water supply, and flood protection. The respondents acknowledged the fact that this function was more of a regional that a local benefit. They described how the vegetation in woodlands contribute to the availability of water, and how some of the trees such as the *Ficus species* and *Kigelia Africana* were actually believed to 'create' water.

The results obtained from the scoring and ranking exercise indicate that the Machibini respondents ranked this function No. 1 with an average score of 77%. In KwaNompondo it obtained the same score (77%) but was ranked second, whilst in KwaMduku watershed protection received 70% and was ranked the third most important ecological function of woodlands.

Results according to the different groupings indicate that the male groups scored an average of 8.0, followed by the female group with 7.7 and the mixed children group with 7.3. The males of KwaNompondo scored 100% for this benefit. The least was scored by the children's groups of KwaMduku and Machibini.

2. Social Benefits

Besides the ecological services woodlands provide for important social benefits to rural communities. The social benefits can be described in terms of indirect contribution to the livelihoods of the surrounding communities and the aesthetic aspect associated with them.

Aesthetic pleasure

The respondents recognized the aesthetic benefit that woodlands provide, contrary to the belief that rural people do not value this benefit. During discussions the respondents indicated that although they recognize this benefit and value it, it is not as highly valued as compared to the other benefits which have a larger contribution to their livelihoods. However, the respondents acknowledged the beauty of the landscape and features such as streams, wetlands and mountains.

Table 6-7: Ranking of aesthetic value across the three villages

	Score			Rank	
	Average per village	M	F		C
KwaNompondo	6.0	6	6	6	4
KwaMduku	7.0	6	7	8	3
Machibini	6.3	6	6	7	3
	Mean	6.0	6.3	7.0	

The values obtained from the scoring exercise were generally low for the adult respondents, averaging 60% and 63% for the male and female groups. The results reveal that the children's groups ranked the aesthetic value of woodlands higher, averaging 70%. This could mean that aesthetics are not a major concern for adults, whereas the younger generation appreciates aesthetic benefits more. Compared to the male groups, the female respondents scored a slightly higher score, indicating that they value it more than their male counterparts.

The village results indicate that the people of KwaMduku value aesthetic benefits of woodlands more than the other two villages. It should be remembered that KwaMduku is in the vicinity of the GSLWP, which may be considered more aesthetically pleasing compared to the HUP. The transect walks revealed that KwaMduku has the most dense vegetation compared to KwaNompondo and Machibini. The latter have smaller patches of woodland and denser homesteads.

Cultural Practices

The results obtained indicate that woodlands are considered to be important in carrying out various traditional, cultural and spiritual activities. The respondents described these activities first before ranking this benefit in relation to the other social benefits. Benefits that were listed include:

- Burial sites for different clans are located in woodland areas;
- Prayer sites for communities in times of stresses e.g. droughts and famines;
- Dwelling place for ancestors is in woodland areas, often together with the burial sites; and
- Spiritual activities performed in woodlands include wading off evil spirits and healing possessed people.

After listing and discussing the cultural benefits, the respondents estimated the value of these benefits using stones, and then ranked these against the other social benefits. The results obtained from this exercise are presented in the table below:

Table 6-8: Ranking of cultural activities across the three villages

	Score			Rank	
	Average per village	M	F		C
KwaNompondo	5.7	6	6	5	5
KwaMduku	6.0	6	7	5	5
Machibini	6.3	7	8	4	3
	Mean	6.3	7.0	4.7	

From the results presented in Table 6-8 above, it is apparent that the female groups scored a higher value (7 out of 10) for this service, compared to the males (63%) and children (47%). In all three villages the women scored higher scores than the men. This result is contrary to the expectation that males would be more in touch with traditional beliefs compared to their female counterparts. For the children's groups this was the lowest score they scored for all the benefits discussed, which could indicate a loss in

interest in traditional activities in the younger generation, and a need for education and awareness about these activities.

Recreation

Woodlands also provide recreational activities such as mountain hikes and tourist activities such as visits to nature reserves. Although the PRA respondents indicated that they do not participate in recreational activities, they displayed awareness of these activities, and more importantly, their value to human beings. During discussions it was evident that some of the respondents felt aggrieved that they have to pay the 'white man' in order to benefit from conservation areas whereas they used to enjoy these benefits freely before the parks were proclaimed. However, the respondents pointed out that they enjoy simple things like a walk in the woods or a stream, which has a calming and relaxing effect. The results of scoring and ranking this function are presented in the table below:

Table 6-9: Ranking of recreational benefits across the three villages

	Score			Rank	
	Average per village	M	F		C
KwaNompondo	7	4	8	9	2
KwaMduku	7.3	7	7	8	1
Machibini	6.6	5	7	8	3
	Mean	5.3	7.3	8.3	

From Table 6-9, it can be deduced that children in the study area value recreation more than adults do. The average score that children from all three villages scored for recreational benefits of woodlands was 8.3 out of 10. The second highest was 7.3 scored by women. Men scored 5.3 out of 10 for recreation. This could mean that they do not appreciate the recreational aspect of woodlands as their female counterparts do.

Analysing the results per village indicates that the highest average score was obtained in KwaMduku village (7.3 out of 10), followed by KwaNompondo (7.0) and lastly Machibini (6.6). These results are consistent with the observations that the woodlands in KwaMduku are the least degraded out of the three villages.

Shade

Woodlands provide shade, which lowers the ground temperature and benefits both human beings and their livestock. The provision of shade was recognized as the most important indirect use of woodlands in this study. It was perhaps the easiest function to identify and the most commonly enjoyed in all three villages and amongst both males and females, and children. Besides being of benefit to people, shade was identified as important for livestock and wild animals too. Ranking of this function produced the following results:

Table 6-10: Ranking of shade across the three villages

	Average per village	Score			Rank
		M	F	C	
KwaNompondo	8.0	5	10	9	1
KwaMduku	7.0	7	9	7	1
Machibini	7.3	6	8	8	1
	Mean	6.0	9.0	8.0	

These results indicate that shade was ranked the highest social benefit in all three villages, ranked No. 1. The KwaNompondo female group scored 10 out of 10 for shade, followed by their KwaMduku counterparts and KwaNompondo children (90%). Gender results indicate that females valued shade higher than males (90% compared to 60%), whereas the children's group scored 80%. All averages from the three villages were 70% and above.

During discussions, the respondents indicated that the hot summers experienced in the area affected them and their livestock, and as a result they valued shade highly. During the transect walks it was observed that most of the households had trees in their yards. The trees were planted mainly to provide fruits and shade. Some were left standing when they constructed their homesteads or cleared the land for vegetable gardens and fields.

The shade provided by trees also enabled community members to hold meetings under the shade. Most of the community meetings are held under the trees, often located next to a grocery store or by the road. This was witnessed during this study when the izinduna of KwaNompondo and Machibini announced the study and introduced the researchers to the community members. According to the izinduna, the advantages of using these venues were:

- No cost required, which is often the case when using buildings such as school halls and church buildings;
- The venue can hold a limitless number of people; and
- Air conditioning is not required, particularly during the hot summer months when it becomes unbearably hot indoors.

However, the major drawback with using this kind of venue is the unpredictability of weather; if it rains the meeting has to be postponed.

Privacy

The results obtained varied widely between 50% and 80%. The table reveals that privacy was recognized as the second highest social benefit realized from woodlands. The children's groups ranked this benefit highly in all three villages, averaging 80%. This was followed by the females (73%) and lastly males (50%). respondents cited the lack of adequate ablution facilities as one of the reasons why they valued the privacy provided by woodlands. The female respondents added that children often utilize nearby bushes to avoid accidentally falling into poorly-maintained pit toilets. Privacy was also associated

with traditional activities and spiritual activities performed in woodlands. The results of the scoring and ranking exercise are presented in Table 6-11.

