

**FOREST RESOURCE USE AND MANAGEMENT IN TWO  
VILLAGES IN THE FORMER CISCHEI, SOUTH AFRICA**

**By**

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degree of Master of Science in Forestry Sciences**



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## DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and has not previously in its entirety or in part been submitted at any university for a degree.

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## ABSTRACT

Rural communities in South Africa are similar to communities in other areas of the developing world in terms of obtaining natural resources. A wide range of resources are harvested from the communal woodlands and processed for home consumption and sale. Until recently, there has been little recognition of the contribution these common pool resources make to the rural economy. In South Africa, only a few studies have attempted to estimate the monetary value of widely used non-timber woodland products.

Natural resources valuation techniques were used to estimate the values of the direct consumption of woodland resources by households in two rural villages: Woodlands, and Pirrie Mission, Eastern Cape, South Africa. The two villages are situated next to two different vegetation types. Woodlands is in valley bushveld while Pirrie Mission is next to high mountain forest. The approach involved a combination of household interviews, participatory group sessions, key informant interviews and natural vegetation assessment. Questions were designed in such a way that they established the types of resources used, the frequency of use, quantities used, their availability, the extent to which they are traded both locally and in more distant markets and forms of management preferred. Participatory Vegetation assessment was done in order to monitor the forest use in both vegetation areas over a period of a year.

Results indicated that in both study areas, all households were gathering or purchasing at least some woodland resources, with the most frequently used resources being fuelwood (48% in Woodlands and 51% in Pirrie Mission), branches (4% in Woodlands and 7% in Pirrie Mission), poles (21% in Woodlands and 20% in Pirrie Mission), fencing (15% in Woodlands and 16% in Pirrie Mission) and herbs for medicinal purposes (12% in Woodlands and 7% in Pirrie Mission). Fuel wood and branches contributed to the largest proportion of overall value in both villages. There was no difference in terms of resource use despite the differing tenure of the woody resources. The majority of people from both villages (41% in Woodlands and 29% in Pirrie Mission) believed that their woody resources could be used and managed sustainably if villagers and village management authorities could be involved in decision making on how to use them. Quantitative results of vegetation assessment revealed that the State Forest found at Pirrie Mission has a relatively high growth rate with mean values ranging between 0.01- 0.17 as compared to a communal woodland found in Woodlands village.

Sustainable utilisation is critical to the survival of the indigenous woody vegetation. Based on the findings of this study one can conclude that both the community woodland and State forest are over-harvested. This can be attributed to the fact that after the 1994 elections, the State forest became available to all as the Government withdrew the management strategies used before the 1994 Government elections in South Africa.

## OPSOMMING

Landelike gemeenskappe in Suid-Afrika is soortgelyk aan gemeenskappe in ander areas van die ontwikkelende wêreld in terme van die benutting van natuurlike hulpbronne. 'n Wye verskeidenheid van hulpbronne word verkry uit gemeenskaplike bosse en verwerk vir tuisgebruik en om te koop aan te bied. Tot onlangs was daar min erkenning vir die bydrae wat hierdie gemeenskaplike hulpbronne maak tot die landelike ekonomie. In Suid-Afrika is slegs 'n paar studies aangepak om die finansiële waarde van algemeen gebruikte nie-hout bosprodukte te beraam.

In hierdie studie is natuurlike hulpbronwaarderingstegnieke gebruik om 'n skatting te maak van die waarde van die direkte verbruik van bosprodukte by huishoudings in twee landelike gemeenskappe: Woodlands, en Pirrie Sendingstasie, Oos-Kaap, Suid-Afrika. Die twee gemeenskappe is geleë langs twee verskillende plantegroei tipes. Woodlands is in vallei bosveld terwyl Pirrie Sendingstasie by bergwoude is. Die studiebenadering het 'n kombinasie van huishoudingonderhoude, groepsdeelnamesessies, sleutelinformantonderhoude en natuurlike plantegroei ondersoek ingesluit. Die onderhoudvrae is sodanig ontwerp dat die tipes van hulpbronne gebruik, gebruiksfrekwensie, gebruikshoeveelhede, hulpbronbesikbaarheid, en die mate waartoe die produkte in plaaslike sowel as verder afgeleë markte te koop aangebied is, bepaal kon word. Die voorkeurvorme van hulpbronbestuur binne elke gemeenskap is ook ondersoek. Die plantegroei ondersoek is gedoen om die bosbenutting te monitor in beide plantegroeistreke oor 'n tydperk van een jaar.

Die resultate het aangedui dat alle huishoudings van die hulpbronne versamel of gekoop het. Die mees algemeen gebruikte van die hulpbronne was vir brandhout, (48% in Woodlands en 51% in Pirrie Sendingstasie), takke (4% in Woodlands en 7% in Pirrie Sendingstasie), pale (21% in Woodlands en 20% in Pirrie Sendingstasie), heinings (15% in Woodlands en 16% in Pirrie Sendingstasie), en kruie vir medisinale gebruik, (12% in Woodlands en 7% in Pirrie Sendingstasie). Brandhout en takke het die grootste bydrae gemaak tot die totale waarde van produkte in beide die gemeenskappe. Daar was geen verskil in terme van hulpbrongebruik as gevolg van verskille in eiendomsregte van die hulpbronne nie. Alhoewel die twee gemeenskappe onder verskillende eiendomsregstelsels funksioneer het, het die meeste van die inwoners van beide gemeenskappe (41% in Woodlands en 29% in Pirrie Sendingstasie) geglo dat die hulpbronne volhoubaar bestuur kan word as beide die inwoners en die gemeenskapsbestuur betrokke is by benuttingsbesluite. Kwantitatiewe resultate van plantegroei-bepalings het gewys dat die staatsbos by Pirrie Sendingstasie 'n relatiewe hoë groeitempo het, met gemiddelde waardes wat wissel tussen 0.01- 0.17, in vergelyking met die gemeenskaplike bos by Woodlands.

Volhoubare benutting is krities vir die behoud van inheemse houtagtige plantegroei. Gegrand op die bevindings van hierdie studie kan daar afgelei word dat beide die gemeenskapsbos en die staatsbosoorbenut is. Dit kan toegeskryf word aan die feit dat die gebruik van die staatsbos aan almal oopgestel is na 1994 regeringsverkiesing in Suid-Afrika.

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My heart trusted in him, and I’m helped;  
Therefore my heart greatly rejoices and with  
my song I will praise him” (Psalm 28:7).

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## **DEDICATION**

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## TABLE OF CONTENTS

Content	Page
<b>1 LIST OF TABLES</b> -----	<b>XIII</b>
<b>1 INTRODUCTION</b> -----	<b>1</b>
<b>1.1 FORESTRY IN SOUTH AFRICA</b> -----	<b>1</b>
<b>1.2 NATURAL FORESTS AND WOODLANDS</b> -----	<b>1</b>
<b>1.3 CONSERVATION STATUS OF FORESTS IN SOUTH AFRICA</b> -----	<b>2</b>
<b>1.4 CONTRIBUTION OF FORESTS TO HUMAN WELL BEING</b> -----	<b>3</b>
1.4.1 <i>Forests and Rural Livelihoods</i> -----	<b>3</b>
1.4.2 <i>Source of Income</i> -----	<b>5</b>
<b>1.5 MANAGEMENT OF WOODLANDS AND FOREST RESOURCES ON COMMUNAL LAND IN SOUTH AFRICA</b> -----	<b>7</b>
<b>1.6 TENURE IN SOUTH AFRICA</b> -----	<b>8</b>
1.6.1 <i>Tenure in Rural areas</i> -----	<b>9</b>
1.6.1.1 Private property -----	<b>9</b>
1.6.1.2 Common property -----	<b>10</b>
1.6.1.3 State property-----	<b>10</b>
1.6.1.4 Open access-----	<b>11</b>
<b>1.7 COMMUNITY FORESTRY IN SOUTH AFRICA: PURPOSE</b> -----	<b>12</b>
1.7.1 <i>Community Forestry in the Eastern Cape</i> -----	<b>13</b>
1.7.2 <i>Policy Performance</i> -----	<b>16</b>
<b>1.8 PROBLEM STATEMENT</b> -----	<b>16</b>
1.8.1 <i>Justification of the study</i> -----	<b>18</b>
<b>1.9 OBJECTIVES</b> -----	<b>20</b>
1.9.1 <i>Overall objective</i> -----	<b>20</b>
1.9.2 <i>Specific objectives</i> -----	<b>20</b>
1.9.3 <i>Research questions</i> -----	<b>21</b>
1.9.4 <i>Thesis structure</i> -----	<b>21</b>
<b>2 STUDY AREA AND METHODS</b> -----	<b>23</b>
<b>2.1 STUDY AREA</b> -----	<b>23</b>
2.1.1 <i>The Valley Bushveld (Woodlands)</i> -----	<b>23</b>
2.1.1.1 Climate and rainfall -----	<b>25</b>
2.1.1.2 Vegetation -----	<b>25</b>
2.1.1.3 Tenure -----	<b>26</b>
2.1.2 <i>The High Mountain Forest (Pirrie Mission)</i> -----	<b>26</b>
2.1.2.1 Climate and rainfall -----	<b>27</b>
2.1.2.2 Vegetation -----	<b>28</b>
2.1.2.3 Tenure -----	<b>28</b>
<b>2.2 METHODS</b> -----	<b>29</b>
2.2.1 <i>Participatory methods</i> -----	<b>29</b>
2.2.1.1 Village mapping -----	<b>29</b>
2.2.1.2 Group interviews-----	<b>30</b>
2.2.1.3 Semi-structured interviews -----	<b>31</b>



2.2.2	<i>Vegetation Assessment</i> -----	31
2.2.2.1	Establishment of monitoring plots-----	31
2.2.2.1.1	Pirrie Forest-----	32
2.2.2.1.2	Woodlands forest woodland-----	33
2.3	DATA COLLECTION-----	33
2.3.1	<i>Identification of species</i> -----	33
2.3.2	<i>Size class distribution</i> -----	33
2.3.3	<i>Regeneration</i> -----	34
2.3.4	<i>Data analysis</i> -----	34
3	RESULTS-----	35
3.1	PARTICIPATORY RURAL APPRAISAL-----	35
3.1.1	<i>Woodlands village (Valley Bushveld)</i> -----	35
3.1.1.1	Village mapping-----	35
3.1.1.2	Group interviews-----	37
3.1.1.3	Semi- structured interviews-----	38
3.1.1.3.1	Species used at Woodlands village-----	38
3.1.1.3.2	Functions of wood in Woodlands-----	40
3.1.1.3.3	Perspectives on present resource availability and effects of use ---	40
3.1.1.3.4	Perceptions on Future use of woodland products-----	41
3.1.1.3.5	Commercialisation of wild resources-----	42
3.1.1.3.6	Perspectives and attitudes towards woodland management-----	43
3.1.1.3.7	Future management practices-----	44
3.1.2	<i>Pirrie Mission village (The High Mountain Forest)</i> -----	45
3.1.2.1	Semi structured interviews-----	45
3.1.2.2	Local perceptions on present resource availability-----	46
3.1.2.3	Perceptions on future use of forest products-----	46
3.1.2.4	Commercialisation of wild resources-----	47
3.1.2.5	Opinions on current status of resource management-----	47
3.1.2.6	Perspectives towards future Management practices-----	48
3.2	VEGETATIVE ASSESSMENT-----	51
3.2.1	<i>Identification of species</i> -----	51
3.2.2	<i>Size class distribution and regeneration of the preferred species in Pirrie Mission</i> 52	
4	DISCUSSION-----	54
4.1	IMPORTANCE OF FOREST RESOURCES TO LOCAL USERS' LIVELIHOODS-----	54
4.2	COMMUNITY PARTICIPATION AND POTENTIAL FOR COLLABORATIVE MANAGEMENT-----	57
4.3	VEGETATIVE ASSESSMENT-----	59
5	CONCLUSIONS AND RECOMMENDATIONS-----	63
5.1	CONCLUSION-----	63
5.2	FUTURE PREDICTIONS-----	66
5.3	RECOMMENDATIONS-----	69

6	REFERENCES -----	73
7	APPENDICES.....	94

## LIST OF PLATES

<b>Plate</b>	<b>Page</b>
PLATE 1: WOODLANDS LOCATION SHOWING THE NEIGHBOURING WOODLAND-----	24
PLATE 2: VEGETATION MEASUREMENTS AT WOODLANDS VILLAGE -----	32
PLATE 3: AN ANIMAL ENCLOSURE (KRAAL) BUILT FROM BRANCHES, WOODLANDS VILLAGE -----	40
PLATE 4: WOMEN CARRYING HEAD LOADS AT PIRRIE MISSION VILLAGE -----	46
PLATE 5: CATTLE PULLING A WOOD LOAD AT PIRRIE MISSION VILLAGE -----	49
PLATE 6: A LOCAL VILLAGER HOLDS UP A DONKEY CART STRUCTURE -----	49
PLATE 7: WOOD PILES NEXT TO A SHACK AT PIRRIE MISSION VILLAGE -----	50

## LIST OF FIGURES

<b>Figures</b>	<b>Pages</b>
FIGURE 1: EASTERN CAPE PROVINCE SHOWING THE LOCATION OF KING WILLIAM'S TOWN AND PEDDIE DISTRICT (1:50 000) -----	23
FIGURE 2: WOODLANDS VILLAGE DRAWN BY A GROUP OF MALE AND FEMALE PARTICIPANTS FROM THE VILLAGE DURING GROUP DISCUSSIONS (N = 15)-----	37
FIGURE 3: LOCAL PERCEPTIONS ON PRESENT RESOURCE AVAILABILITY-----	41
FIGURE 4: PERCEPTIONS ON FUTURE USE OF FOREST PRODUCTS-----	42
FIGURE 5: PERSPECTIVES ON COMMERCIALISATION OF FOREST PRODUCTS -----	43
FIGURE 6: OPINIONS ON CURRENT STATUS OF RESOURCE MANAGEMENT -----	44
FIGURE 7: PERSPECTIVES ON AND ATTITUDES TOWARDS FUTURE FOREST MANAGEMENT -	45
FIGURE 8: SIZE CLASS DISTRIBUTION OF THE MOST PREFERRED SPECIES FOR FUEL, BRANCHES, POLES AND MEDICINES IN PIRRIE MISSION VILLAGE. -----	53

## 1 LIST OF TABLES

Table	Page
TABLE 1: TABLE SHOWING PREFERRED FOREST SPECIES IN WOODLANDS AND PIRRIE MISSION (N=75 IN WOODLANDS AND N=95 IN PIRRIE MISSION)-----	39
TABLE 2: DIAMETER MEAN AND STANDARD DEVIATION VALUES OF THE MOST PREFERRED SPECIES IN PIRRIE MISSION VILLAGE-----	51

## 1 INTRODUCTION

### 1.1 FORESTRY IN SOUTH AFRICA

South Africa has extensive and valuable indigenous forest resources. Forests that are mostly used for timber commercialisation are situated in the Western Cape (Knysna and George) and the Eastern Cape Province (Amatola Mountains). The mountain and coastal forests, which are valued for their biological diversity, for medicinal and local uses, and their aesthetic and spiritual values, are the exception, forming the small fragments of habitat set within grasslands and fynbos (DWAF, 1997; FAO, 2001; GOSA, 1996).