Table 6-11: Ranking of privacy across the three villages

	Score			Rank	
	Average per village	M	F		C
KwaNompondo	7.0	4	8	9	3
KwaMduku	7.3	6	8	8	2
Machibini	6.0	5	6	7	2
	Mean	5.0	7.3	8.0	

From Table 6-11 it is evident that the children value privacy much more than the adults who participated in this research. In terms of village results, KwaMduku respondents scored 73% for this function, closely followed by KwaNompondo respondents with 70%. respondents from Machibini scored an average of 60%, which was the least obtained for this function. The transect walks revealed that KwaMduku had denser woodland cover, while Machibini had the most sparse woodland cover. It can be deduced that the value of this function to the people of KwaMduku is related to the ability of the woodland to provide this benefit. The available woodland cover in Machibini does not adequately fulfil this function.

Windbreak

Tall and dense woodland vegetation act as windbreaks. The PRA respondents acknowledged this as an important role of trees and bushes surrounding their homesteads. Most of the homesteads in the study area were observed to have live trees for fencing around their homesteads. During the PRAs the respondents indicated that apart from shade and fruit, this trees act as windbreaks. The results obtained from the scoring and ranking exercise are presented in the following table.

Table 6-12: Ranking of windbreaks across the three villages

	Score			Rank	
	Average per village	M	F		C
KwaNompondo	7.3	6	9	7	2
KwaMduku	6.7	7	7	6	4
Machibini	6.7	6	7	7	2
	Mean	6.3	7.7	6.7	

The results in Table 6-12 indicate that this function of by woodlands is deemed important, but is not as important as shade. The highest average was scored by the female groups, who scored 77%. The second highest was 67% scored by the children's groups, with men scoring 63%. Per village, KwaNompondo obtained the highest score (73%), and the other two villages both scored 67%. This function was ranked the second highest in KwaNompondo and Machibini while in KwaMduku it was ranked No. 4.

Lightning absorption and repelling

The results of the scoring activity for woodlands function as a lightning prevention are presented in Table 6-13 is not surprising that children scored the lowest points for this function (5.3) and the adult males scored the highest (7.3). The adult female groups scored an average of 6.7.

Table 6-13: Ranking of lightning function across the three villages

	Score			Rank	
	Average per village	M	F		C
KwaNompondo	6.0	7	6	5	4
KwaMduku	7.0	7	8	6	3
Machibini	6.3	8	6	5	3
	Mean	7.3	6.7	5.3	

Discussions revealed that most of the females and all the children were not knowledgeable about this benefit. The male respondents displayed the most knowledge about lightning repelling, describing how this works. Specific trees are planted at strategic places around the homestead. When lightning strikes, the trees absorb the lightning and prevent it from striking property or people, or repel the lightning back to the sender in cases where it is the product of witchcraft. Well-known species that are considered as protection against lightning include Umviyo (*Vangueria infausta*) and Umvongothi (*Kigelia africana*).

Discussion on the status of woodlands

During the discussions respondents were requested to analyse the status of woodland resources in the study area among themselves. The discussions revealed that many respondents believed that the woodlands were decreasing over time. Reasons cited for this decrease included population growth and the need for more land for farming and to construct houses. The residents did not think that the woodland resource exploitation was unsustainable, but believed that it was being done in the most sustainable form given the circumstances in which they live. Few respondents believed that the resource exploitation could be reduced in order to allow for the regeneration of the degrading woodlands

6.3.3 Contingent ranking

The indirect use benefits identified by respondents are listed in Table 6-14, Table 6-15 and Table 6-16, together with the results of the ranking exercise undertaken. The indirect use benefits are divided into two types: ecological services and social benefits.

Table 6-14: KwaNompondo results from PRA activities

	Indirect use benefit	Males	Females	Children	Average	Rank
Ecological services	Air purification	7	8	9	8	2
	Climate regulation	8	9	7	8	2
	Soil protection	10	9	7	9	1
	Nutrient cycling	7	9	7	8	2
	Watershed protection	10	8	7	8	2
Average		8.4	8.6	7.4		
Social benefits	Landscape aesthetics	6	6	6	6	3
	Cultural practices	6	6	5	6	3
	Clean, fresh air	7	7	7	7	2
	Lightning deterrent	7	6	5	6	3
	Privacy	4	8	9	7	2
	Recreation	4	8	9	7	2
	Shade	5	10	9	8	1
	Windbreaks	6	9	7	7	2
Average		5.6	7.5	7.1		

KwaNompondo female respondents placed a higher value for both social and ecological services than their male counterparts. The results indicate that ecological benefits scored an average value of 8.6 (female group), 8.4 (male group) and 7.4 (children). Social benefits scored average values of 7.5 (female group), 7.1 (children) and 5.6 (male group). The highest average value was 8.6 scored by female respondents for ecological services, while the lowest was 5.6 scored by male respondents for social benefits.

Analysis of the combined results for all three groups of respondents revealed that soil protection was ranked as the most important indirect use benefit in KwaNompondo, with an average value of 9. All the other services were valued at average value of 8 each.

Table 6-15: KwaMduku results from the PRA activities

	Indirect use benefit	Males	Females	Children	Average	Rank
Ecological services	Air purification	8	7	8	8	1
	Climate regulation	6	8	9	8	1
	Soil protection	8	9	8	8	1
	Nutrient cycling	7	9	7	8	1
	Watershed protection	8	7	6	7	2
	Average	7.4	8	7.6		
Social benefits	Landscape aesthetics	6	7	8	7	2
	Cultural practices	6	7	5	6	3
	Clean, fresh air	6	6	6	6	3
	Lightning deterrent	7	8	6	7	2
	Privacy	6	8	8	7	2
	Recreation	7	7	8	7	2
	Shade	7	9	7	8	1
	Windbreaks	7	7	6	7	2
Average	6.5	7.4	6.8			

In KwaMduku indicate the female group once again scored the highest average value (8) for ecological services, followed by children with an average value of 7.6, and lastly the male group (7.4). For social benefits women scored an average value of 7.4, with children scoring 6.8 and the male group 6.5. These results are generally comparable with those obtained in KwaNompondo, in both the ecological services and the social benefits.

Analysis of the aggregated results for ecological services from all three groups of respondents indicated that watershed protection was ranked as the second most important (with an average of 7), while soil protection and nutrient cycling were ranked as the most important (with an average of 8). For the social benefits, shade obtained an average of 8, followed by all except cultural practices and fresh air, which averaged 6.

Table 6-16: Machibini results from PRA activities

	Indirect use benefit	Males	Females	Children	Average	Rank
Ecological services	Air purification	6.0	7.0	8.0	7.0	2
	Climate regulation	6.0	7	7.0	7.0	2
	Soil protection	7.0	8.0	8.0	8.0	1
	Nutrient cycling	6.0	8.0	9.0	8.0	1
	Watershed protection	9.0	7.0	6.0	7.0	2
	Average	6.8	7.4	7.6		
Social benefits	Landscape aesthetics	6.0	6.0	7.0	6.0	2
	Cultural practices	7.0	8.0	4.0	6.0	2
	Clean, fresh air	5.0	6.0	5.0	5.0	3
	Lightning deterrent	8.0	6.0	5.0	6.0	2
	Privacy	5.0	6.0	7.0	6.0	2
	Recreation	5.0	7.0	8.0	7.0	1
	Shade	6.0	8.0	8.0	7.0	1
	Windbreaks	6.0	7.0	7.0	7.0	1
Average	6.0	6.8	6.4			

The results from Machibini showed a similar trend to the other two villages, with the ecological services scoring a higher average than the social benefits. An average value of 7.6 was obtained for the children's group, followed closely by the female group with 7.4, and lastly the male group scoring an average value of 6.8 for ecological benefits. Soil protection and watershed protection were ranked the most important, with average values of 8 each. The rest of the ecological functions of woodlands were ranked the second, averaging 7 each. For social services, the female group scored 6.8 average value, and was followed by the children's group with 6.4 and the male group last with an average of 6.0. The highest value for social benefits was 7, obtained for recreation, shade and windbreaks. The lowest average score was fresh air with an average value of 5.

6.4 Summary of findings

The range of indirect use benefits of woodlands identified through this study is in line with the findings of Netshiluvhi *et al.* (2000 and 2002), among others, who established a similar range of benefits in comparable rural villages in South Africa. What seemed to influence the community's perceptions of indirect-use benefits associated with woodlands? While there may be numerous factors that influence perception of value, a few factors were enumerated with the aim of testing their applicability in this case study. These factors included intrinsic factors such as age, gender, educational level, occupation, household wealth status; and extrinsic factors such as the proximity of the study area to an urban area, the level of development in the area, and access to and availability of livelihood assets. The intrinsic factors were investigated through PRA techniques.

Table 6-17: Average ecological and social values per group per village

Indirect Use Benefits		KwaNompondo		KwaMduku		Machibini		Average	
		Adult	Children	Adult	Children	Adult	Children	Adult	Children
Social services	Aesthetics	6.0	6.0	6.5	8.0	6.0	7.0	6.2	7.0
	Cultural practices	6.0	5.0	6.5	5.0	7.5	4.0	6.7	4.7
	Shade	7.5	9.0	8.0	7.0	7.0	8.0	7.5	8.0
	Privacy	6.0	9.0	7.0	8.0	5.5	7.0	6.2	8.0
	Windbreaks	7.5	7.0	7.0	6.0	6.5	7.0	7.0	6.7
	Lightning prevention	6.5	5.0	7.5	6.0	7.0	5.0	7.0	5.3
	Cool / fresh air	7.0	7.0	6.0	6.0	5.5	5.0	6.2	6.0
	Recreation	6.0	9.0	7.0	8.0	6.0	8.0	6.3	8.3
	Windbreaks	7.5	7.0	7.0	6.0	6.5	7.0	7.0	6.7
	Average	7.5	8.0	7.8	7.5	7.2	7.3		
Ecological services	Air purification	7.5	9.0	7.5	8.0	6.5	8.0	7.2	8.3
	Climate regulation	8.5	7.0	7.0	9.0	6.5	7.0	7.3	7.7
	Soil protection	9.5	7.0	8.5	8.0	7.5	8.0	8.5	7.7
	Nutrient cycling	8.0	7.0	8.0	7.0	7.0	9.0	7.7	7.7
	Water cycle	9.0	7.0	7.5	6.0	8.0	6.0	8.2	6.3
	Average	8.5	7.4	7.7	7.6	7.1	7.6		

The findings obtained indicate that on average adult respondents value both ecological and social services slightly higher than the child respondents (Table 6-18). From these results it can be concluded that age was not a major factor in valuation of indirect-use benefits in this study.

Table 6-18: Ecological and social values according to gender

Indirect-Use Benefits		Males	Females
Social Benefits	Aesthetics	6.0	6.3
	Cultural practices	6.3	7.0
	Cool / fresh air	6.0	6.3
	Shade	6.0	9.0
	Privacy	5.0	7.3
	Recreation	6.0	7.3
	Windbreaks	7.7	7.7
	Lightning prevention	7.3	6.7
	Average	6.3	7.2
Ecological Services	Air purification (dust sink)	7.0	7.3
	Climate regulation	6.7	8.0
	Soil protection	8.3	8.7
	Nutrient cycling	6.7	8.7
	Water cycle	9.0	7.3
	Average	7.5	8.0

In terms of gender, only the results of the adult males and females were analyzed (the children’s groups consisted of both male and female respondents). Table 6-19 reveals more pronounced differences between male and female respondents. It appears that female respondents value ecological benefits more than their male counterparts. A closer analysis of the individual ecological benefits reveals that female respondents regarded all the benefits to be of more value to them except for ‘water cycle’. It would be interesting to assess these values against the respondents’ occupations and the livelihood strategies each of their households pursue. From these results it would appear like the livelihood strategies that female respondents pursue depend on environmental factors such as good climate, rich and fertile soils, etc. This, however, would require more in-depth analysis of the results.

In determining whether extrinsic factors influenced the respondents' perceptions of value, the following factors were analyzed and are presented in Table 6-20:

- Proximity of the village to an urban area;
- Access to and availability of livelihood capital assets; and
- Level of 'development' in each village

Table 6-19: Ecological and social values obtained per village

		KwaNompondo	KwaMduku	Machibini	Mean
Social services	Aesthetics	6.0	7.0	6.3	6.4
	Cultural practices	5.7	6.0	6.3	6.0
	Cool / fresh air	7.0	6.0	5.3	6.1
	Lightning prevention	6.0	7.0	6.3	6.4
	Privacy	7.0	7.3	6.0	6.8
	Recreation	7.0	7.3	6.7	7.0
	Shade	8.0	7.7	7.3	7.7
	Windbreaks	7.3	6.7	6.7	6.9
	Average	6.8	6.9	7.3	
Ecological services	Air purification	8.0	7.7	7.0	7.6
	Climate regulation	8.0	7.7	6.7	7.5
	Soil protection	8.7	8.3	7.7	8.2
	Nutrient cycling	8.7	7.7	7.7	8.0
	Water cycle	8.3	7.0	7.3	7.5
	Average	8.3	7.7	7.3	

On average, social services obtained lower values compared to ecological services in the three villages. Shade was the social service with the highest value, followed by recreation. The importance given to shade as a function is once again consistent with observations during data collection. Most of the PRA activities were held under trees with large spreading canopies in all three villages. It was apparent that trees were the preferred meeting place because of (a) the provision of shade, and (b) the lack of air conditioning in alternative venues would have made meetings very uncomfortable and stifling.

The social benefit given the lowest value was cultural activities, with the lowest value being obtained in KwaNompondo. Incidentally, KwaNompondo is the closest to an urban centre (Hluhluwe town), and in terms of infrastructure, was the second most developed villages after Machibini.

According to the Table 6-20, KwaNompondo on average had the highest ecological value, followed by Machibini. KwaMduku had the lowest values. Analysis of individual benefits revealed that ecological benefits with the highest value included soil and watershed protection, nutrient cycling. During data collection it was noted that there were extensive plots for subsistence cultivation in all three villages. This would imply that crop production is one of the main livelihood strategies in the study area, which corresponds with Magasela (2001) and Zungu's (2003) work in the area.

The respondents in this research displayed vast knowledge about the indirect use benefits of woodlands, and went on to enumerate specific trees associated with some of these benefits. These are presented in Table 6-21:

Table 6-20: Examples of common plant species with indirect-use benefits

Zulu name	Scientific Name	Lightning prevention	Watershed protection	Cultural Practices	Provide Shade	Water availability
Ukhahla		x	x	√	√	√
Umkhiwa	<i>Ficus sp</i>	x	√	√	√	√
Umnyezane		x	x	x	√	√
Umviyo	<i>Vangueria infausta</i>	√	x	x	√	x
Umvongothi	<i>Kigelia africana</i>	√	√	x	√	x

Table 6-20 reveals some of the plant species associated with the indirect benefits that respondents were aware of. From this table it is evident that the *Ficus species* is known to have the most indirect benefits, compared to the other species. *Ficus sp.* is commonly used as an indicator species for water and is believed to increase water availability in an area. It is also commonly used for shade, particularly when located around the homestead or in the middle of cultivated fields, where people rest under the tree. This tree is also said to keep soil moist which aids the crop growing process. Rotten dead leaves provide nourishment for the growing crops.

6.5 Chapter conclusions

Chapter 6 presented the findings of the research carried out in the three villages. From the results presented it is evident that the people of the three villages are knowledgeable about the indirect use benefits associated with woodlands in their villages. The results also indicate that these people value ecological functions higher than the social benefits. The respondents acknowledged that ecological benefits are vital for life, whereas the social services are secondary.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter presents an overview of the study and conclusions that can be drawn from it. The first section is the overview, which reiterates the aim and objectives of the study, and how these were achieved. The methodology that was applied in undertaking the research is described together with its limitations. A summary of the findings is presented against the study objectives to illustrate whether the study objectives were achieved. Lastly, the conclusions that were arrived at from the study are presented, and recommendations for future work outlined.

7.2 Overview of the study

The aim of this research was to investigate monetary and non-monetary values attached to indirect use benefits of woodlands, using CVM and PRA methodologies. A range of non-market ecological services and social benefits were identified by the research respondents, and an attempt was made to assign monetary values to these benefits. However, due to limitations encountered in the use of the CVM methodology during the pilot study, monetary values were not assessed in the main study. Only the non-monetary services were evaluated in detail.

With the involvement of groups consisting of young and old males and females, the indirect use benefits associated with woodland resources were initially identified and listed, and then detailed discussions ensued to determine their value. These benefits were then ranked against each other to determine their relative importance.