The most extensive woody resources are the woodlands, which originally formed about 42 million hectares of open Savanna even though only half remains now. However, although these resources are extensive, there are many places where natural forests have been depleted and where people's needs are not being met (DWAF, 1997).

### 1.2 NATURAL FORESTS AND WOODLANDS

South Africa has never been rich in natural forests. Climate and effect of fires have confined natural forests to about 327 600 ha, 0.2% of South Africa's land area. (GOSA, 1996). The Eastern Cape has the largest areas of natural resources (about 140 000 ha) followed respectively by KwaZulu/ Natal (about 91 200 ha) then the Western Cape (about 60 000 h) and the Northern Province and Mpumalanga (about 35 000 ha). Most of these areas are owned by the State, which since April 1994 also includes the forest areas in the former 'Homelands'. Only in KwaZulu/Natal is substantial portion of natural forests in private ownership (DWAF, 1997; GOSA, 1996). Currently the greatest value of these forests is for environmental protection, biodiversity and ecotourism (DWAF, 1997).

Woodlands occur mostly in semi-arid and semi humid parts of the country. DWAF (1997) states that although the mapped area of woodlands amounts to 28 000 ha, woodlands have been depleted and the current actual area is significantly less than this. Recent findings attribute destruction and degradation of woodlands to a number of factors

such as amongst others, pressures of the apartheid resettlement programmes, unsustainable agricultural developments and local over-harvesting of fuel wood (Grundy & Cocks, 2002).

### 1.3 CONSERVATION STATUS OF FORESTS IN SOUTH AFRICA

Although research shows that much information on the conservation status of forests and woodlands is outdated, there is a growing concern about loss of protected areas and about the lack of adequate management systems to support interest of local communities, as well as to protect their asset (GOSA, 1996). However, the policy recognises the special value which South African people place on natural forests and woodlands and associated habitats, the peoples' obligation to the global community to adequately protect the forests and biodiversity of the world. It also recognises further, the role, which protecting and rehabilitating the woodlands must play into halting and reversing desertification of our country (GOSA, 1996; FAO, 2001).

According to GOSA (1996) and DWAF (1997) the government is ensuring adequate monitoring of the state of natural forests and woodlands on the lands affected, and is using its general regulatory powers and special influence to ensure adequate conservation. Government will also assess the provisions of the Conservation of the Agricultural Resources Act to determine whether they are sufficient to regulate the removal of forests and woodlands and improve them as necessary, and promote the implementation of these provisions (GOSA, 1996).

Research shows that throughout South Africa, better management practices for the sustainable utilisation of indigenous forests and woodlands could create income-earning opportunities. Sustainable wood supplies need to be part of integrated energy programmes to address the historic shortfalls in energy supplies to rural households. This can be done through community forestry programmes, the redistribution of surplus wood from industrial forests, the management of harvesting from natural woodlands, and improved efficiency in wood use (GOSA, 1996).

## 1.4 CONTRIBUTION OF FORESTS TO HUMAN WELL BEING

Research has shown that almost everywhere forests and forest products form part of livelihood systems. Historically, forests and forest products have been important to local people in two main situations, which overlap. In one, forests and woodlands formed part of broader livelihood systems based on rotational agriculture with periods of cultivation alternating with longer periods of forest fallow. In the other, rural households filled gaps in the material and income flows from their on-farm resources by drawing on the nearby areas of forests or woodlands (FAO, 2001).

Forestry refers to the science and management of forests (FAO, 1995). Whilst it involves the relationship between people and the resources provided, it also includes the use and husbandry of wood, fruits and other products that come from trees, as well as the wildlife that live in the forest. Other factors of importance are the environmental, aesthetic and cultural values of forests and woodlands (GOSA, 1996; DWAF, 1997). In South Africa, forestry has tended to be associated with the technical activities of managing planted forests and the closed natural forests that can produce marketable wood. It has been mainly concerned with delivering wood products. Other goods and services have been treated as more or less incidental (FAO, 1995).

### 1.4.1 Forests and Rural Livelihoods

Chambers and Conway (1992) and Dovie *et al.*, (2001) describe livelihoods as comprising the capabilities, assets and activities that are required to achieve the means of living. Titi & Singh, (1994) define livelihoods as peoples' capacities to generate and maintain their means of living, as well as enhancing their well-being. According to FAO, (2001), a livelihood can be sustainable when it can cope with, and recover from stresses and shocks, and maintain and enhance its capabilities and provide opportunities to future generations. This should be done both at local and global levels (Chambers & Conway, 1992).

Nearly everywhere, forests play an important role to rural household subsistence use and agricultural systems and for many they also provide a source of income (GOSA, 1996).



In addition, forests are known to constitute an integral part of the social and cultural framework to those living within them. For example, in some areas, particular areas may be maintained as sacred groves, or forests, or individual species both animal and plant have spiritual or other cultural significance (FAO, 2001). In other areas, even though forest products might not account for overall household inputs, they can be of importance in bridging seasonal gaps, meeting particular needs, helping households over longer periods of shortage and maintaining agricultural productivity (FAO, 2001; Cousins, 2000). Most of the world's rural households in developing countries have also shown that forests provide essential food and nutrition, medicine, fodder, fuel, thatch and construction materials, mulch and non-farm income (FAO, 1995; Perez & Arnold, 1995; Shackleton *et al.*, 1998).

Rural communities and livelihoods are highly differentiated by social identity and vary in their make up depending on class, gender, age and many other factors (Cousins, 2000). These factors determine livelihood options and opportunities. For example, poorer people in rural areas have fewer choices available to them for securing their livelihoods and are more dependant on land and natural resources, while those who are more financially secure rely on multiple livelihood strategies to secure a better living (Shackleton & Shackleton, 1997; Grundy & Cocks, 2002; McGregor, 1995; Cavendish, 1996; Campbell *et al.*, 1997; Qureshi & Kumar, 1998). In many places women (especially those heading families) are responsible for the household activities that involve forest based foods and medicine as well as fuelwood (FAO, 1995; Hopkins *et al.*, 1994 cited in FAO, 2001). Other activities in which women are engaged include collecting and mat making (FAO, 2001). Research has shown that out of six countries surveyed 41% of the total workforce in small forest product enterprises were women (FAO, 1995). In a study conducted in the forest- savannah zone of Guinea it was found that many women traders generate their working capital from cropping, gathering and processing forest products (FAO, 2001). However, in some areas women may be denied access to natural resources as a result of cultural and institutional arrangements and this can affect their livelihoods (Cousins, 1998).

### 1.4.2 Source of Income

The economic value of forests and especially of woodlands to communities is often equal to a significant proportion of the income of rural households. This value has seldom been recognised in South Africa (GOSA, 1996; Dovie *et al.*, 2001; FAO, 1995).

Rural populations are becoming increasingly reliant on farm and non-farm income in order to meet their food and other basic needs (FAO, 1987; Fissein, 1987; Liedholm & Mead, 1993). Commercialisation and trade of woodland products is increasing as more people particularly women seek additional opportunities for cash income (Shackleton & Shackleton, 1997). This can be done at or near home, allowing women to combine these income-earning activities with other household chores (such as childcare). Gathering of forest products can be accomplished in conjunction with other collecting activities (FAO, 2001). In Cameroon, Non Timber Forest Products (NTFPs) trade appears to be an important income generation strategy for women, who constitute the majority of poor forest dwellers in rural Cameroon (FAO, 2001). The strong role of women in NTFPs production and trade in Cameroon is officially governed by local regulations. Women have also been found to play a role in local trade of NTFPs in Ghana. Research has shown that in Ghana, activities (mostly done by women) such as collecting forest leaves for wrapping food, sponge making and basket weaving provide the source of income (FAO, 1995).

Even though in some cases, forest products seldom contribute a large share of a households total income, they are often important in filling gaps, in taking advantage in seasonal fluctuations, in availability of labour, and in helping people to cope with unusual opportunities. For example, income from collection and processing of babacu palm kernels in North Eastern Brazil was reported to account for 29% of cash income and 34% of total cash income per household during the seasonal slack period in agriculture (FAO, 2001). In the western Niger it was found that income from forest products rose from 2% in the harvest season to 9% in the hot and rainy seasons and 11% in the cold season (Hopkins *et al.*, 1994 cited in FAO, 2001).

According to Heinsohn, (1999) and Shackleton & Shackleton, (1997) other forest products such as crafts form part of a more sophisticated market chain and may be sold at more distant and urban markets. In these instances the production system may be highly specialised and the entire livelihood of the producer may be based on a particular resource, for example medicinal plant traders (Mander, 1997), basket weavers (Brigham *et al.*, 1996) and other craft producers.

A countrywide survey by the Gemini programme (Liedholm & Mead, 1993) in six countries in eastern and southern Africa (Botswana, Kenya, Lesotho, Malawi, Swaziland and Zimbabwe), disclosed that on average 2.3% of rural populations and 0.8% of urban populations were selling more than half the wood products and grass, cane and bamboo products that they were gathering or producing from the forest. A similar survey, but covering a wider range of products and users, in the forest zone of Southern Ghana found that 10% of rural people were selling forest products (Townson, 1995).

Studies in forest-rich areas adjacent to large urban markets show even higher levels of involvement in commercialisation of forest products. For example, 68% of households surveyed in villages around the large market centre of Kumasi in Ghana (Falconer, 1994) and all households in surveyed villages supplying the Amazon city of Iquitos (Padoch, 1988) were involved in commercialisation of forest products.

In research conducted in northern Bolivia, results revealed that Brazil nut collection and processing has become the single most important income for many rural households. Factories in neighbouring cities control processing, and forest residents reap financial benefits from both collecting the nuts and working seasonally in the shelling of plants (Townson, 1995).

Besides constituting major sources of income through selling, community-based NTFPs can also provide employment (Sah & Dutta, 1994; Arnold, *et al.*, 1994). For example in India the NTFP sector provides over 30 million jobs (Arnold, 1995). Many Asian countries have also observed that sale of NTFPs result in job creation. These jobs include

include gathering and collecting NTFPs. Although research shows that no formal estimates have been made of the overall value of NTFPs industry, data indicates that in 1996 collectors of black walnut were paid more than \$2.5 million in Asia (Sah & Dutta, 1994). Arnold *et al.*, (1995) report that in six countries surveyed in southern and eastern Africa, most people were engaged in small-scale grass, cane and bamboo production, vending activities and small woodworking activities.

### 1.5 MANAGEMENT OF WOODLANDS AND FOREST RESOURCES ON COMMUNAL LAND IN SOUTH AFRICA

Most woodlands in the rural areas of the former 'Homelands' are communally owned (GOSA, 1996; DWAF, 1997). Under the old Bantu Laws and administration Act, the use and management of natural forests was assigned to Tribal Authorities. Each former 'Homeland' then developed its own set of regulations. However, sometimes some national regulations could overrule the Tribal Authority. Because of the confused administration, controls did not work, leading to confusion and inadequate resource management (GOSA, 1996; FAO, 2001; Grundy & Cocks, 2002).

Despite the traditional control of harvesting of natural products, woodlands have been over-utilised in many areas. Increasing population pressure, coupled, with the eroding of traditional structures of authorities and beliefs, has resulted in the breakdown in control of natural management utilisation (Ardington & Lund, 1996 cited in Cousins, 2000; GOSA, 1996; DWAF, 1997; DWAF, 2002). In KwaZulu/Natal the controls of cutting live trees have collapsed and as a result some forests have disappeared. However, in areas such as rural kaNgwane, the woodlands are still in a relatively good condition. Some communities have demarcated and proclaimed resource management areas for sustainable resource management to the benefit of the community as a whole (DWAF, 1997). Pilot projects are in progress in the former Bophuthatswana, KaNgwane and kwaZulu/Natal (DWAF, 1997; GOSA, 1996).

Sustainability in forest management involves managing permanent forestland to achieve one or more clearly specified objectives of management with regard to the production of

a continuous flow of desired products and services without undesirable effects on the physical and social environment (ITTO, 1992). One important aspect of measuring sustainable use and management in the forest is a resource inventory. According to Huschet *et al.*, (1982) and Chanyenga & Kayambazinhi, (1998), an inventory provides information on the quantity and quality of the forest resource and the characteristics of the land area on which the trees are growing. Whereas, Guldenhuys, (1992) indicates that inventory data provides a basis for yield regulation and selection cutting in the uneven aged, mixed species of a forest. Research has shown that sustainable use and management of resources can be easier practiced when clear roles and boundaries of operation are known to all stakeholders hence the following section deals about tenure in South Africa.

## 1.6 TENURE IN SOUTH AFRICA

In the past, South Africa experienced land tenure problems originating from a lack of adequate legal recognition of communal tenure systems, abuse of powerful elites, the breakdown of old-permit based system and gender inequalities (Cousins, 2002). These problems often resulted in conflicting claims to land and bitter disputes over authority. Development efforts were severely constrained by a lack of clarity on land rights. In order to resolve land tenure problems especially in the 'Homeland' areas the South African Government drafted a Communal Land Rights Bill. Despite the improvements on the earlier versions, the Bill turned out not to be the answer to the tenure problems experienced by 'Homeland' areas. The disastrous consequences of the Bill were attributed to the fact that the Bill adopted a wholly inappropriate approach to communal land tenure reform by placing undue emphasis on the issuing of land titles, either to groups or individuals, after transfer of ownership from the state (Cousins, 2002).

As from 1996, 500 titles were issued to Community Property Associations, but many of these titles are dysfunctional. This is attributed to the fact that Constitutions were poorly drafted and misunderstood by the members and rights of individual members were poorly defined. These inadequacies resulted in endemic infighting. In some cases, traditional leaders contested the authority of elected trustees while in other cases, elites captured the

benefit of ownership. Although there are notable exceptions to the reaction of the new draft Bill, the overall experience has been frustrating to many people in the land sector.

### **1.6.1 Tenure in Rural areas**

Management of woodlands within communal areas is closely linked to land tenure. According to FAO, (1990), natural resource tenure refers to the set of rights that a person or group of people or a public entity hold in natural resources. It includes the terms and conditions under which land and other natural resources such as trees and water are held and used. There are many forms of tenure. Some people may use a resource under 'freehold' and other indigenous land system such as 'permission to occupy (FAO, 1995). It is argued that for resource managers to be effective in their work as facilitators in the process of sustainable resource management, they have to understand the social systems, particularly those relating to ownership, management and control. Mutual acceptance of clearly defined rights, responsibilities and accountability by both forest departments and communities is also important for Joint Forest Management to succeed (Berkes, 1989; Berkes & Forke, 2002).

The concepts of resource regimes and property rights are closely linked to tenure system. Property rights are defined as a bundle of entitlements indicating an owner's rights, privileges and limitations for use of the resource (Zinnes, 2004; Bromley & Cernea, 1989). A resource regime is a structure of rights and functions that shows the relationship of individuals or communities to one another with respect to that particular resource. Property rights can be divided into four groups. These are private property; common property; state property and open access.