The study revealed two categories of indirect use benefits that are important to the three villages. Ecological functions enumerated included purification of air, provision of water, soil protection, climate and air temperature regulation, and nutrient cycling. Social benefits associated with the indirect use of woodland resources included provision of shade, windbreaks, and sites for cultural and traditional practices.

The results of the scoring and ranking of these benefits indicate that ecological benefits were ranked higher than the social benefits. The mean score for the ecological services obtained from the three villages was 77%, whereas the social benefits received a score of 67%. The results obtained varied according to age and gender of the respondents, with the children's groups valuing the social benefits higher than the ecological services, whereas the adult males and females valued the ecological services higher than social benefits.

7.3 Conclusions

Sustainable use and management of woodland resources is vital for sustainable livelihoods for many rural communities. Access to this natural capital provides a crucial contribution to their livelihoods, as well as a buffer against poverty through providing an opportunity for income generation. Hanley *et al.* (undated) argue that because of the vital role played by the natural environment in the livelihoods and socio-economic development of many developing countries, there is a major need to communicate the value of environmental resources into the decision-making process. This study aspired to reveal a deeper understanding of the importance of woodland resources to households in three rural areas by establishing the value of indirect use benefits obtained from woodlands. It was hoped that the knowledge generated would contribute to the increasing body of knowledge on how resource users value the environmental resources they use, specifically in the context of communal resources in rural villages. Once all relevant stakeholders such as the resource users, policy-makers and decision-makers are aware of the significance and worth of these resources to rural households, it is hoped that they can begin to

aggressively promote good management practices that will result in sustainable utilization of these resources.

The main conclusion that can be drawn from the findings of this study is that rural households perceive the indirect use benefits they obtain from woodland resources to be of significant value to their livelihoods. A majority of them are knowledgeable about the benefits and concurred that they rely on them for their livelihoods. Some of these benefits are more valued than others, but they all collectively contribute to the total livelihood of rural households. A major part of the value of woodland resources is recognized through the services it provides.

Factors that were observed to affect value include gender of respondents and the location of their villages. The female groups that participated in the PRA generally assigned higher values to both ecological services and social benefits, than their male counterparts. This observation was made in all three villages. In addition, the values obtained from all respondents in the three villages ranged, with KwaMduku residents placing a higher value to social benefits, followed by KwaNompondo, and Machibini with the least. For the ecological services, KwaNompondo residents placed the highest value, followed by KwaMduku, and Machibini once again with the least value.

Observations and literature indicated that Machibini village was (a) the most developed in terms of social infrastructure (b) the closest to an urban area and (c) had the most disturbed woodland area and the least woodland resources. Comparatively, KwaMduku was (a) the least developed and (b) had the most pristine woodlands, compared to the other two villages. These results could be an indication that the respondents from Machibini are not aware of the contribution that woodland resources make to their livelihoods. As a result they may have neglected proper management, which could be one of the factors that have led to their degradation. Alternatively, the reason for this undervaluation of woodland resources could be because the resources are already degraded, and people do not depend as much on them for their livelihoods. It is difficult to determine the correctness of the two statements with the findings of this study. A more detailed

study on the patterns of woodland resource use and the trends in woodlands availability over the years would be required to establish when the woodlands were degraded, and what caused their degradation.

Social functions were generally valued as less important than ecological functions. The fact that ecological functions were valued higher is in line with the belief that the main source of livelihoods for these people is subsistence agriculture, which depends to a large extent on the integrity of the whole ecosystem. It can thus be concluded that the rural dwellers are aware of the impact that degraded natural capital has on their livelihoods. Although more and more people are moving towards non-resource based livelihoods, agriculture provides a cushioning effect in case the other livelihood strategies fail.

The purpose of this study was to make a contribution to the body of knowledge on indirect use values of woodland resources in rural areas. This study offered a slightly different angle to studies done by Netshiluvhi *et al.* (2000); Fox (2002); Netshiluvhi *et al.* (2002); Watson and Madonsela (2002), by attempting to ascertain monetary and non-monetary values. Regrettably, during the pilot study it became apparent that the monetary values obtained using the CVM would not add any value or meaningful information, hence the decision to pursue the investigation of non-monetary values only. Therefore the objective of monetary valuation could not be met.

The main factor that limited the monetary valuation was the methodology due to its inappropriateness in this context (rural village in a developing world with prevalent semi-literacy). As literature indicates, the CVM was developed in the Western world where the economy is money based, and every one, regardless of location (urban or rural) participates in that economy. The issue of establishing WTP proved to be unattainable in this study area.

The second limiting factor to monetary valuation was the socio-economic status of the people of the study area. From documents such as the Municipal IDPs and through the interviews conducted, it was evident that many of the people in rural areas are functionally illiterate (DAEA, 2002a; 2002b). The majority of educated people reside in

urban areas where they are employed, thus those remaining behind are other mostly unemployed and are often either semi-literate or illiterate. The CVM requires that the respondent be in a position to state their WTP in monetary terms. It proved almost impossible to obtain WTP estimates from most of the respondents. The majority of the female respondents were unemployed and did not have an income. In addition, due to the traditional culture which suppresses disclosure of such aspects to their partners, their husbands / partners never reveal nor discuss financial matters with them. As a result they did not have a clue of their monthly household income. The adult male respondents could not state their WTP because they were being interviewed by young researchers, and found the question somewhat inappropriate.

7.4 Recommendations

This study used a combination of quantitative and qualitative methods in an effort to establish the value of indirect use benefits of woodland resources. The specific methods used were the CVM for monetary valuation and PRA for non-monetary valuation. However, from the pilot study it became evident that the CVM was highly inappropriate for this context, and the values obtained could not be validated. As a result the study failed to establish monetary values of indirect use benefits of woodland resources. The researcher believes that this was because of the inappropriateness of the methodology available to estimate monetary values of non-market indirect use benefits. A more suitable methodology is required for monetary valuation in developing countries.

There is still a gap in understanding the contribution that woodland resources make to the livelihoods of rural households. To ensure sustainability of the woodland resource in rural areas, there is a need to understand fully the contribution that these resources make to the livelihoods of rural households, as well as the dynamics that affect this. Substantial research has been undertaken in this regard, and effort has been put in developing methods and techniques to try and investigate how livelihoods benefit from these resources. Unfortunately most of this work has been directed towards one aspect of the value associated with woodland resources, and that is direct use values. Less effort has

been invested in understanding how indirect use and non-use of woodland resources contribute to local people's livelihoods. Moreover, much less effort has been invested in developing techniques that are suitable for the context of the developing world. DWAF has initiated research into this sphere, but there is room for more interest and investment in this research.

Other aspects that need to be understood are the implications of time in valuation exercises. It is accepted that people's attitudes and behaviours adapt to the ever-changing world. The values that one might obtain in 2004 might be completely different ten years later, even if the research is repeated to the same respondents. There needs to be a clearer understanding of what influences the decision-making process of the resource users, and how the values obtained change in response to economic and policy changes.

Collaborative research between natural scientists, economists, and sociologists and socio-anthropologists would contribute to the assessment of the values of different resources. It is accepted that valuation of environmental resources can play a critical role in the management of environmental resources. Determining estimates of value for environmental resources can assist and enable decision-makers to make well-informed decisions and establish management plans that enhance the benefit to all affected parties, while reducing the negative impacts.