#### **1.6.1.1 Private property**

Private property refers to a set of rights assigned to an individual owner or group of owners. The key characteristic of private property is the legally and socially sanctioned rights of exclusion of other resource users and as a result, few landowners are entirely free to do as they wish with resources (Bromley & Cernea, 1989; Watts, 2002). Matose & Wily (1996) view this type of regime as a source of landlessness and conflict to many

rural people. With the view that forests and woodlands need to be managed in large units, particularly now that they are managed for timber and non-timber products, private property becomes inappropriate (McKean & Ostrom, 1995). Besides this, in private property situations are fairly straight forward, although resolving conflicting land use claims can be complex (FAO, 1995).

#### *1.6.1.2 Common property*

In common property, resources have clearly recognised users who although they may not own the resource, have recognised access rights and the ability to limit access to others (FAO, 1995). Shackleton *et al.*, (1998) defines common property regimes as 'structured arrangements in which group membership is defined, boundaries are clear, outsiders excluded, rules are developed and enforced, incentives of co-owners exist to conform and sanction work to ensure compliance'.

However, there are many misconceptions over the management of common property and common resources. As Bromely (1985) cited in Berkes (1989) points out, this is often due to confusion of terminology. Many people do not understand the critical distinction between 'open access resources' and 'common property'. Open access is free- for- all, while common property represents a well defined set of institutional arrangements concerning who may or may not make use of a resource, and the rules governing how the accepted users shall conduct themselves (Bromley, 1985 cited in Berkes 1989).

#### *1.6.1.3 State property*

State property regime is found where ownership and control over use of resources remain in the hands of the State. Individuals and groups may be able to make use of the resources, but with the permission of the State (Bromley, 1992). In Africa, State ownership began with the intention of establishing reserves during the colonial administrations, when private and communal tenure of forests were thought to pose danger to preservation and utilisation. It was considered that State must take over control of the forests and carefully regulate their use (Bruce & Fortmann, 1992). However, the State has never been without problems while trying to enforce ownership rights over

communities, the communities have been resisting this act (FAO, 2002; Watts, 2002). As a result of this, local people in other areas have tended to either ignore the forest management practices or resorted to using forest resources unsustainably, as they believe the forests belong to their forefathers thus resulting in an open access regime.

#### *1.6.1.4 Open access*

Open access regimes are situations where a number of people or owners have equal access in their rights to use the resource. Under open access, each individual can make use of the resource without regard to the costs imposed to others (Bromely, 1985 cited in Berkes 1989; Zinnes, 2004). A resource under open access belongs to the first party that exercises control over it (IFAD, 1995). Open access may also occur where local people have broken down a management and authority system whose purpose was to enforce sets of rules and regulations aimed at controlling access and utilisation of a resource. For example, local people using State forest without anyones' approval because they insist it belongs to them (Wily & Matose, 1996). This practice has been done in many areas of South Africa as the Government has stopped having rangers patrolling in the forest. Open access mostly results in the overuse and depletion of the resource. This shows that without clear rights, there is no incentive for forest conservation. In Latin America, open access of tropical forests has led to deforestation under demographic pressures (Zinnes, 2004).

In line with the policies that involve the management and conservation of natural resources, it is worthwhile to assess the possibilities of recognising local people's rights and responsibilities as well as partnerships in decision-making (Ndayambaje, 2002). The government may pass certain user rights and responsibility to the local communities as a strategy to over-come the conflict between the community needs and the conservation of the forest. Therefore it is important to provide guidelines that may lead to the Government and non-Governmental partners to develop and implement decisions over the forest with the dual focus of improving the local community livelihoods and enhancing proper management of the forest (Bruce & Fortmann, 1992; Masutha, 2002; Ndayambaje, 2002).



## 1.7 COMMUNITY FORESTRY IN SOUTH AFRICA: PURPOSE

The Government's White Paper on Sustainable Forest Development defines Community Forestry as "forestry designed and applied to meet local, social, household and environmental needs and to favour local economic development. It is implemented by, or with the participation of communities" (DWAF, 1997). The vision and policy of community forestry is to contribute to the social and economic upliftment of all South Africans by promoting the responsible and sustainable utilisation of natural resources and encouraging tree centred development in South Africa. It aims to achieve this by addressing the national problem of social deprivation, impoverishment, deforestation and land degradation in all sectors of rural and urban communities through Community Forestry development (DWAF, 2002).

In the past, community forestry has been neglected in South Africa except in some parts of the Eastern Cape, where woodlot establishment around indigenous forests has helped to conserve the natural resource, and in scattered cases where woodlots have been incorporated into the local resource use system (GOSA, 1996). Generally, the lack of adequate Community Forestry is reflected in many things. These include amongst others shortfalls between fuelwood demand and fuelwood production; the severe degradation of woodlands in many districts; as well as the local destruction of natural forests, and the fact that few communities have been able to build trees into their local development initiatives (DWAF, 1997; GOSA, 1996). This reflects the past lack of recognition of the value of natural and plantation forest resources to rural households, in economic, environmental and social terms. There has been an absence of sound policy that recognised local needs, as well as suitable supporting institutional framework (GOSA, 1996).

However, recent research points out that the Government acknowledges that Community Forestry improves the social and physical environment of local people, conserves forest and woodland estates and creates income opportunities for both rural and urban communities (Watts, 2002; DWAF, 1997; GOSA, 1996). With this view in mind, the Government seeks to implement its policy on Community Forestry by supplying relevant

information and technologies, which would arise from scientific research programmes. Although the Government intends to pursue the 'principle of people driven' Community Forestry, provision for financial support has also been made. According to the National Forests Act of 1998, DWAF would encourage Community Forestry by availing incentives such as information, advice and extension services, seeds and seedlings; and grants, including recovery from disaster on condition that there are no such grants from any other source (DWAF, 2002; Watts, 2002; GOSA, 1996). Government also believes that having a positive attitude in forestry would have plantation forests removed from areas where demonstrable environmental damage has been done e.g. on the Eastern shores of St Lucia. These aspects of industrial forestry will be investigated and developed accordingly.

### **1.7.1 Community Forestry in the Eastern Cape**

Prior to 1994, there was narrow scientific focus and little concern for the social development potential for forests and forestry in the Eastern Cape. The policies then did not cater for local users' interests hence local users responded by using natural resources unsustainably as many would resist restrictions imposed by government authorities without proper consultation (Harrison, 2002; Kameni, 2002). Interventions were not participatory in their planning and implementation and failed to adequately take account of communities' expressed needs, priorities and constraints.

Although in recent years there has been greater emphasis on participation in service delivery in this province, many interventions have failed to make lasting impacts relative to their costs of implementation. In addition to this, lack of communication and co-operation between Government authorities and local users has brought about a number of issues pertaining to Community Forestry in this province. The following issues have been highlighted in the Eastern Cape concerning Community Forestry (Harrison, 2002):

- Lack of awareness: social, economic and environmental benefits
- Lack of access to information, expertise and support
- Lack of ownership and participation in management of woodlots
- Poor management of State woodlots

- Reluctance to invest in communal forestry ventures
- Deforestation and unsustainable utilisation of indigenous forests.

It is from the above issues that, through its Reconstruction and Development Programme (RDP), the South African Government highlighted the need to develop rural areas throughout the country. The RDP strategy identifies the forest sector as an important element of local natural resources development that can contribute to creating better living environments and economic opportunity (GOSA, 1996). The RDP acknowledges that successful rural development can only be achieved through co-operation between rural people, their local Government, and many provincial and national agencies. The RDP strategy based on a multisectoral approach to rural development and Community forestry has been recognised as one of the multisectoral approaches aimed at achieving these objectives (GOSA, 1996).

In the Eastern Cape particularly, development and growth in numerous sectors provides means of building a sound and sustainable economy that facilitates economic empowerment. A primary contributor to this development is the Eastern Cape Development Corporation (ECDC). Opportunities for development in this province exist in the following sectors: Agriculture and Minerals (Crops, Forestry, Livestock and Minerals); Agro-processing (Dairy, Food processing, Furniture, Leather and Leather products); Industrial Development Zones (IDZs) (Coega IDZ and East London IDZ); Infrastructure (Air, Constructing, Housing and Water and sanitation); Manufacturing (Textiles and Clothing, Metal and Engineering); Social Development (HIV/AIDS, Health and Teacher training) and Tourism (Private Game Reserves and Agritourism). The ECDC aims to enhance these opportunities through support of existing business, creating opportunities for new business, sustaining and developing markets, improving access to finance and ensuring that skills, infrastructure and policies support Enterprise Development (<http://www.ecdc.co.za>).

Based on the above experiences, it is evident that Community Forestry, based on the active participation of rural people through Participatory Rural Appraisals (PRAs) can

make a significant step forward in the design of methodologies and selection of these techniques (Leakey *et al.*, 1996; Skottke & Mauambeta, 2000). The term PRA implies a two-way exchange of experience and local knowledge, in a partnership between local people and forestry professionals. Such participation may range from the recognition and strengthening of forestry activities already being implemented by local people, to new initiatives requiring considerable outside technical as well as institutional support (DWAF, 2002).

Following earlier arguments about inappropriate development strategies and lack of effective management of natural resources in this province, PRAs are believed to be of significance in moral justification of involving people in the control and management of their traditional lands. Providing access to resource and creating jobs through PRAs can contribute to the Governments Growth, Employment and Redistribution policy (GEAR) (GOSA, 1996).

Very few studies have concentrated on the resource exploitation and impact in the two study areas. The general approach of the study involves focussing on the preferred forest resources through the use of participatory rural appraisal techniques. The study takes the step in assessing ways of managing the two forests in a sustainable manner with the participation of local communities. Approaches to achieving this stem from the understanding of the priority needs and interest of local communities in their forests.

Presently the main goals according to DWAF concerning Community Forestry in the Eastern Cape are as follows (Harrison, 2002)

- Sustainable utilisation of natural forest resources
- Growth of the forest industry in the Province
- Improved agricultural production and environmental health
- Successful entry of small timber growers into economy
- Improved urban environments.

To achieve the above goals DWAF has adopted Participatory Forest Management in this province. Within this context, DWAF is now striving to consider local peoples' forest based needs, their role in management and intends to empower them through decision-making over forest resource utilisation (DWAF, 2002).

### **1.7.2 Policy Performance**

DWAF notes that the previous forest policy in South Africa has strongly emphasised closed canopy forests and has neglected woodlands and hence this has resulted in improper use and mismanagement of woodlands (DWAF, 1997). Subsequently this led to fuelwood deficiency. Presently, there is no effective policy to control fuelwood deficiency. Planted woodlots provide only 1% of fuel wood demand nationwide (Hoffman *et al.*, 1999).

DWAF, 1997 states that there would still be a problem of unsustainable use of natural resources in many areas, unless the government emphasises implementation policies and regulations on how to use and conserve forests and woodlands. However, policy implementation involves changing peoples' attitudes; and the timeframe required to do this is determined by what people stand to gain from adoption of particular form of behaviour. Unfortunately in South Africa the link between forest officers, planners and local people is still very weak. A suggestion following this has been for the South African Forestry Sector to combine the outputs of the previous policy with the outputs of the existing one. It is believed that this will be counter productive because street-level beauracrats and their clients would become familiar with the old laws. Furthermore where appropriate incentives should be provided (Watts, 2002).

## **1.8 PROBLEM STATEMENT**

Prior to 1994, the management of indigenous forests in South Africa had a very narrow scientific focus and there was little concern for the social development potential of forests and forestry (DWAF, 2002; Ainslie, 1997; Grundy & Cocks, 2002). This left the 'majority of people in impoverished Homelands' that are characterized by high population densities, underdevelopment and inadequate agricultural base and high levels

of unemployment (Masutha, 2002). In order to sustain their livelihoods, people in these rural areas had to combine and presently (still combine) migrant labour to mining and urban centres elsewhere in South Africa with crop cultivation and livestock raising in their homes (Edkins, 1996).

Previously, the main aim of the government forest policy was to protect the indigenous forests and woodland resources (Bigalke 1983 cited in Watts, 2002). Like other forest policies of the time, the South African Government did not see any role for rural, forest dependent people or at worst adopted a deliberate policy of marginalisation. According to Peart & Wilson (1998), the concern for the environment before the implementation of democratic rule in South Africa was largely articulated within an 'authoritarian conservation' paradigm, which focused on protecting the natural environment from people and as a consequence the black population viewed conservation policies negatively.

It may be a futile exercise to aim at conserving diversity in the forest without understanding the problems underlying its conservation. Addressing the needs of the neighbouring communities can partly alleviate threats and to conservation (Skottke & Maumbeta, 2002). In addition to tangible benefits, intangible benefits that local people derive from the forest near to them should be allowed so as to utilise the resources in a sustainable way, leading to their conservation (Skottke & Maumbeta, 2002; Leakey *et al.*, 1996; Nel & Binns, 2000 & Ndayambaje, 2002). According to Masutha (2002), the adoption of such an approach would answer questions related to community involvement in forest management and to the benefits that the community may obtain in return.

Presently, the two forests in the study, Woodlands (communal woodland) and Pirrie Mission (state forest) have no clear or known management committees in place. There are also no activities based on forest protection, public awareness programmes and ecological studies. Against this background, the post apartheid Government of South Africa is faced with a major task of redressing the imbalances of the past by improving the life for the majority of black people. The Government must therefore develop forest

policies that will have a positive impact on the less privileged people of the country, especially in the former 'Homelands' (Masutha, 2002). Rural communities are expected to manage the natural resources that surround their villages whether communally or State owned, in a sustainable way (DWAF, 1997; Nel & Binns, 2000). This, together with local community needs for social development has led the Governments' Forestry Department into Participatory Forest Management Programmes together with multiple stakeholders as a means to achieve their objectives (DWAF, 2002; FAO, 2002).

The overall stated government's goal in the existing policy is to promote a sustainable forestry sector capable of satisfying the social, economic, cultural and economic values of its society (Lent *et al.*, 2000). This is to be done by encouraging wider participation in policy formulation and implementation, particularly by rural communities, the private sector and other Government economic sectors that exert tremendous pressure on forests. As a way forward, in 1998 DWAF passed the National Forest Act which makes provision for the protection of forest and trees as well as the setting aside of protection areas. Consequently, the Department has also adopted its mission statement as being the conservation of natural forests and woodlands, on sustainable basis for scientific benefit of all (Anon. 1995; Cocks *et al.*, 2001). However, with many interest groups, each exerting pressure on forest and woodland products and services, the formulation of this Act to harmonise their needs has not been an easy task. 'Consequently, the National Forests Act had to pass through several stages in the form of discussion paper, green paper, draft white paper and white paper' (Watts, 2002).

### **1.8.1 Justification of the study**

Recent studies have shown that the Eastern Cape Province is home to 15.5% (6.3 million) of South Africa's total population (40.6 million in 1996). The province incorporates two of the former 'Homelands' of the apartheid period (that is Ciskei and Transkei) (Dold & Cocks, 2002). Of the Eastern Cape Population, 86% is African, 37% is urbanized, 49% is unemployed (with 31% of those employed earning less than R500 a month) and 41% of the households live in traditional dwellings. According to Cocks & Moller, (2002), the people of the Eastern Cape tend to be more traditional and rural, but also significantly

poorer and less developed than those in other parts of South Africa. A large population of the province's population is reliant to some extent on natural resources for direct subsistence use or indirectly for generating income (Cocks & Dold, 2000; Hassan & Haveman, 1997; Ainslie *et al.*, 1997; Ainslie, 1999; Dold & Cocks, 2000; Shackleton *et al.*, 2002). It is therefore noted that a rapidly growing population coupled with increasing poverty and urbanization has a huge impact on the province's resource base (Dold & Cocks, 2002). This suggests that proper measures such as sustainable use and management and conservation of resources need to be taken into account in order to conserve this province's resources.

In the past the Ciskei Government realised the unsustainable use of natural resources in the Eastern Cape Province and responded by instituting fines for illegal cutting of green (live) trees (Steyn, 1990). However, these laws have not succeeded in curbing exploitative utilisation patterns, as some households acknowledged (and still acknowledge) that they cut live trees when harvesting (Cocks & Dold, 2000; Motinyane, 2002). This pattern often results in trees being unavailable near the village while more trees are available in areas further away from the village (Van Rensburg *et al.*, 1997).

During the transition period from the former Apartheid Government to the present Democratic Government the incompetence and corruption of the Ciskei regimes left the Ciskei underdeveloped in terms of infrastructure, agricultural development and especially the management of natural resources. For a variety of reasons both the National and Provincial Government have failed to define the role and administrative responsibilities of Village and District Governments. As a result these bodies have failed to implement effective natural resource management strategies (Cocks & Dold, 2000; DWAF, 1997). It is also argued that inappropriate development strategies have also stemmed from methodologies that fail to appreciate the whole picture in rural communities, and in particular ignore local peoples' perceptions, needs and understanding in this province (DWAF, 2002).



This study was aimed at providing baseline data on forest resources of importance to local communities. Further, it evaluated the possibility of including the institutional frameworks in resource management. In order to be effective, institutional frameworks and all other forest stakeholders needed to introduce a decision-making authority recognised and respected at the local level. In case of conflict, the presence of a mediator capable of leading negotiations was important. According to Fischer, 1999, monitoring of the community level forest management enabled the provision of checks and balances as well as identification of successful community level management. The study was aimed at coming with recommendations, which would enhance collaborative form of management that would contribute to the building of trust and confidence.

## **1.9 OBJECTIVES**

### **1.9.1 Overall objective**

The main aim of this study was to assess the present status of resource use and management of two forests in the Eastern Cape; State forest in King Williams Town and communally owned woodland at Peddie, and also to determine the potential for community involvement in management and sustainable utilisation of forest products in the future. Focus was placed on assessing whether the two forests in the study area have the potential to supply the adjacent community needs. This study forms part of a larger work in progress based at the University of Stellenbosch to assess the sustainability of forest and woodland use by local communities in the former Ciskei 'Homeland' of the Eastern Cape (Grundy & Cocks, 2002).

### **1.9.2 Specific objectives**

1. To identify local communities problems, needs preferences and interests in access to and use of resources in these two forests
2. To identify the potential of these two forests to provide the most preferred species to local communities
3. To inventory the forest resources in order to ascertain the abundance, the size class distribution and regeneration potential of the preferred tree species in these forests

4. To determine the tree species that can be used sustainably
5. To recommend management options that enable access to resources and community participation in management and utilisation of these forests.

### **1.9.3 Research questions**

1. What are the overall patterns and extent of utilisation of natural resources in livelihood strategies in the two study areas?
2. Which natural resources are most commonly used in the two study areas and what are they used for?
3. How much do the villages harvest from the forests?
4. What are the other uses of the species identified as useful by local users?
5. Is there any form of management regarding the use of natural resources? If any is it private or public?
6. How do existing natural resource management practices and policies affect the peoples' utilisation of natural resources?
7. Are there any intentions by local communities to be engaged in resource management strategies?
8. What Community forestry programmes, aimed at reducing poverty in the rural areas, can be introduced in these study communities?

### **1.9.4 Thesis structure**

The thesis is structured in the following way:

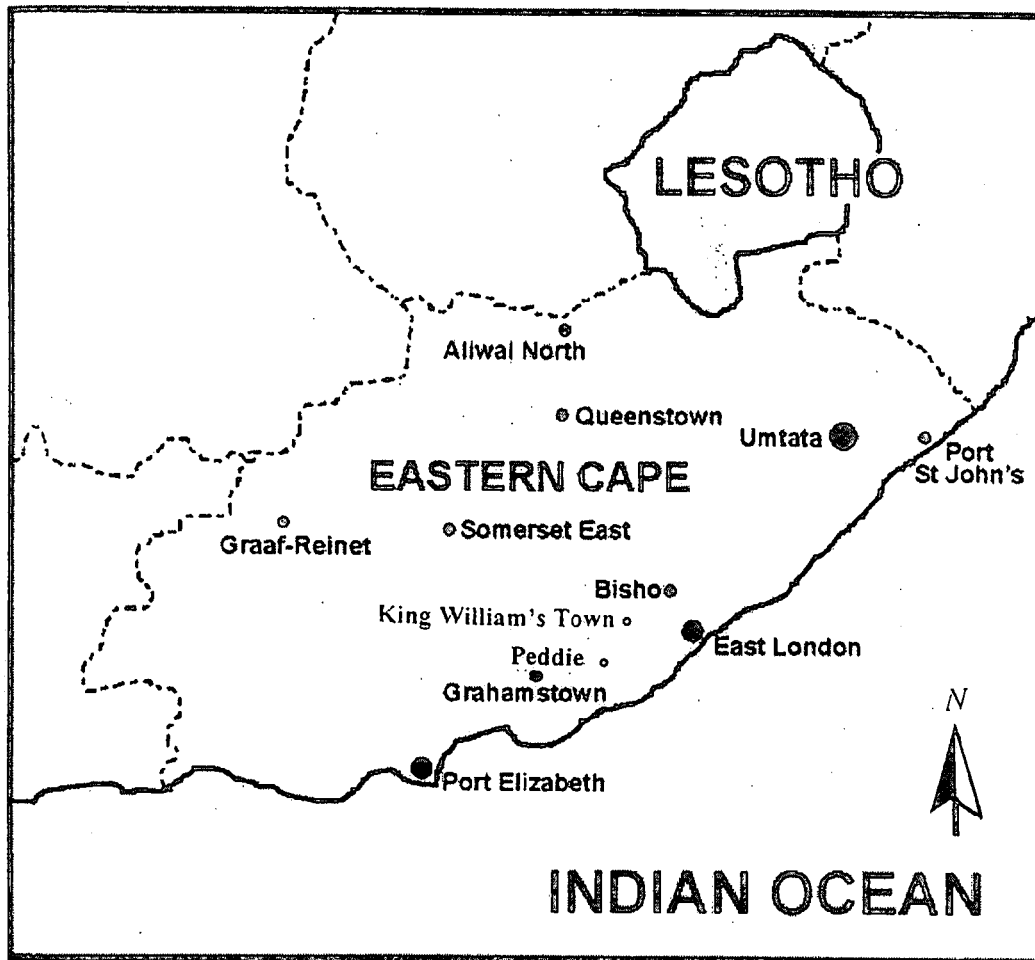
- Chapter 2 gives a description of the study areas and describes how the research was conducted. It covers the methods used to collect data (Participatory and Vegetation assessment methods).
- Chapter 3 covers the findings of the study. The results of the participatory assessment cover household surveys, group and key informant interviews. Also, within this chapter, vegetation assessment results are provided, with emphasis on preferred resources identified during the surveys.
- Chapter 4 represents the discussion of the various results obtained based on the findings of the study and supported by relevant literature where appropriate.

- Chapter 5 summaries the important findings and some aspects that relate to the findings from the literature review. It also concludes by making some recommendations for future forest use and management by the two study areas.
- Chapter 6 gives all the references used throughout the study

## 2 STUDY AREA AND METHODS

### 2.1 STUDY AREA

The study was conducted in the Eastern Cape, Valley Bushveld in Peddie District (Communal woodland), and High Mountain Forest in Pirrie Mission village (State Forest) in King William's Town (Figure 1).



**Figure 1: Eastern Cape Province showing the location of King William's Town and Peddie District (1:50 000)**

#### 2.1.1 The Valley Bushveld (Woodlands)

Peddie District, locally known as Ngqushwa, is situated in the Eastern Cape Province in South Africa. It is situated between the Great Fish and Keiskama Rivers 65 km East of

Grahamstown and 50 km South -West of King Williams Town. It comprises an area of 176 000 ha. Before the establishment of the new national Government in South Africa in 1994, Peddie District formed part of the Ciskei "Homeland". Peddie District consists of thirty-five locations<sup>1</sup> and sixty commercial farms. According to the 1994 estimates the District has a population of about 89 000 people. Woodlands village forms part of the Peddie District and is found near the Fish River, not far from the town of Peddie (Ainslie *et al.*, 1996).



**Plate 1: Woodlands location showing the neighbouring woodland**

Woodlands village consists of a total number of 189 households with an estimation of 800 people (Ainslie *et al.*, 1994). It is subdivided into two sub-villages; Runlets and Louis, all of which use and depend on the woodland around them. In Woodlands as in most rural areas of Peddie District, many people are unemployed and chances of employment are remote (Mail & Guardian, 2004; Ainslie *et al.*, 1994). Pineapple and citrus schemes nearby employ small numbers of people, with seasonal (temporary) high peaks in labour requirements at harvest time. Small entrepreneurial opportunities exist in

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<sup>1</sup> Locations are places where people live often distinguished by different names of villages

Woodlands village, where small shops often operated by women from their homes, sell food, domestic items and paraffin (Ainslie *et al.*, 1994).

According to villagers, many economically active men were retrenched and returned from urban employment, especially the mining sector, to Peddie between 1980 and early 1990s. These men derive existence by doing "small jobs" around the village and are employed on a temporary basis on Government-sponsored public works projects. There is also general low agricultural production in this area due to drought (Palmer & Tanser, 2000; pers.obs). Garden irrigation was cited as a major problem by rural residents since there is a shortage of water for household consumption (Ainslie *et al.*, 1996). For those who undertake agriculture, it contributes only small amounts to household incomes hence pensions and grants act as disincentives for agricultural production and resource management. However, livestock grazing is still considered important by large numbers of the residents (Ainslie *et al.*, 1997).

#### **2.1.1.1 Climate and rainfall**

The Valley Bushveld (Woodlands) is a rural village, which is semi-arid in nature (Deshingar & Cinderby, 1997). The temperature can be as high as 43<sup>0</sup> C from September to May. The temperature seldom drops to 0<sup>0</sup> C. According to Ainslie *et al.*, (1996) the area receives a mean annual rainfall of about 300-400 mm, and a mean annual temperature of 19<sup>0</sup> C. The soils vary from sandy lithosols to deep solonetic soils (Low & Rebelo, 1998; Acocks, 1988).

#### **2.1.1.2 Vegetation**

According to Low & Rebelo (1998) and Grundy & Cocks (2002), the Valley Bushveld (Woodlands) vegetation in Peddie consists of a very dense thicket of woody shrubs and trees. The quantity and type of vegetation varies considerably across the Peddie District region (Ainslie *et al.*, 1996; Acocks, 1988). The vegetation map indicates high levels of biomass across some parts of Peddie, particularly on the freehold farms (Palmer & Tanser, 2000). The scarcity of green vegetation at Woodlands indicates that there is low quantity of photosynthetic biomass on the ground (Ainslie *et al.*, 1996).

There is a great diversity of species in this thicket type. Locally there may be many endemic species. Common species are Kooboo-berry (*Cassine aethiopica*), Thorn fern (*Asparagus species*), *Plumbago auriculata*, *Dovyalis species*, *Diospyros dichrophylla*, *Euphobia triangularis* and *E. tetragona*. This type of vegetation is economically important as the best area for Angora and Boer goat farming (Low & Rebelo, 1998).

### **2.1.1.3 Tenure**

Currently, there is no form of woodland management in Woodlands village. All communities have an equal access to the resource. The formation of the Ciskei “Homeland” in the 1980s led to the introduction of Tribal Authorities who became responsible for the allocation of land and its management. Later various Government Departments such as Department of Agriculture and Department of Public Works shared responsibilities of land and natural resources management. In the 1990s conditions changed, the Gqozo regime in the “Homeland” suspended the headmen and this led to intense political activities and resistance by community members. However, Gqozo later reintroduced headmen but the Forest was under the control of Forest Rangers. After the 1994 elections, the rangers were not reinstated and the forest reverted to being open to all community members (Grundy & Cocks, 2002).

### **2.1.2 The High Mountain Forest (Pirrie Mission)**

Pirrie Mission village is located not far from King William’s Town, which is situated in the Eastern Cape Province in South Africa. Dimbaza and Alice Townships border the village. It is a rural village consisting of a total number of 230 households with an estimation of 1400 people (van Lieshout, 2002). Although there is high unemployment in this area, poverty levels are slightly lower in this village than in Woodlands. This can be attributed to the fact that people from this area are exposed to formal employment in nearby towns such as King William's Town (Grundy & Cocks, 2002).

Pirrie Forest is State owned and has been used both by herbal gatherers and historically by wood- cutters. Past and recent political changes in South Africa have impacted on

forest management at Pirrie Forest. For example, under the previous dispensation, the management of the Forest was under the jurisdiction of the Government. During this era communities were strictly prohibited from accessing resources from the forest by authorities. Forest guards were employed to patrol the area to ensure that surrounding communities did not access the resources. This however changed after the 1994 democratic elections. The Chief Directorate of Forestry inherited *de jure* responsibility for all State Forests previously under the jurisdiction of the former provinces, “Homelands” and self-governing territories. The Department of Water Affairs and Forestry has subsequently, since 1998, adopted legislation which supports the implementation of Participatory Forest Management, which aims to include all stakeholders in collaborative forest management in the form of agreements, shared regulatory roles or community monitoring systems (Grundy & Cocks, 2002).

Despite the adoption of the Participatory Forest Management programme by DWAF in 1998, no concrete steps at community level have occurred to bring these management programmes into place in Pirrie Forest. Consequently, there are currently no effective conservation structures in place as neither the surrounding community structures nor the Department is effectively managing the indigenous forest (Cocks & Dold, 2000; Grundy & Cocks, 2002).

#### **2.1.2.1 *Climate and rainfall***

Rainfall in the Pirrie area is generally above 700 mm per year. It occurs mostly during summer months (September- April). Maximum temperatures reach about 35<sup>0</sup> C between September and April. Minimum temperatures rarely fall below 0<sup>0</sup> C. In some of the higher altitudes snowfalls may occasionally occur in winter (Low & Rebelo, 1998; White, 1983). According to Low & Rebelo (1998), soils in this area are regarded as well developed and mature, and in the higher rainfall regions may be leached. Soils tend to be shallow on steeper slopes, but may be fairly deep in valleys.