REFERENCES

1. Africa Centre (2000). *HIV/AIDS Statistics*. Online: <http://www.hivan.org.za/details> [Accessed: 13 January 2003]
2. Allison EH and Ellis F (2001). The Livelihoods Approach and Management of Small-Scale Fisheries. *Marine Policy* 25: 377-388
3. Ashley C, Mdoe N and Reynolds L (2002). *Rethinking Wildlife for Livelihoods and Diversification in Rural Tanzania: a Case Study from Northern Selous*. Ladder Working Paper No. 15. DRAFT <http://www.uea.ac.uk/dev/odg/ladder> [Accessed: 12 February 2003]
4. Ballance A (2000). *Option Values and Non-use Values: A Review of Methodologies Used, and Recommendations for Assessment of Woodland Resources in South Africa*. Report No. ENV/P/I 2000-017. CSIR Environmentek, Pretoria
5. Beder S (1997). The Environment Goes to Market. *Democracy and Nature* 3(3): 90-106
6. Boxall PC and Beckley T (2002). An Introduction to Approaches and Issues for Measuring Non-market Values in Developing Economies. In: BM Campbell and MJ Luckert (eds), *Uncovering the Hidden Harvest: Valuation Methods for Woodland and Forest Resources*. Earthscan Publications Ltd, London: 104-140
7. Brown K and Moran D (1993). *Valuing Biodiversity: The Scope and Limitations of Economic Analysis*. Centre for Social and Economic Research on the Global Environment (CSERGE). GEC Working Paper 93-09: 30pp
8. Campbell B (1987). The use of Wild Fruits in Zimbabwe. *Economic Botany* 41: 375-385
9. Campbell B (1993). *Monetary Valuation of Tree-based Resources in Zimbabwe: Experience and Outlook*. Paper prepared for the FAO Expert Consultation of Non-wood Forest Products (Anglophone Africa). University of Zimbabwe: 20pp <http://www.fao.org/docrep/x5325e/x5325e0c.htm> [Accessed: 23 June 2003]

10. Campbell BM, Luckert M and Scoones I (1997). Local-level Valuation of Savanna Resources: A case study from Zimbabwe. *Economic Botany* 51 (1): 60-70
11. Campbell BM and Luckert MK (2002). Towards Understanding the Role of Forests in Rural Livelihoods. In: BM Campbell and MJ Luckert (eds), *Uncovering the Hidden Harvest: Valuation Methods for Woodland and Forest Resources*. Earthscan Publications Ltd, London: 1-16
12. Carney D (1998). *Sustainable Rural Livelihoods: What Contributions Can We Make?* UK Department for International Development, London
13. Cawe SG and Mckenzie B (1989): The Afromontane Forests of Transkei, Southern Africa. 111 Structural Classification. *South Africa Journal of Botany*. 55: 40-44
14. Cavendish W (2002). Quantitative Methods for Estimating the Economic Value of Resource use to Rural Households. In: BM Campbell and MJ Luckert (eds), *Uncovering the Hidden Harvest: Valuation Methods for Woodland and Forest Resources*. Earthscan Publications Ltd, London: 17-65
15. Chambers R (1995). Poverty and Livelihoods: Whose Reality Counts? *Environment and Urbanization*. 7(1):173-204
16. Chambers R and Guijt I (1995). Participatory Rural Appraisal – Five Years Later. Where are we now? *Forests, Trees and People Newsletter* Issue 26/27 April 1995: 4-13
17. Chambers R (undated). *Introduction to Participatory Approaches and Methodologies*. <http://www.ids.ac.uk/ids/particip/introind.html> [Accessed: 12 February 2002]
18. Chambers R and Mayoux L (2003). Reversing the Paradigm: Quantification and Participatory Methods. In: *New Directions in Impact Assessment for Development: Methods and Practice*. Proceedings of the EDIAS Conference. Manchester, 24 – 25 November 2003. University of Manchester

19. Clarke J and Grundy I (2004). The Socio-economics of Forest and Woodland Resource Use: A Hidden Economy. In: Lawes MJ, Eeley HAC, Shackleton CM and Geach BGS (eds), *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*. University of KwaZulu-Natal Press, Pietermaritzburg: 167-193
20. CSIR (2000). *The Role of Non-Timber Forest Products in Rural Livelihoods*. Research Plan. Unpublished Manuscript: CSIR, Pretoria
21. Denzin NK and Lincoln YS (1994). (eds), *Handbook of Qualitative Research*. Sage Publications Inc.
22. Department of Agriculture and Land Affairs (1997). *White Paper on South Africa's Land Policy*. Government Printer, Pretoria
23. Department of Agriculture and Environmental Affairs (2002a). *Integrated Development Plan for The Big Five False Bay Municipality*
24. Department of Agriculture and Environmental Affairs (2002b). *Integrated Development Plan for the Hlabisa Local Municipality*
25. Department of Water Affairs and Forestry (1996). *White Paper on Sustainable Forest Development in South Africa*. DWAF, Pretoria
26. Department of Water Affairs and Forestry (1997). *National Forestry Action Programme*. DWAF, Pretoria
27. Department of Water Affairs and Forestry (1998a). *National Forests Act, Number 84 of 1998*. DWAF, Pretoria
28. Department of Water Affairs and Forestry (1998b). *National Veld and Forest Fire Act* DWAF, Pretoria
29. Department of Water Affairs and Forestry (2002). *The Working for Water Programme*. DWAF. [Online] Available: <http://www.dwaf.gov.za/wfw/> [Accessed: 15 October]
30. Dovie DBK and Witkowski ETF (1999). Reviewing Participatory Approaches in Data Collection for Studying Forest and Woodland Resource Utilization, Valuation and Livelihoods. In: *Towards Sustainable Management Based on Scientific Understanding of Natural Forests and Woodlands*. Proceedings of the

Natural Forests and Savanna Woodlands Symposium II, Knysna, 5-9 September 1999. Department of Water Affairs and Forestry: 219-224

31. Dovie DBK, Shackleton CM and Witkowski ETF (2001). *Valuing Non Timber Forest Products: Indicator for Interplay between Poverty, Livelihoods and the Environment*. Paper presented at the Open Meeting of the Global Environmental Change Research Community. Rio de Janeiro, October 6-8 2001
32. Dovie DBK, Witkowski ETF and Shackleton CM (2003). Direct-use value of Smallholder Crop Production in a Semi-arid Rural South African Village. *Agricultural Systems* 76: 337-357
33. EEP (2003). *Valuing Forests: A Review of Methods and Application in Developing Countries*. International Institute for Environment and Development, London: 135pp
34. Ellis F (1999). Rural Livelihood Diversity in Developing Countries: Evidence and Policy Implications. Natural Resource Perspectives No. 40. Overseas Development Institute: 9pp
35. Ellis F and Bahigwa G (2003). Livelihoods and Rural Poverty Reduction in Uganda. *World Development* 31(6): 997-1013
36. Emerton L (1996). *Valuing the Environment: Case Studies from Kenya*. African Wildlife Foundation, Nairobi, Kenya
37. Evans J, Shackleton SE and von Maltitz G (1999). Managing Woodlands under Communal Tenure: Institutional Issues. In: *Towards Sustainable Management Based on Scientific Understanding of Natural Forests and Woodlands*. Proceedings of the Natural Forests and Savanna Woodlands Symposium II, Knysna, 5-9 September 1999. Department of Water Affairs and Forestry: 216
38. Farber SC, Constanza R and Wilson MA (2002). Economic and Ecological Concepts for Valuing Ecosystem Services. *Ecological Economics* 41(3): 375-392

39. Fox HE (2002). *A Comparative Cultural Valuation of Three Rural Landscapes in the Eastern Cape*. In: *The Role of Non-Timber Forest Products in Rural Livelihoods: Interim Report No. 8*. Report No. ENV-P-C 2002-019. CSIR Environmentek, Pretoria: 44pp
40. Gilpin A (2000). *Environmental Economics – A critical Overview*. John Wiley and Sons Ltd. West Sussex, England
41. Gram S (2001). Economic Valuation of Special Forest Products: An Assessment of Methodological Shortcomings. *Ecological Economics* 36: 109–117
42. Grossman D and Gandar M (1994). *The Management of Natural Woodland for Fuelwood and Other Resources*. Energy and Development Research Centre, University of Cape Town
43. GWAAI Working Group (1997). *Local Level Valuation of Village Woodlands and State Forests: Cases from Matebeleland Southern Zimbabwe*. Institute of Environmental Studies Working Paper. University of Zimbabwe, Harare
44. Hanley N, MacMillan D and Wright RE (undated). *Economic Valuation Methods and the Design of Nature Conservation Policy: A Case Study of Wild Geese Conservation in Scotland*. www.ccs.st-and.ac.uk/valuationPaper2.doc [Accessed: 4 June 2003]: 22pp
45. Hassan R and Haveman J (1997). *The Values and Rates of Harvesting Natural Forest and Woodland Products for Direct Use by Communities in the Eastern Cape Province*. Unpublished. Draft Report. Development Bank of South Africa.
46. High C and Shackleton CM (2000). The Comparative Value of Wild and Domestic Plants in Home Gardens of a South African Rural Village. *Agroforestry Systems* 48: 141–156. Kluwer Academic Publishers. Netherlands
47. Howarth RB and Faber S (2002). Accounting for the Value of Ecosystem Services. *Ecological Economics* 41(3): 421-429
48. Infield MM (1986). *The Viability of Establishing Industries in KwaZulu Based on Wildlife Products from the Central Complex*. Final Report to the KwaZulu Bureau of Natural Resources. Institute of Natural Resources, Pietermaritzburg