### 2.1.2.2 *Vegetation*

The High Mountain Forest (Pirrie Mission), ranges from small to extensive patches depending on locality and variation in aspect, geology and soils (Low & Rebelo, 1998). Trees can reach up to between 30 and 40m height and distinct strata of trees and shrub and herb layers are present (Acocks, 1988; Low & Rebelo, 1998; Grundy & Cocks, 2002).

The forest is characterised by tall closed canopy evergreen forest tree species including: Yellowwood (*Podocarpus latifolius*), Outeniqua Yellowwood (*Podocarpus falcus*), White Witchhazel (*Trichocladus ellipticus*), Assegai tree (*Curtisia dentata*), Cape chestnut (*Calodendrum capense*), White pear (*Apodytes dimidiata*), Tree fuchsia (*Halleria lucida*), African Holly (*Ilex mitis*), Forest nuxia (*Nuxia floribunda*), Lemonwood (*Xymalos monospora*) and Stinkwood (*Ocotea bullata*). In the undergrowth grasses, herbs and ferns may be locally common. Ferns, shrubs and small trees such as Cape Beech (*Rapanea melanophloes*) are often abundant along the forest edges (Acocks, 1988; Low & Rebelo, 1998).

### 2.1.2.3 *Tenure*

Although the forest is State-owned, villagers use the whole forest for various purposes. Officially, people are restricted to the parts of the Forest neighbouring the village and written boards indicate this, but the Government Department responsible for it does not monitor this (Kameni, 2002). Hence timber harvesters continually exploit forest trees commercially with specific species usually selectively harvested. Likewise other species are selected for *muti*<sup>2</sup>, and in the more populated areas, for firewood and poles (Grundy & Cocks, 2002; Cocks, *et al.*, 2001). There is also a village committee for the day to day running of the village but there is no natural resource management committee.

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<sup>2</sup> Muti is a Zulu name meaning traditional medicine

## 2.2 METHODS

The study was conducted using participatory methods of collecting information and vegetation assessment, which involved laying out of monitoring plots.

### 2.2.1 Participatory methods

Similar participatory surveys were aimed at being conducted in both study villages however, in Pirrie Mission Village a participatory survey was limited to semi-structured interviews. This was due to the fact that at the time of the survey local community members from this village were busy with protests against their local councilors for shortage of water and therefore they claimed that they could only settle for community group discussions addressing issues of water and not any other resources (Kameni, 2002; pers obs). Participatory Rural Appraisal (PRA) techniques and Social Science qualitative techniques are used to determine the problems, needs, priorities and interests of local communities in rural areas (Carter, 1996). Various participatory methods were used to collect information during April, May and June 2001 and 2002. Specifically, village mapping which is a PRA toolbox and, group and semi-structured interviews which form part of a normal Social Science qualitative technique were used in the study.

#### 2.2.1.1 Village mapping

This exercise was done to generate some background information about the community and its resources. Local members (Four groups each with 15 members) were asked to draw a map showing their village, as they perceive it, showing all landmarks, buildings, places and other characteristics. Other questions were asked especially about the motives to include or omit certain factors on the map. Questions on whether the forest was currently managed, and who manages the forest and intentions on the forest being managed in future were addressed.

Participants were allowed to draw the maps with minimal interruption except in instances where further useful information outlined in the key questions was required. After the map was drawn it was copied, with as much detail as possible onto a sheet of paper (Figure 2).

The key questions covered in this activity were as follows:

- What are the names of the neighbouring villages?
- How many households are found in the village?
- Is the number of the villages increasing or decreasing?
- What are the social structures and institutions found in the village?
- Which resources are abundant and which resources are scarce?
- Who has access to the Forest?
- Who makes decisions on land allocation?
- Are there any community gatherings regarding Forest use?
- What kind of development activity is carried in this community?

#### **2.2.1.2 Group interviews**

The aim of the exercise was to explore and define the relationship between the community and the surrounding areas or villages in terms of consumer goods, woodland products such as fuel, medicinal plants and wood (FAO, 1994). Groups of 15 to 25 people were randomly identified with the aid of local community leaders at Woodlands village. Individuals known to be the heaviest users of the woodland and woodland forest products were selected for group discussion. During group discussions and informal interviews, notes were taken in point form to be elaborated in future.

Group interviews and discussions provided information on resource availability within the woodland as well as preferences and their uses and general information on agriculture and livestock keeping, and perceptions of institutions that might help take the responsibility for sustainable use and conservation of the woodland. Key informants such as leaders of community people were also approached to identify the current challenges and opportunities facing managers of the woodland if there was any management. These key informants were believed to have a potential to influence their community in future on how to conserve and manage the woodland in Woodlands village since they are their leaders.

### **2.2.1.3 *Semi-structured interviews***

The interviews were undertaken using a questionnaire (Appendix 2). The purpose of the questionnaire was to establish which species are used from the Forest and woodland and their uses (Delali *et al.*, 1999). The availability and possible future use of these species was also addressed. This information is important for identifying the resources that could be exploited and for understanding where there are constraints in resource use (FAO, 1994; Carter, 1996). The activity also addresses the accessibility of the resource by various members of the community. The questionnaire also included questions on present management strategies and future institutional arrangements that are believed by households to enable the conservation for the benefit of rural communities. Questions focussed on finding strategies to co-ordinate local level needs and conservation of the forest (in Pirrie Mission) and woodland (in Woodlands) and linking the management of the forest to community involvement and sustainable utilisation and governance.

### **2.2.2 *Vegetation Assessment***

A plan was developed to ensure that all facets of the inventory were thought through before implementing in the field. The map of the Eastern Cape (1:50 000) was obtained and together with sketches of the two study areas were used to locate the targeted areas where studies would be carried out. Plots used in the studies were based on the previous experience in Probyn *et al.*, (1997) and Chanyenga *et al.*, (1998). The plots would help researchers to see the distribution of preferred species across the study sites. Harvesting trends would be noticeable during monitoring after a year.

#### **2.2.2.1 *Establishment of monitoring plots***

This exercise was done in order to monitor the forest resource use in both vegetation areas over a period of a year (April, May and June 2001 and 2002). The studies were to focus on the nature of the forest and woodland areas and the related results of use, growth and management systems present at the time.

In this study measurements were taken in both vegetation areas with the participation of community members. In each of the two sites, a minimum of three transects (two transects at the extreme end of the forest and the third transect in the centre of the forest) were laid across the vegetation from the direction of the study village towards the deeper parts of the forest using a compass (Echardt & Biggs, 1999). Other measuring parameters used were measuring tapes and diameter tapes. Landmarks such as mountains, rocks, and neighbouring houses were noted for future guidance to the plots.



**Plate 2: Vegetation measurements at Woodlands village**

#### 2.2.2.1.1 *Pirrie Forest*

A maximum of 15 plots were laid out in a circular nature with a radius of 3 m at Pirrie Mission Forest along predetermined transects. In each plot the total numbers of species found were identified. The radius was adjusted between 2 m and 3 m if necessary, in order to sample a minimum number of 30 trees per plot. Only trees of greater than 1m in height were considered (Grundy, 1995 & Chanyenga *et al.*, 1998). Measurements included species type of each tree and diameter of each individual tree measured at 1m. Trees of less than 1m in height were regarded as saplings that would be included in the

next generation (Chanyenga *et al.*, 1998). All diameter measurements were taken at thirty centimetres above the ground, or above any basal swelling. For multi-stemmed trees, the basal area for each stem was calculated. Dead trees were not included (Rathogwa *et al.*, 1999; Grundy, 1995).

#### *2.2.2.1.2 Woodlands forest woodland*

As the trees in the woodland were mainly shrubby in nature, measurements were recorded for height and diameter of the canopy (Moshe *et al.*, 1999). Canopy diameter measurements were taken by measuring across the sides that make the widest part of the canopy (see Plate 2). Height measurements were taken for each tree except where trees make a cluster or seem to grow from one point such that individual trees could not be identified, then height was measured for the whole cluster (that particular cluster was treated as one tree) (Grundy, 1995). Unidentified species were collected and sent to Schonland Herbarium in Grahamstown for identification. Each transect consisted of 7 plots 100 m apart, making a total of 21 plots. A transect walk for visual comparison was taken at Runlets village (a neighbouring village) where the woodland is not as exploited as in Woodlands. Similar procedures were followed in a period of a year to assess any changes that might have taken place in the laid plots.

### **2.3 DATA COLLECTION**

#### **2.3.1 Identification of species**

Tree species were identified in the field by a team of five local people including students from Fort-Cox College of Agriculture in King WilliamsTown, Eastern Cape who provided vernacular names. Local people were included in this survey team because they knew local names of the tree species. A list showing the scientific and vernacular names was made by compiling all tree species found in the surveyed area. Only the most preferred species were listed.

#### **2.3.2 Size class distribution**

According to Peters (1994) cited in Ndayambaje (2002) size class distribution and density are indicators of the impact of exploitation in a given plant population. Analysis of size

class distribution was limited to tree species most preferred by local members in Pirrie Mission. No size class distribution measurements were taken at Woodlands forest woodland because there are very few large trees in this woodland. Density describes not only the degree to which the site is being utilised but also the intensity of competition between trees (Ndayambaje, 2002).

### **2.3.3 Regeneration**

The most abundant and dominant preferred tree species were compared in terms of corresponding available adult and sapling trees. The relationship between tree species and relative abundance of seedlings/ sapling was considered to be a measure of species regeneration and thus was used to predict the ability of the preferred tree species to produce significant resources (Armesto & Fuentes, 1988).

### **2.3.4 Data analysis**

The data collected were screened and entered into a computer-spread sheet using Excel<sup>□</sup>. Diameter Mean values and Standard Deviation values of the most preferred tree species in Pirrie Mission village were analysed and results were presented in a table showing values obtained for both years of study. Size class distribution pattern graphs of the most preferred species for poles, branches, fuel and medicines were drawn using Excel<sup>5</sup>. The result section will be presented in the next section.

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<sup>□</sup> Excel 5 (2000 Workbook) <http://www.Excel.com>

### 3 RESULTS

In this chapter, the results from the study are presented drawing from the PRA and vegetation surveys in the forests.

#### 3.1 PARTICIPATORY RURAL APPRAISAL

Results from village mapping, group discussions and semi- structured interviews are presented in this chapter.

##### 3.1.1 Woodlands village (Valley Bushveld)

###### 3.1.1.1 Village mapping

During the participatory mapping sessions in Woodlands village, common features represented on the map by participants were as follows:

- Village boundaries were marked by features like streams, rivers, paths and roads (Figure 2).
- Buildings comprised dwellings and schools. However, no church was shown in this community as community members indicated that they had to attend church in other villages because they claimed that they were not homogenous in terms of Christianity.
- Woodland areas were depicted close and away from dwellings. Generally, trees in the forest were shown as scattered.
- Grazing fields were shown along rivers and streams while vegetable gardens were shown by some groups as grown at home.

Prominence was given to “Bosisi” blue bush as it covers a greater part of the Forest.

Differences in features depicted by group interview participants were as follows:

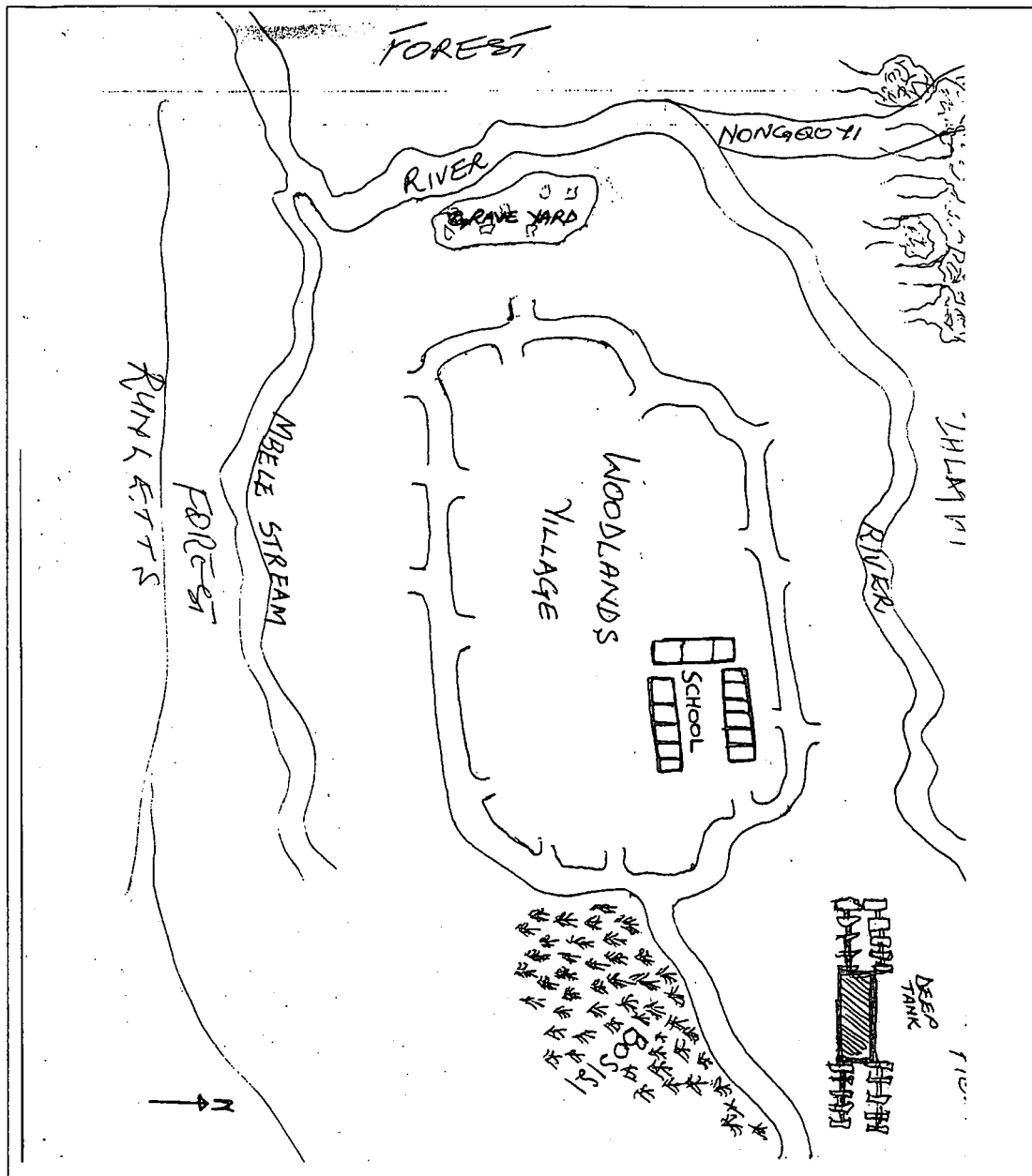
- Youth did not include graveyards in their map since they were not interested in them
- A group consisting mainly of women had a problem of placing boundaries between villages; they were not sure about them hence they argued over this.