49. International Union for the Conservation of Nature (IUCN) (2002). *Human and Social Perspectives in Natural Resource Management*. An IUCN - ROSA Regional Training Course Handbook. Series No. 4
50. Kaiser B and Roumasset J (2002). Accounting for the Value of Ecosystem Services. *Environment and Development Economics* 7: 701-714
51. Khanya-mrc (1999). *Rural Planning for Sustainable Livelihoods in South Africa*. Report prepared for the International Institute for Environment and Development. Khanya-managing rural change: 62pp
52. Lange GM, Hassan R and Hamilton K (2003). *Environmental Accounting in Action: Case Studies from Southern Africa*. Edward Elgar Publishing Inc. Cheltenham, UK
53. Leedy P (1997). *Practical Research – Planning and Design*. Prentice – Hall Inc., New Jersey, USA
54. Low AB and Rebelo AG (1996). *Vegetation of South Africa, Lesotho and Swaziland*. Dept. Environmental Affairs and Tourism, Pretoria
55. Magasela BB (2001). *An Assessment of the Direct Use Value of Woodland Resources in the Hlabisa District of KwaZulu-Natal*. Unpublished Master of Arts Dissertation, University of Durban-Westville: 161pp
56. Mkwanzazi H (2002). Personal Communication: Councillor of Ward 7, KwaNompondo. Interviewed: 10 October 2003
57. Nemarundwe N and Richards M (2002). Participatory Methods for Exploring Livelihood Values Derived from Forests: Potential and Limitations. In: BM Campbell and MJ Luckert (eds), *Uncovering the Hidden Harvest: Valuation Methods for Woodland and Forest Resources*. Earthscan Publications Ltd, London: 168–197
58. Netshiluvhi TR, Scholes, RJ and Crookes D (2000). *Direct and Indirect Use Values of Natural Resources: An Assessment of Biodiversity and Ecosystem Services*. CSIR, Pretoria
59. Netshiluvhi TR, Moshe D, Twine WC and Siphugu MV (2002). Valuation of the Indirect use Services of Woodlands: Case Study of Ga-Mametja Rural Villages, Limpopo Province, South Africa. In: *The Role of Non-Timber Forest*

Products in Rural Livelihoods: Interim Report No. 8. Report No. ENV-P-C 2002-019. CSIR Environmentek, Pretoria: 21pp

60. Nunes PAL and van den Bergh JCJM (2001). Economic Valuation of Biodiversity: Sense or Nonsense? *Ecological Economics* 39: 203–222
61. Obiri JF and Lawes MJ (2002). Challenges Facing New Forest Policies in South Africa: Attitudes of Forest Users Towards Management of the Coastal Forests of the Eastern Cape Province. In: *Multiple Use Management of Natural Forests and Woodlands: Policy Refinements and Scientific Progress*. Proceedings of the Natural Forests and Savanna Woodlands Symposium III, Kruger National Park, 6–9 May 2002. Department of Water Affairs and Forestry: 397-411
62. Pearce D and Pearce C (2001). *The Value of Forest Ecosystems*. A Report to the Secretariat Convention on Biological Diversity. University College, London: 65pp
63. Scoones I, Mary M and Jules P (eds) (1992). *The Hidden Harvest -- Wild Foods and Agricultural Systems. A Literature Review and Annotated Bibliography*. IIED, London
64. Scoones I (1998). *Sustainable Rural Livelihoods: A Framework for Analysis*. Institute of Development Studies Working Paper 72. University of Sussex, UK: 20 pp
65. Scott D and Zaloumis A (2004). The Ecotrack: Co-operative Governance in the Buffer Zone of the Greater St. Lucia Wetland Park. In: *Southern African Environments – Growth or Bust?* Proceedings of the IAIIAsa Conference. Champagne Sports Resort, Drakensberg, 17 – 20 October 2004: 116-127
66. Sekhwela MBM (1990). *Environmental and Natural Resources in Botswana – Major Environmental Problems*. The National Institute of Development Research and Documentation, Gaborone, Botswana
67. Shackleton CM (1993). Fuelwood Harvesting and Sustainable Utilization in a Communal Grazing Land and Protected Area of the Eastern Transvaal Lowveld. *Biological Conservation* 63: 247-254
68. Shackleton CM (2000). Woodlands in South Africa and the National Forest Act. *South African Forestry Journal* 187: 19-28

69. Shackleton CM and Shackleton SE (1997). *The Use and Potential for Commercialisation of Veld Products in the Bushbuckridge Area. DANCED Community Forestry Project*. Unpublished Report. DWAF, Nelspruit
70. Shackleton CM and Shackleton SE (2000). *Direct Use Value of Secondary Resources Harvested From Communal Savannas in the Bushbuckridge Lowveld, South Africa*. CSIR, Pretoria
71. Shackleton SE, Shackleton CM and Cousins B. (2000a). *Re-valuing the Communal Lands of Southern Africa: New Understanding of Rural Livelihoods*. ODI Natural Resource Perspectives (NRP) Programme for Land and Agrarian Studies. No. 62: 1-4
72. Shackleton SE, Shackleton CM and Cousins B (2000b). The Economic Value of Land and Natural Resources to Rural Livelihoods: Case studies from South Africa. In: *At the Crossroads, Land and Agroplan Reform in South Africa into the 21st century* (ed: Ben Cousins). Cape Town/Johannesburg: Programme for Land and Agrarian Studies (PLAAS), National Land Committee/University of the Western Cape: 35–67
73. Shackleton S, Shackleton CM, Netshiluvhi T (1999): How Valuable are Our Woodlands for Sustainable Rural Livelihood? Local Level Valuation of Woodland Resources From Three Villages in South Africa. In: *Towards Sustainable Management Based on Scientific Understanding of Natural Forests and Woodlands*. Proceedings of the Natural Forests and Savanna Woodlands Symposium II, Knysna, 5-9 September 1999. Department of Water Affairs and Forestry: 305-321
74. Statistics South Africa (2002). *Statistics in Brief 2002*. Statistics South Africa, Pretoria: 103pp
75. Sunday Times (2003). Business Times www.btimes.co.za. [Accessed: 25 May 2004]
76. Trollope WSW (1999). Effects and Use of Fire in Southern African Savannas. In: *Towards Sustainable Management Based on Scientific Understanding of Natural Forests and Woodlands*. Proceedings of the Natural Forests and Savanna Woodlands Symposium II, Knysna, 5-9 September 1999. Department of Water Affairs and Forestry: 149-163