- A group consisting of male participants took a relatively shorter time to draw village boundaries than females and there were no arguments on whether to include or remove some features as was with the other groups.

Other important information retrieved from this activity was as follows:

- Neighbouring villages mentioned were Runlets and Louis.
- The number of households in villages was referred to as increasing with this being evidenced by the fact that youth from Woodlands had to start a new village across Woodlands (Runlets) where they can settle because there were no spaces left in this village for building houses.
- No prominent social structures or institutions running the village were mentioned during this activity. (Except for a community leader (isibonda) which was referred to as non-functional since 1994).
- Resources were perceived to be relatively scarce than in the past.
- It was also mentioned that the woodland was open and free to all and no one was mentioned as making decisions on land allocations.



**Figure 2: Woodlands village drawn by a group of male and female participants from the village during group discussions (n = 15)**

### 3.1.1.2 Group interviews

People from Woodlands revealed that there was a close relationship and association in terms of sharing the woodland resources between Woodlands and Runlets villages. It was highlighted that people used to live more spread out, but were forced to move their houses according to the betterment planning, to provide land for camp areas where

livestock could graze. People previously used aloe as a fence, but since they are living closer together now, they believe they need real fences so they use more poles for fencing which results in frequent harvesting of woodland products. Commercialisation of woodland products, especially of trees was also mentioned. Local people from this village indicated that to buy woodland products, it normally costs about R300<sup>4</sup> per trailer of poles, R200 per trailer of branches, R150 per donkey cart of poles, R140 per donkey cart of branches and R15 per head load (28 kg) of fuel wood. There are differences in size of the trees used for different purposes. Poles used are taken from more mature, larger stems than branches. For example a pole of 11 cm diameter and two metres in length weighed 19 kg (Boniwe pers.com). This commercialisation was also mentioned to be another factor resulting in frequent harvesting of woodland products. These factors were perceived to play a role in woodland degradation. However, it was also indicated that from 1965 until now the woody vegetation has been disappearing because people were moved to the location as part of the Government's "Betterment Programme".

### 3.1.1.3 Semi-structured interviews

#### 3.1.1.3.1 Species used at Woodlands village

Although modernisation has introduced some alternatives for wood such as fencing wire, exotic timber in woodlots, building bricks and corrugated iron, the majority of people from Woodlands village still prefer to use traditional materials for fuel wood and fencing. Trees are not only used for one specific purpose. A few species have multiple functions and are favoured both by men and women. These are considered to be the most important species in this village. Often-collected species for both fuel and kraal purposes are *Ptaeroxylon obliquum* (Umthathi); *Maytenus heterophylla* (Umqaqoba); *Olea europaea* L. subspecies *africana* (Umnquma); *Acacia karoo* (Umnga) (see Table 1). While collecting, people usually look for certain species, particularly for poles, but if they cannot find the preferred species, they take what they can find.

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<sup>4</sup> R1 = 0.126 US Dollars at the time of study

**Table 1: Table showing preferred forest species in Woodlands and Pirrie Mission**  
**(n<sup>5</sup>=75 in Woodlands and n=95 in Pirrie Mission)**

Category of use	Genus and species name (Woodlands)	Xhosa name	Genus and speciesname (Pirrie Mission)	Xhosa names	n in Woodlands	n in Pirrie Mission	%respondets( Woodlands)	%respondents ( Pirrie Mission)
Poles	<i>Ptaeroxylon obliquum</i> ,	Umthathi	<i>Acacia mearnsii</i>	Umnga	16	18	21	19.5
	<i>Olea europea subsp. African</i> ,	Umnquma	<i>Apodytes dimidiata</i> ,	Umdakane				
	<i>Pappea capensis</i> ,	Ilitye	<i>Ochna arborea</i>	Umthentsema				
Branches	<i>Pappea capensis</i> ,	Ilitye	<i>Podocarpus falcatus</i> ,	Umkhoba	3	6	4	6.5
	<i>Olea capensis</i>	Umqqumba	<i>Olea capensis</i>	Ugqwangxa				
	<i>Cordia rudis</i> ,	Intsinde	<i>Cordia rudis</i> ,	Intsinde				
Fencing	<i>Ehretia rigida</i>	Umhleli	<i>Ochna arborea</i> ,	Umthentsema	11	15	15	16
	<i>Ptaeroxylon obliquum</i> ,	Umthathi	<i>Maytenus capitata</i>	Umqaqoba				
	<i>Olea europea subsp. African</i> ,	Umnquma	<i>Olea capensis</i>	Ugqwangxa				
	<i>Schotia Africana</i> ,	Umqonci	<i>Ochna arborea</i> ,	Umthentsema				
Medicine	<i>Maytenus heterophylla</i>	Umqaqoba			9	6	12	6.5
	<i>Olea europea subsp. African</i> ,	Umnquma	<i>Acacia mearnsii</i>	Umnga				
	<i>Acacia karoo</i> ,	Umnquma						
Fuelwood	<i>Ptaeroxylon obliquum</i> ,	Umthathi	<i>Olea capensis</i>	Ugqwangxa	36	47	48	51
	<i>Olea europea subsp. African</i> ,	Umnquma	<i>Maytenus capitata</i>	Umqaqoba				
	<i>Acacia karoo</i> ,	Umnquma	<i>Cassine aethiopica</i> ,	Umthiwabafazi				
	<i>Maytenus heterophylla</i>	Umqaqoba	<i>Scutia myrtina</i> ,	Isiphingo				
		Umqaqoba	<i>Acacia mearnsii</i>	Umnga				
			<i>Podocarpus falcatus</i> ,	Umkhoba				
Total					75	92	100	100

<sup>5</sup> n=number of respondents

### *3.1.1.3.2 Functions of wood in Woodlands*

48% of people interviewed in this village indicated that of the different functions wood fulfils in Woodlands village, firewood is regarded as the most important. 21% of the respondents indicated that firewood was followed in order of importance by branches, which are mostly used for fencing. About 15% of respondents indicated that poles which are used for fencing and kraal building form the third part (see Plate 3), while 12% of the respondents mentioned medicines as forming the last part (see Table 1).

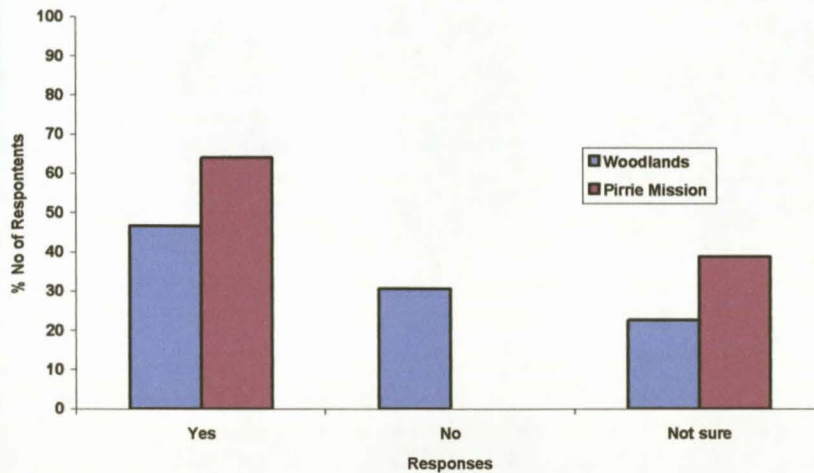


**Plate 3: An animal enclosure (kraal) built from branches, Woodlands village**

### *3.1.1.3.3 Perspectives on present resource availability and effects of use*

Although the majority of local people at Woodlands insist on still being able to find all the resources they need from the woodland they do mention that a thorough search has to be done before finding big and tall trees. About 47% of the people interviewed from this village indicated that they can still find tall trees forming patches in deeper parts of the

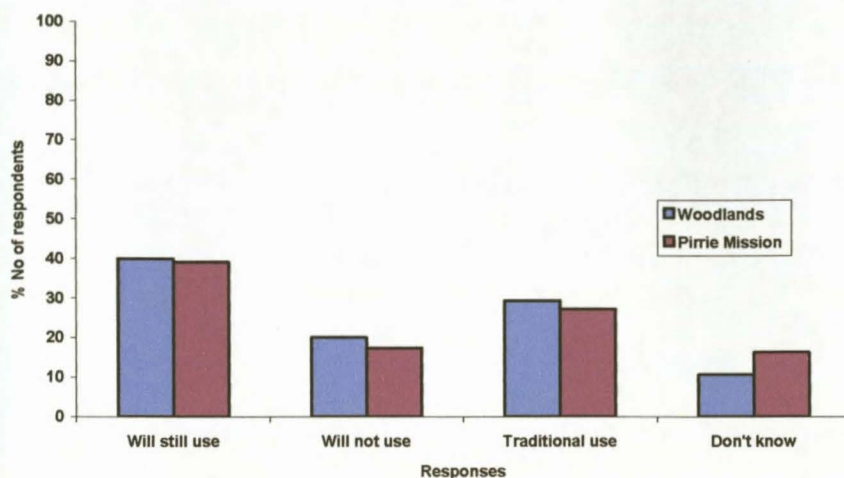
woodland. However, 31% of the respondents felt that they are faced with scarcity of resources while 23% of the respondents are not sure whether the resources are available or scarce (Figure 3).



**Figure 3: Local perceptions on present resource availability**

#### *3.1.1.3.4 Perceptions on Future use of woodland products*

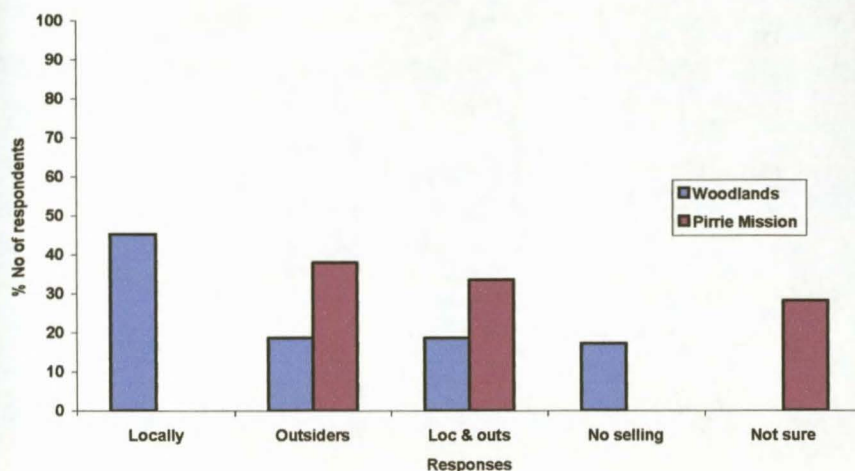
About 40% of respondents from Woodlands felt that they will still use woodland products in the future. 29% of these respondents indicated that they will only use the woodland for traditional purposes only in the future. However, about 20% of these respondents said that they will not use these products while about 11% of the respondents were not sure if they will use the woodland products in the future (Figure 4).



**Figure 4: Perceptions on future use of forest products**

#### *3.1.1.3.5 Commercialisation of wild resources*

People in Woodlands indicated that many people are selling wood products from their village. Approximately 55% of people interviewed said that products are mostly sold locally but some are taken to King William's Town. About 32% of people interviewed said that products might be sold to outsiders while 10% of them indicated that they were not sure whether products are sold to outsiders. Only 3% indicated that those with relatives in other areas make arrangements with them in terms of harvesting wood products from Woodlands, although this is unacceptable to the Village committee members. However, 17% of people interviewed felt that there was no selling of forest products in this village (Figure 5).

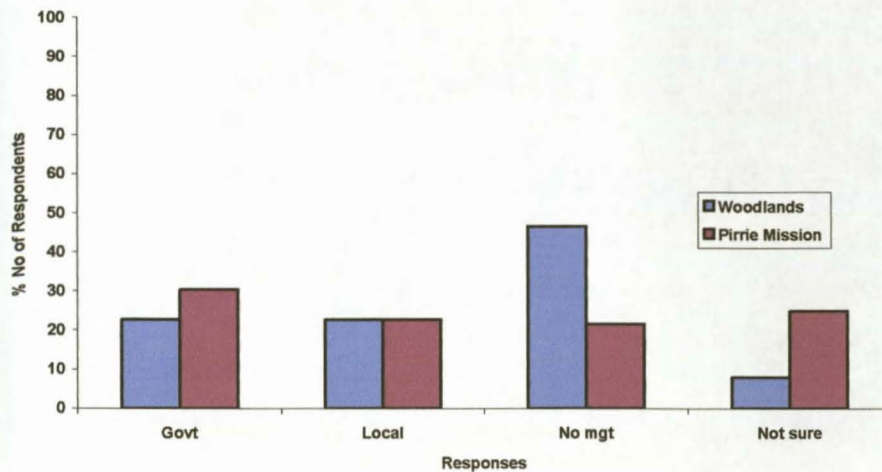


**Figure 5: Perspectives on commercialisation of forest products**

#### *3.1.1.3.6 Perspectives and attitudes towards woodland management*

About 47% of local people interviewed indicated that there is no natural resource management committee in Woodlands, although they would like to have one in the near future. These respondents also highlighted that presently there are no rules that are set to manage the woodland. Therefore when there are problems such as resource overuse, local village community members take the responsibility of calling a meeting where they address these problems. About 23% of respondents felt that the woodland is under the management of the Government while another 23% felt that the woodland management falls under local people. Only 8% of respondents were not sure as to who manages the forest presently as they were last aware of the woodland management prior to the 1994 elections in times of traditional leaders and rangers (Figure 6).

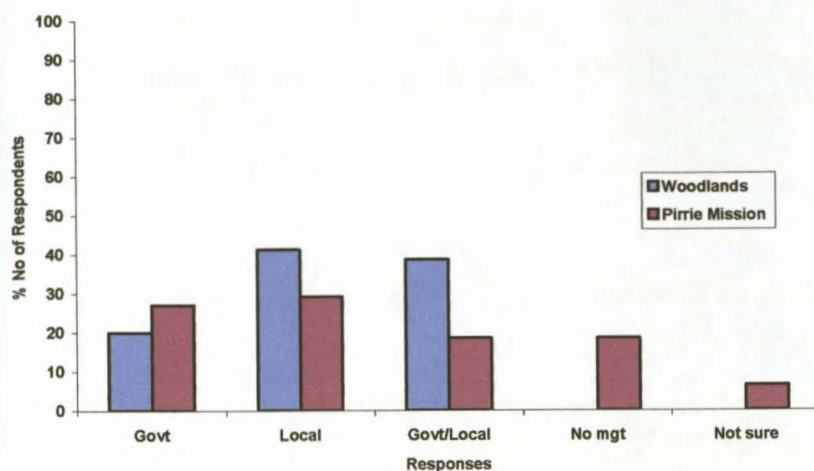




**Figure 6: Opinions on current status of resource management**

#### *3.1.1.3.7 Future management practices*

Generally local community members from Woodlands felt that there is a need for woodland management as they indicated that failure of management has resulted in stolen fences surrounding the woodland. They further argue that this was followed by over harvesting and hence scarcity of important species. About 41% of local people interviewed from this village felt that the woodland should be managed by local people while 39% felt that a joint structure (including community members and Government) should be responsible for the management of the woodland. A few people about 20% of the interviewed people felt that Government alone should manage the woodland, as they believe that Government has enough resources to manage the woodland compared to the local community members (Figure 7).



**Figure 7: Perspectives on and attitudes towards future forest management**

### 3.1.2 Pirrie Mission village (The High Mountain Forest)

#### 3.1.2.1 Semi structured interviews

People from Pirrie Mission indicated that they use the forest to collect forest products for various purposes (see Table 1). The species which are often collected were referred to as Umdakane (*Apodytes dimitiata*), Umkhoba (*Podocarpus falcatus*) and Umthathi (*Ptaeroxylon obliquum*). It was highlighted that gender makes a difference regarding the forest products collected. Women mostly collect dry wood often from parts of dead trees, which are accessible, and carry them home as *inyanda* (head loads) (see Plate 4) and store outside as woodpiles (see Plate 7). On contrary, men were said to cut the whole tree down which they cut into pieces and drag out of the woodland with cattle or donkey carts (see plate 5 & 6). Some women will also collect *imifino* (edible wild vegetables) and medicines for household use while men collect poles and *amahlahla* (branches) while some use the forest to graze their livestock.

Girls collect fuel wood during weekends and school holidays while young boys collect fuel wood and fruit. The families indicated that they collect twice as much firewood as

usual during the coldest months in June and July when additional wood is needed for heating.



**Plate 4: Women carrying head loads at Pirrie Mission village**

### ***3.1.2.2 Local perceptions on present resource availability***

Although people insisted on the forest being less dense than in the past a large number about 64% of respondents from Pirrie Mission indicated that they can still find all the products they need from the forest. About 36% of people interviewed from this village were not sure whether they can still find all the products they need from the forest or not. None of the respondents from this village felt that they do not find the products they need from the forest (Figure 3). The majority of people, 57% (see Appendix 3) from this village were of the view that there will never be scarcity of forest products in the future in this village.

### ***3.1.2.3 Perceptions on future use of forest products***

About 39% interviewed in Pirrie Mission village felt that they will still use forest products in the future. 27% of them indicated that they will use the forest products for

traditional purposes only in the future. Otherwise 18% of these respondents felt that they will not use the forest at all in the future while 16% of them indicated that they do not know whether they will still use the forest products in the future or not (Figure 4).

#### ***3.1.2.4 Commercialisation of wild resources***

Approximately 38% of those people interviewed from Pirrie Mission indicated that commercialisation of particularly medicinal plants occurs on an alarming scale in this village, with harvesters from both nearby villages ring barking the plants. This commercial trade is believed to be done by local people who are unemployed and they do this commercial trade in King Williams Town. About 34% of the respondents from this village claimed that harvested forest products are sold both locally and to the outsiders (for example, King Williams Town). However, amongst forest products, products sold locally are mostly for firewood and medicine found in the deeper parts of the forest where few people have access. Otherwise if local people want other medicine found elsewhere other than in their forest they buy it in town. About 28% of people interviewed were not sure but suspected that there might be sale of products in town and to those villages far from the forest but this would not be prominent because people are afraid of harvesting in public since they avoid being arrested. None of the respondents from this village indicated that there was selling of forest products in this village. Also there were no respondents indicating commercialisation of forest products on a local level in Pirrie Mission village (Figure 5).

#### ***3.1.2.5 Opinions on current status of resource management***

About 30% of respondents from Pirrie Mission indicated that they think the Government is managing the forest presently because there are still restrictions in terms of harvesting and also arrests done by police in those who harvest indicating that the Government is in control. 25% of respondents were not sure as to whether there is anyone managing the forest presently as they emphasize that sometimes local members harvest without restrictions whereas sometimes there are police patrolling in the forest and arrest harvesters. However, 23% of respondents think that local users are managing the forest as they argued that before harvesting local users have to get permission from the

traditional leader. In addition they also argued that the forest belonged to local users who should therefore also logically manage the forest. About 22% of the respondents argued that there is absolutely no management of the forest as no one abides by the rules that were initially set by the Government before the 1994 elections on harvesting only the selected species. Furthermore, there are no rangers anymore and the fence separating what the State must use versus what the community must use from the forest has been removed. A very small number of respondents, 8% indicated that they are not sure or aware of anything pertaining to the forest management (Figure 6). Local community members can only be able to predict their future dependence on forest resources when they know how much will they be having, this leads to the introduction of the following section.

### ***3.1.2.6 Perspectives towards future Management practices***

Out of the people interviewed in Pirrie Mission, about 29% of them felt that the forest needs to be managed by local community members as they believe that those who live nearby the forest can be more responsible towards management because they know and understand activities that are taking place in the forest and therefore could be able to report these activities to traditional leaders who should set rules on how to use the forest on the basis of community members agreements. However, about 27% of the respondents felt that the Government should embark on forest management so that harvesting can only be done by permission in order to alleviate overuse of forest resources. Furthermore, they believe that the Government has money and therefore it will be able to hire specialists who will understand the forest dynamics. Management by Government will help to create jobs for local people according to them. Amongst interviewees, about 19% felt that forest management should be done by both local community members and the Government as they believe that Government will be able to help give guidance to local community members in terms of management. This group of respondents emphasised that in this form of management rules pertaining to the forest use and management should be suitable for everyone. Unlike in Woodlands village, in Pirrie Mission village there were respondents (about 19%) who felt that there was absolutely no need for management of forest resources as they argued that the forest is 'Gods creation'

and it belonged to everyone. Only 6% of respondents did not know who should manage the forest (Figure 7).



**Plate 5: Cattle pulling a wood load at Pirrie Mission village**



**Plate 6: A local villager holds up a donkey cart structure**



**Plate 7: Wood piles next to a shack at Pirrie Mission village**

### 3.2 VEGETATIVE ASSESSMENT

The distribution of the most preferred species at Pirrie Mission forest was analysed and the values of the Mean and Standard Deviation were presented as indicated in the table below:

**Table 2: Diameter Mean and Standard Deviation values of the most preferred species in Pirrie Mission village**

Species	Mean $\pm$ Standard deviation (Year 1)	Mean $\pm$ Standard deviation (Year 2)
1. <i>Acacia mearnsii</i>	2.19 $\pm$ 1.32	2.36 $\pm$ 1.33
2. <i>Apodytes dimitiata</i>	2.27 $\pm$ 3.92	2.29 $\pm$ 4.01
3. <i>Scutia myrtina</i>	3.42 $\pm$ 1.78	3.65 $\pm$ 1.80
4. <i>Ochna arborea</i>	1.42 $\pm$ 0.73	1.44 $\pm$ 0.72
5. <i>Cassine aethiopica</i>	1.63 $\pm$ 0.81	1.66 $\pm$ 0.82
6. <i>Olea capensis</i>	8.76 $\pm$ 9.21	9.48 $\pm$ 9.89
7. <i>Codia rudis</i>	2.44 $\pm$ 2.15	2.66 $\pm$ 2.28
8. <i>Maytenus capitata</i>	2.68 $\pm$ 2.35	2.73 $\pm$ 2.40
9. <i>Podocarpus falcatus</i>	9.00 $\pm$ 7.13	9.56 $\pm$ 7.75

The above results indicate that although there was a general increment in tree growth for different species over 12 months period, the increment was not sustainable. The results also indicate that there is no apparent fast growth even for tree species in the small diameter classes.

#### 3.2.1 Identification of species

The local and scientific names of the most preferred in both study villages are presented in Table 1. Some local names were applied at “generic level”, and a single local name could respond to two or more species, as reported by Cunningham (1996). For example, the single local name “Umnga” correspond to two *Acacia* species, *Acacia Karoo* and



*Acacia Mearnsii*. Local names were matched to the scientific names through the help of Schonland Herbarium in Grahamstown.

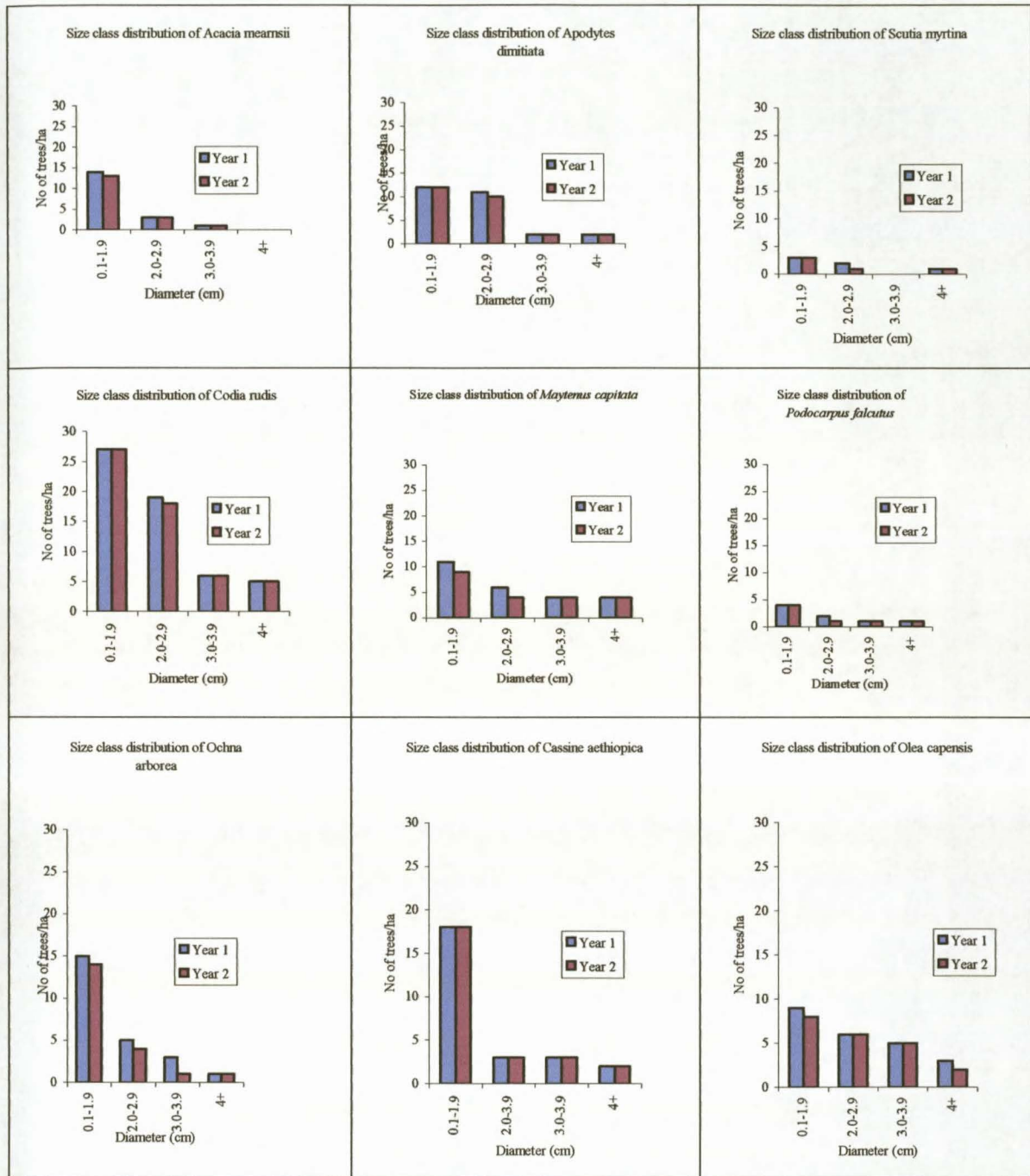
### 3.2.2 Size class distribution and regeneration of the preferred species in Pirrie

#### Mission

Size class distribution of species differed among the preferred species (Figure 8). Among the nine most preferred species in Pirrie Mission *Podocarpus falcatus*, *Ochna rudis* and *Maytenus capitata* followed an “inverse” J’ shaped curve that is characteristic of a mature and stable system or a population that is self-perpetuating (Bazzaz, 1998; Luken, 1990). This suggests that the species were shade tolerant and had abundant regeneration. This could also be a result of controlled harvesting.

For *Scutia myrtina*, the curve was irregular with intermediate classes that contain no individuals at all. This suggests that the existing level of small trees were insufficient to restore these classes. *Cassine aethiopica* and *Ochna arborea* also showed no overall pattern, with the lack of regeneration among smaller size class and the presence of few large trees in other diameter size classes. This pattern illustrates an intense harvesting of large trees.

Of the nine most preferred species the most vulnerable species are *Acacia meansii*, *Ochna arborea*, *Apodytes dimitiata* and *Olea capensis*. These species show a pattern where large trees are over-harvested at an alarming rate (Figure 8) and hence threatening the reproduction of new species. *Acacia meansii* was the extremely vulnerable as it contained no trees at all in the final classes. However, its over-harvesting is not threatening as it is an invasive species and therefore very easy to regenerate. Over harvesting of these may be due to their multiple functions, which were mentioned, earlier on in Participatory activities (see Table 1). This also confirms what was mentioned in Group activities that poles used are normally taken from mature, larger stems as this can be evidenced by the fact that these species were also confirmed to be used for poles (see Table 1).



**Figure 8: Size class distribution of the most preferred species for fuel, branches, poles and medicines in Pirrie Mission village**

## 4 DISCUSSION

This section discusses the main findings from the previous section.

### 4.1 IMPORTANCE OF FOREST RESOURCES TO LOCAL USERS' LIVELIHOODS

It is evident that in both study areas woody resources contribute substantially to the daily needs of the community. Most people interviewed during this study had a good knowledge of the tree species they prefer for harvesting especially for fuel wood and construction. This finding supports the argument of Bembridge & Tarlton (1990), that most harvesters in the Eastern Cape have a good knowledge of the tree species they harvest. The fact that people from the two study areas know much about their tree species highlights their dependence on the indigenous woodlands and forests.

Most species exploited by people in Woodlands village were mentioned several times in the interviews. Factors which influence people's preference for certain tree species for fuel were mentioned as their capacity for prolonged, steady burning without emitting sparks, excessive smoke or noxious vapours. They further argued that the fuel wood most preferred should make long-persistent glowing coals, which eventually disintegrate to fine ash. Visual assessment of the woodland at Woodlands village suggests that fuel wood and larger sized trees for construction are becoming increasingly scarce. Very few trees with diameters larger than five centimetres were found within a kilometre of the village, although some larger trees were found at some distance at the bottom of the river. The appearance of the woodland from a distance is given by the presence of *Euphorbia species*, which are not used for fuel or construction.