77. Turner RK (1993). *Sustainable Environmental Economics and Management – Principles and Practice*. John Wiley and Sons Ltd, England
78. Turner RK, Pearce D and Bateman I (1994). *Environmental Economics: An Elementary Introduction*. Harvester Wheatsheaf, Hertfordshire, UK
79. Twine W (2004). Socio-economic Threats to Woodland Resources on Communal Lands. In: Lawes MJ, Eeley HAC, Shackleton CM and Geach BGS (eds). *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*. University of KwaZulu-Natal Press, Pietermaritzburg: 664-671
80. Twine W and Siphugu V (2002). Rural-urban Linkages and the Role of Non-local Demand for Unprocessed Woodland Resources in Ten Villages across the South African Savanna Biome. In: *The Role of Non-Timber Forest Products in Rural Livelihoods: Interim Report No. 8*. Report No. ENV-P-C 2002-019. CSIR Environmentek, Pretoria: 29pp
81. Von Maltitz G and Flemming G (1999). Status of Conservation of Indigenous Forests in South Africa. In: *Towards Sustainable Management Based on Scientific Understanding of Natural Forests and Woodlands*. Proceedings of the Natural Forests and Savanna Woodlands Symposium II, Knysna, 5-9 September 1999. Department of Water Affairs and Forestry: 93-99
82. Von Maltitz G and Grundy I (2000). Non-timber Forest Products from the Forest Estate. *South African Forestry Handbook*. Vol. 2 South African Institute of Forestry, South Africa: 491-496
83. Von Maltitz G and Shackleton SE (2004). Use and Management of Forests and Woodlands in South Africa. In: Lawes MJ, Eeley HAC, Shackleton CM and Geach BGS (eds). *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*. University of KwaZulu-Natal Press, Pietermaritzburg: 109-112
84. Ward D (2002). Do we Understand the Causes of Bush Encroachment in African Savannas? In: *Multiple Use Management of Natural Forests and Woodlands: Policy Refinements and Scientific Progress*. Proceedings of the Natural Forests and Savanna Woodlands Symposium III, Kruger National Park, 6–9 May 2002. Department of Water Affairs and Forestry: 189-202

85. Warner K (2000). Forestry and Sustainable Livelihoods. *Unsylva* 51(202): 3-12
86. Watson HK (1991). *A Comparative Study of Soil Erosion in the Umfolozi Game Reserve and the Adjacent KwaZulu Area from 1937 to 1983*. Unpublished PhD. Thesis, University of Durban Westville, Durban
87. Watson HK (1996). Short and Long Term Influences on Soil Erosion of Settlement by Peasant Farmers in KwaZulu-Natal. *South African Geographical Journal* 78 (1): 1-6
88. Watson HK (2002). The Sustainability of Southern Africa's Savanna Resources. In: Baijnath H and Singh Y (eds). *Rebirth of Science in Africa: A Shared Vision for Life and Environmental Sciences*. UMDAS Press, Pretoria: 160-174.
89. Watson HK and Madonsela NV (2002). Valuation of Indirect Use and Non-use Benefits of Woodland Resources in the Hlabisa District of KwaZulu-Natal. In: *The Role of Non-Timber Forest Products in Rural Livelihoods: Interim Report No. 8*. Report No. ENV-P-C 2002-019. CSIR Environmentek, Pretoria: 45pp
90. Watson HK and Schoultz (2002). Assessment of the Link Between Household Poverty and Woodland Resources. In: *The Role of Non-Timber Forest Products in Rural Livelihoods: Interim Report No. 8*. Report No. ENV-P-C 2002-019. CSIR Environmentek, Pretoria: 12pp
91. Watson HK, Magasela BB and Madonsela NV (2002). Does Increasing Reliance on Diminishing Woodlands in KwaZulu-Natal's Hlabisa District Pose a Threat to Hluhluwe-Umfolozi Park? In: *Multiple Use Management of Natural Forests and Woodlands: Policy Refinements and Scientific Progress*. Proceedings of the Natural Forests and Savanna Woodlands Symposium III, Kruger National Park, 6–9 May 2002. Department of Water Affairs and Forestry: 359-366
92. Weber GE and Jeltsch F (2000). Long Term Impacts of Livestock Herbivory on Herbaceous and Woody Vegetation in Semi-Arid Savannas. *Basic Applied Ecology* 1: 13–23
93. Willis CB (2004). Policy Frameworks Pertaining to the Conservation and Sustainable Use of Forests and Woodlands in South Africa. In: Lawes MJ, Eeley HAC,

Shackleton CM and Geach BGS (eds). *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*. University of KwaZulu-Natal Press, Pietermaritzburg: 77–107

94. Willis CB, Geach B, Pillay V, Versfeld D and Shackleton CM (2000). *A Review of Current Policies and Legislation which may Impact on the Sustainability of Natural Woodlands*. CSIR Report ENV-P-12000-016. Division of Water, Environment and Forestry Technology, Pretoria: 34pp
95. Young MD and Solbrig OT (1992). *Savanna Management and Ecological Sustainability, Economic Profit and Social Equity*. MAB Digest 13. UNESCO Paris, France.
96. Zungu V (2003). *From Fortress Conservation to Community Conservation: An Assessment of Environmental Partnerships at the Hluhluwe-Umfolozi Park, KwaZulu-Natal*. Unpublished Master of Environmental Management Dissertation. University of Natal, Durban: 189pp

Appendix 1: Illustration of sketches drawn during mapping exercise

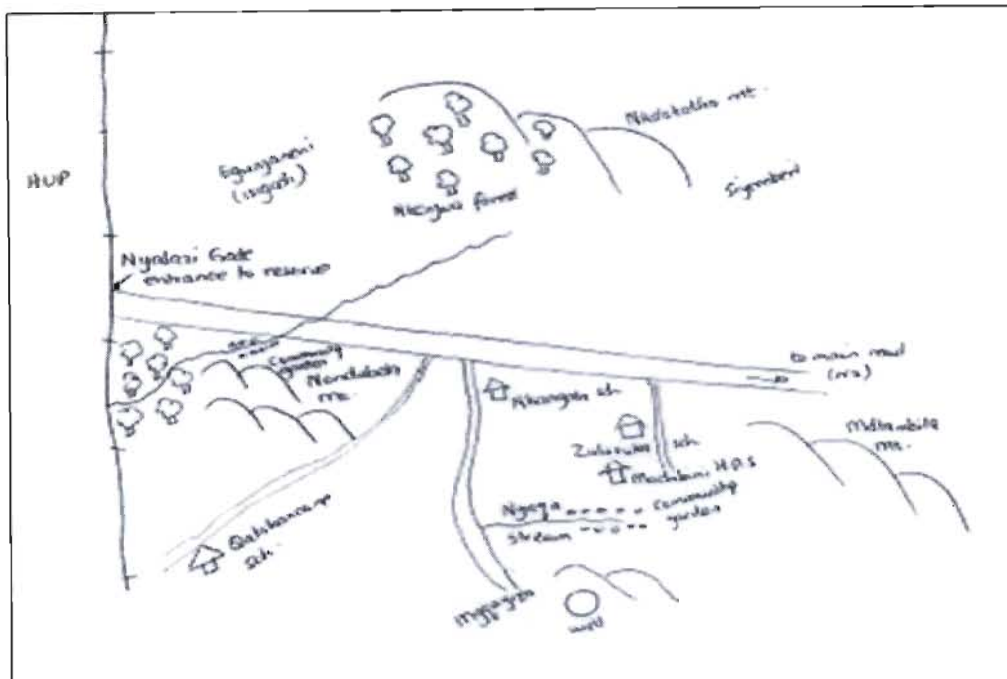


Figure 0-1: Map of Machibini village drawn by adult female group

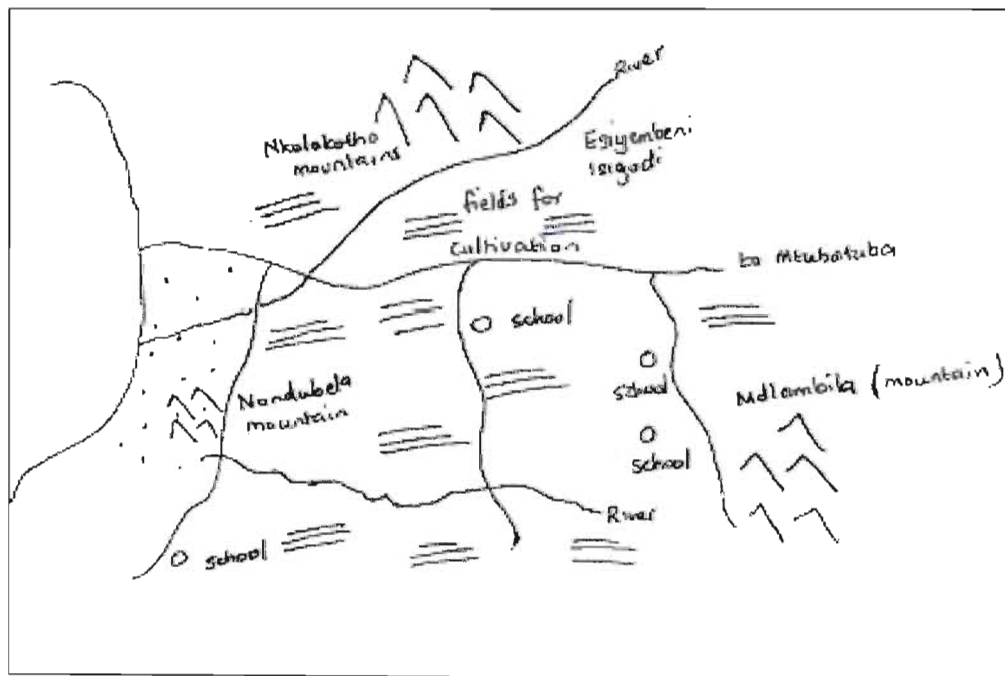


Figure 0-2: Map of Machibini village drawn by children's group

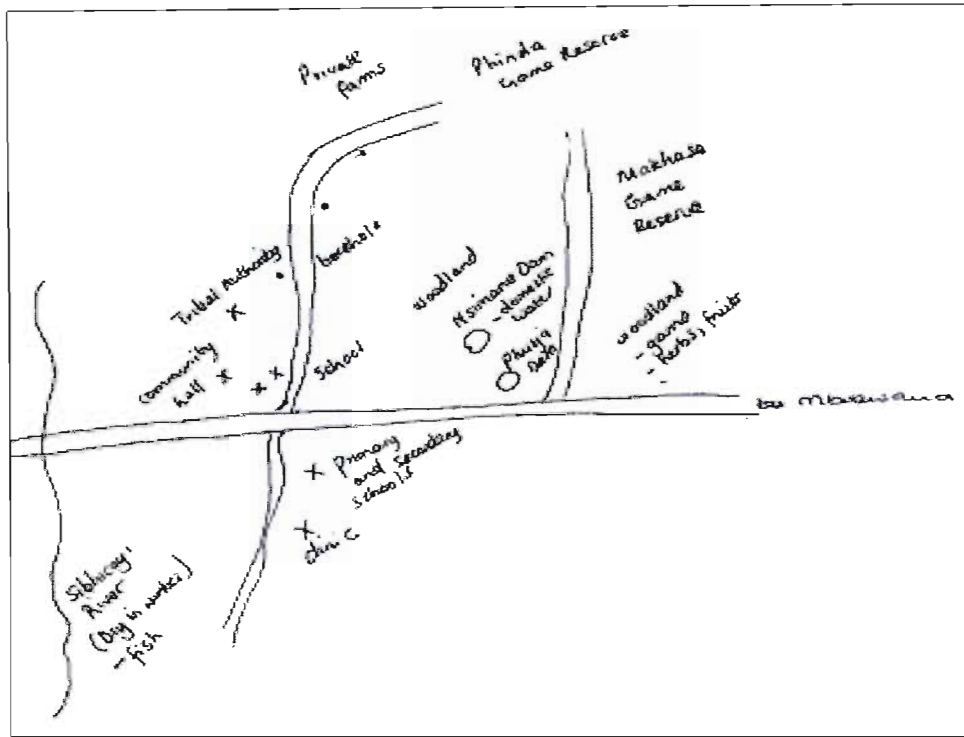


Figure 0-3: Map of KwaMduku village drawn by adult female group

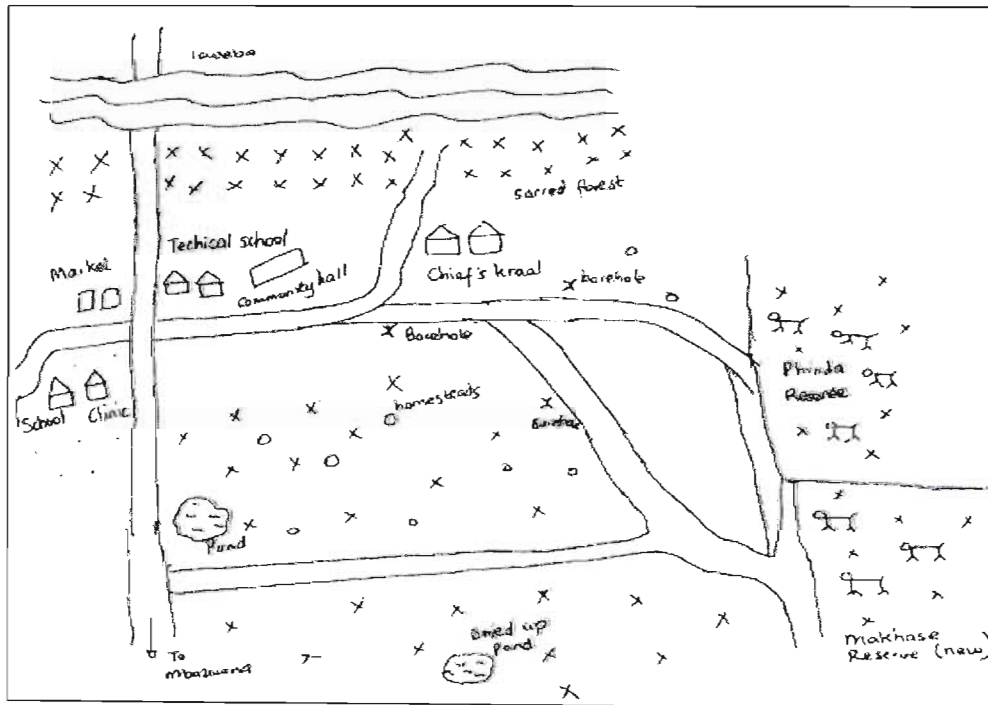


Figure 0-4: Map of KwaMduku village drawn by the children's group

Appendix 2: Wealth indicators used for household socio-economic profile

Feature	Range of possibilities	Comments
Main material of dwelling floor	Earth/sand	
	Dung	
	Wood	
	Finished floor	
	Vinyl	
	Ceramic tiles	
	Cement	
	Carpet	
No. of rooms in main house		
Main source of drinking water	Piped into dwelling	
	Piped into yard	
	Public tap	
	Borehole	
	Dug well	
	Spring	
	Rainwater collection	
	Pond, river or stream	
	Tanker-truck, vendor	
	Other (<i>specify</i>)	
Toilet facility used	Flush	
	Traditional pit latrine	
	Open pit	
	Bucket Toilet	
	No facilities, use bush / field	
Electricity	Within homestead	
	In Some of the houses	
	Not connected	

Feature	Range of possibilities	Comments
Appliances	Radio	
	Television	
	Refrigerator	
Transport System Used	Public transport	
	Bicycle	
	Motorcycle	
	Car	
	Other (<i>specify</i>)	
Main cooking fuel used	Firewood	
	Kerosene	
	Charcoal	
	Bottled gas	
	Dung	
	Electricity	
	Other (<i>specify</i>)	

Appendix 3: Questionnaire used for personal interviews

PERSONAL DETAILS & HOUSEHOLD DEMOGRAPHIC INFORMATION

1. Interviewee: Male [] Female []

2. Age of respondent: _____

3. What is your relationship to the head of the household?

a) I am the head of the household

b) Spouse

c) Brother / Sister

d) Son / Daughter

e) Grand-daughter / Grand-son

f) Parent

g) Other _____

4. What is your occupation?

a) Employed full-time / part-time

b) Self-employed (Give details _____)

c) Retired, on pension / not on pension

d) Unemployed, seeking work / not seeking work

e) Attending school / technical college / university

f) Other _____

5. How many people eat MOST of their meals in this household?

Men []

Women []

Children (under 18) []

6. How many people eat their meals OCCASSIONALLY in this household, and how often?

Frequency	No. of men	No. of women	No. of children
More than 4 days per week			
Most weekends			
Once every second weekend			
Once every month			
A few days every 2-4 months			

7. Please list the household occupants and fill in the table below.

Name	Occupation	Full-time/part-time/casual	Estimate of income	Pension (old age / disability)

8. Is there anything that any household member does to supplement the income in this household?

9. How long has this household lived in this village?

10. If less than 5 years, where did you move from and why did you move here?

11. What do you like about living in this area?