Although recent studies conducted in Pirrie Mission (Cocks *et al.*, 2004), indicated a heavy utilisation of medicinal plants in this village, the results of the study came with a different outcome. The findings from this study indicated that medicinal plants were not so important in the village (evidenced by 12% respondents as the last important resource). A difference in findings can be attributed to the unwillingness of elder people to participate in both group and semi-structured interviews due to the previous mentioned

protests against councillors. Although no data was recorded, it was obvious in the semi-structured interviews that only youth (ages 18-25) were willing to be interviewed and the tendency with this group of people is that they are either not familiar with most medicines from the forest or they are not interested in them since some of them are working and therefore can afford the medical expenses. Another reason might be since only the preferred species were used for the study some of the medicine which were useful fell out of the priority list (see Appendix 1).

According to Grundy & Cocks (2002), Pirrie Mission displays a wealthier nature as compared to Woodlands village. This gives Pirrie Mission households' more options to meet their basic needs than Woodlands. For example, disposable incomes in Pirrie Mission allow greater access to resources, through the purchase of more labour to collect resources, the availability of transport to increase the area from which resources can be gathered, the purchase of wild resources from outside the immediate vicinity, or through the purchase of market alternatives to wild products. This can be shown by the fact that rather than preferred trees mentioned as scarce in this village, they were believed to be still found in relatively satisfactory numbers but not as much as they used to be found before. Visual assessment and vegetative assessment also confirmed this (Figure. 8). Generally, attempts to promote fuel wood alternatives to rural population are usually hampered by poor rural conditions such as lack of income and unemployment. This means that since Pirrie Mission people seem to have a potential to supplement forest products then sustainable harvesting of indigenous resources can still be reinforced in order to protect the forest in this village. In order to help reduce dependence on indigenous resources especially fuel the government therefore needs to improve the rural populations' economic conditions. This view is also supported by Furness, (1979); Martin, (1996); Agrawal & Singh, (2001).

The dependence on woodland and forest resources by the two study areas can be attributed to the fact that in South Africa, the lack of rural development resulted in an increase in people who are mostly unemployed and therefore rely on woodland and forest products. According to Grundy & Cocks, (2002); Ainslie *et al.*, (1996), people living in

the Eastern Cape are some of the poorest in South Africa, with those from the former apartheid "Homelands" facing the worst poverty. In the rural areas such as Peddie these poverty levels are even higher (Ainslie *et al.*, 1997; Mail & Guardian, 2004).

Findings in this study have also indicated that despite for domestic use, forest resources in both study areas contribute substantially to income generation. For example in Woodlands village and a neighbouring village Ntloko, fuel wood is being sold to elders and elsewhere in King William's Town (Van Lieshout, 2002). Grundy & Cocks, (2002) found out that in both study areas, a few male villagers with donkey carts harvest hardwood poles and fuel wood from the rivers and sell them to neighbouring villagers. This accelerates deforestation. Except for income generation purposes commercialisation of traditional medicines in both study areas can be attributed to the scarcity of hospitals and dispensaries near the two study areas. Although no data was presented for this, local communities in both study areas showed a considerable knowledge about many aspects of medicinal plants, including their abundance, uses and methods of harvesting. There is no doubt that medicinal plants cannot be managed effectively without the co-operation of local communities, who are in the best position to protect and manage them. This means that there should be agreements between traditional healers from these study areas and forestry authorities in terms of which medicinal plants should be used, amounts to be collected, and by whom. This could result in an increased interest among local collectors in the protection and conservation of the resources for their continuing benefits.

The impact of harvesting on woodland and forest resources is also indicated by the relationship between distance one travels before finding preferred species and the density of the woodland and forest. As has been observed in both study areas the most preferred species were found more or less in the deeper parts or far ends of the woodland and forests instead of being distributed nearer the villages. The size class distribution results also confirmed this. Ultimately, this has increased the susceptibility of land to degradation such as soil erosion and depletion (Plate 5). Depletion of woodland and forest resources in both study areas was due to illegal harvesting of resources, especially for firewood. Size class distribution also proved this.

## 4.2 COMMUNITY PARTICIPATION AND POTENTIAL FOR COLLABORATIVE MANAGEMENT

According to Obiri *et al.*, (2002) knowledge of woodland and forest resource base and its ecological functioning are prerequisites for sustainable woodland and forest management. They further argue that besides that, the attitude of communities towards a management system seems to be equally important. It is often hypothesised that communities actively use and manage their resources if they are involved in the planning and decision-making of forest issues. Failure to involve communities usually results in resistance and overexploitation of resources (DWAF, 2002). For example local community members in Pirrie Mission village indicated that one of the reasons they embarked on over-harvesting forest resources was the failure for Government to involve them in decisions made towards their forest. Several interviewees (Appendix 3) mentioned this during semi-structured interviews. The negative attitude towards community management in this village may also be partly explained by a reduction in local chiefs' control over local woodlands and forests caused by new political dispensations. With the introduction of the Transitional Rural Council, chiefs' powers have dwindled and so have woodlands and forests under their control (Grundy & Cocks, 2002). This loss of influence may have reduced local confidence in the ability of traditional tenure systems to manage woodland and forests (Kennedy *et al.*, 2001).

The above view is supported by Shackleton & Shackleton (1997) by arguing that communities hardly recognise the value of resources, especially when not expressed in monetary terms, when it cannot be owned and when there is little understanding of the benefits enjoyed. This means that the Government is faced with a challenge of involving local community members in decision-making about the forests and woodlands (Collaborative management). The concept of collaborative management should promote the idea of trying to develop equitable partnerships especially at Pirrie Mission drawing upon the complementary strengths of forestry departments and local users. In principle, the Government rather than withdrawing from forest control and management in this village, it should reshape its responsibilities to ensure the largest measure possible of involvement by the latter, and to ensure collaboration rather than conflict between the

two. Otherwise without this, seemingly it will not be an easy task to involve Pirrie Mission village in collaborative management issues notwithstanding the fact that DWAF exists or has had a presence in this village.

Local community members need to be trained and made to understand their needs and how they fit into the overall strategy of sustainable natural resource use and management (DWAF, 2002). This statement supports the conventional wisdom of many researchers that communities need to be involved in all levels of decision-making. Obiri *et al.*, (2002) believed that communities have a vital role in environmental management and development because of their knowledge and traditional practices.

It has been reported that people are unwilling to participate in any form of management at Pirrie Mission village (Harrison, 2002; Kameni, 2002). Even though no data was provided for this, one of the reasons provided by community members was that they fear to involve themselves in this kind of management because they will have to report those who break the law and this might be followed by killings, house burning and robbery against those who are against harvesting of the forest. This means that proper security and safety measures also need to be ensured to local members who participate in these management strategies.

South Africa has amongst the most progressive and detailed forestry policies in the world, but their implementation is a problem. The policy implementation needs to be constantly improved relative to the nation's needs by applying the lessons learnt in their experiences. Since the forest sector does not exist in isolation of other elements of the society, to be successful the policy implementation must be sufficiently inclusive and robust. Moreover the policy implementation must be sufficiently credible to inform other policy processes where their impact is significant upon the forest sector (Foy & Willis, 1998). In this way policies will make progress towards sustainable forest management.

According to Govere (1997), sustainable forest management can be achieved by strengthening income-tree growing programs. People responsible for tree growing should

be provided with both economic and social incentives. Principles and practices of tree growing and management should be incorporated in School curricula. This means that Rural institutions and organisations must be strengthened and this can be done by providing forestry extension and research services. Land tenure systems that promote tree growing and management must be supported.

However, the above points are not without shortcomings especially, legal, institutional and socio-economic shortcomings (Govere, 1997). Besides including local community members in decision- making about the forests, it is very important for Community Forestry projects to realise the complexity of a rural community and to understand the influence of different social factors. Although Community forestry is important for community development, it can be harmful when done on the basis of a whole community since communities are too diverse to sustain long-term projects and hence sometimes there are conflicts associated with different interest groups, which can lead to destruction of a project. According to Cernea (1991) and Burkey (1993), the solution to this is to identify the community sub-sections able to implement and sustain the innovative approaches and carry out the work with them.

However, with Woodlands village it was evident that local members were too keen to start management controls of their woodland (Appendix 3). Besides this being emphasized during semi-structured interviews, the community is also engaged in a number of other development projects. Although much has to be done to improve the nature of the woodland in Woodlands, given the state that it is already in, the interest and enthusiasm shown by people from this village during both group discussions and semi-structured interviews could help improve this woodland. Seemingly, people would be engaged in any Community Forestry Programmes that could be suggested by the Government.

### 4.3 VEGETATIVE ASSESSMENT

The study on the assessment was based only on the most preferred species at Pirre Mission village (as mentioned in section 1.8.1). Preference was based on fuel, branches,



poles and medicinal uses. As no data was available for the population biology of the preferred tree species, their distribution and responses to exploitation and maximum sustainable yield could not be determined (Perez & Arnold, 1996). This means that information provided by these results can only be used to understand the importance of this forest in livelihoods of local communities as well as to suggest the management policies that can be implemented in this forest.

According to Low & Rebelo (1998), Pirrie Mission forest consists of well-developed matured soils with a potential to enhance growth. Size class distribution patterns measurements of trees in this forest confirmed this (Figure 8). These measurements indicated that this forest consists of a majority of smallest trees, which signifies differences in measurements between size classes for both year 1 and year 2 as smallest trees normally grow faster compared to old trees (see Table 2). Distribution of smallest trees in this forest indicates that with more careful use and management of the forest there is a potential that these trees can grow and become bigger. Smaller number of trees can also be due to normal population distribution

Although no size class distribution measurements were done at Woodlands due to the fact that the woodland is degraded and there are very few trees with diameters larger than 5cm left, it was evident that there are differences in the conditions of the forest at Pirrie Mission and the communal woodland at Woodlands. These differences can be attributed to the differing tenure systems, nature and quality of soils due to harvesting, and the rainfall. Pirrie Mission, which is a State Forest, has higher rainfall as well as well-developed matured soils, which enhance rapid growth (Low & Rebelo, 1998). In contrast, soils in the communal woodland at Woodlands are described by Ainslie *et al.*, (1996) as infertile, dispersive, unstable and exhibiting extreme phosphorus deficiency, a character that obviously hinders growth and development in plants. Besides soil infertility and other mentioned factors, over-harvesting is also a problem at Woodlands village. This was noticed during a visual comparison between Runlets and Woodlands. The presence of tall trees at Runlets might be due to the fact that trees at Runlets were growing as riverine forests on the slopes of the river. Soil moisture is higher in this area

hence trees grew bigger. The steep nature of Runlets woodland also reduces easy access to vegetation hence the ability for this woodland to maintain tall trees.

Size class distribution measurements in Pirrie Mission indicated that a number of trees showed an irregular pattern and this could be attributed to over harvesting of adult trees (Figure 8). Over-harvesting was probably due to the fact that as from 1994, those living next to the State Forest utilised resources almost as freely as their counterparts in communal areas due to a reduction in control over the State Forest boundaries. There was no sense of ownership of resources amongst villagers in this study area.

The analysis of size class distribution of preferred tree species indicated that many populations examined were unstable, with variable transitions from one size class to the next. A stable population is characterized by low ratios of change between successive size classes (Taylor & Walker, 1984), corresponding to marginally convex curves without clear inflections (Knowles & Grant, 1983). With the exception of *Podocarpus falcatus*, *Maytenus capitata*, and *Codia rudis*, other species did not conform to this ideal since they showed a negative exponential distribution. The populations of *Cassine aethiopica*, *Scutia myrtina*, *Codia rudis*, *Ochna arborea*, *Acacia mearnsii* and *Apodytes dimitiata* had more small trees than adult trees indicating that there was over harvesting of adult trees of these species. However, this pattern of distribution indicates that species were more stable in densities and had a potential to self replace (Geldenhuys, 1992).

On the other hand, species like *Acacia mearnsii*, *Ochna arborea* and *Olea capensis* seemed to be most vulnerable as they showed patterns of being over harvested especially at mature stages. This means that these species might lose their reproductivity. Even though most studies in Working for Water Programmes have indicated that *Acacia mearnsii* is an invasive species, which needs to be eliminated, its value as a medicinal plant was of significance to both study villages (used for rituals). This means that with careful management this species can be of importance to both communities.

Generally, the size class distributions of the preferred species in Pirrie Mission indicated that no species were in natural and unharvested condition. In the presence of such disturbance, these species may temporarily disappear from the forest with their populations being represented only by few small trees and seeds lying dormant in the soils. The differences in the abundance of different species across the forest indicated may also have been caused by differences in environmental conditions (for example soils and rainfalls) and differences in canopy cover or light gaps in the forest (Armesto & Fuentes, 1988).

## 5 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 CONCLUSION

Even though recent studies have shown that people are becoming increasingly integrated into the market economy, it is obvious that the forest will always play a buffer role as a resource that people can draw upon during periods of agricultural shortfalls and unemployment (FAO, 2002). For example, although the installation of electricity in South Africa is considered to be the most economical step forward in meeting rural peoples' needs, electrification of rural households does not necessarily guarantee that there will be less fuel usage in the future as most rural households in the two study areas still use fuel wood as their main source. Trollop & Cotzee (1978) had similar findings to this study. Although no data was collected, but this was evidenced by people in the two study areas where they also indicated clearly that they would not rely on electricity, as most of them feel that it is unreliable and expensive. It is therefore logical to assume that an improvement of rural populations' economic conditions is one of the many ways that can help reduce dependence on indigenous forests. The reluctance of the majority of rural people to change to other commercially available household fuels is also an indication that fuel wood usage will continue to rise in absolute terms even in the next generation, as in the 19<sup>th</sup> and 20<sup>th</sup> centuries (Munslow *et al.*, 1988, Obiri *et al.*, 2002).

In South Africa and elsewhere (for example, South America), traditional management and use of natural resources have been undermined since the colonial era by policies that encourage settlement by colonists, with property rights linked to land clearance, and that yield resources to logging, mining and other interests (Pert *et al.*, 1991). However, the democratic Government in South Africa has since adopted a comprehensive system of promoting integrated rural development, inter alia sustainable use and management of resources. This important issue clearly requires an inter-disciplinary "marriage" between social forestry, social anthropology and sociology, a new research tradition, that is, Participatory Rural Appraisal and engaging in community participation and capacity building strategies such as public- private- partnerships. The Government, forest rangers, local communities and the general public must find ways to balance and integrate past

conservation values, land uses and traditional rural forest use with more diverse forest social values, uses and changing rural or urban communities (DWAF, 2002). Failing which socio-political conflict could become the major 21<sup>st</sup> century constraint to sustainable forest ecosystems and to rural community socio-economic development (Kennedy *et al.*, 2001).

Community Forestry and woodlot projects should be looked at in their entirety, with all possible benefits. If any of these are found to be favourable options, then they should be implemented so that the benefits are developed as much as possible (Ham & Theron, 1999). The objectives of these projects should be phrased in terms of contributing to an appropriate sustainable land use and rural upliftment. Considering the above-mentioned, community forestry can form an integrated part of rural development programmes as stated in the Reconstruction and Development Plan of Government. Through community forestry projects, which are people driven, human resources can be developed and hence increased empowerment of local community members.

To be relevant and effective in the 21st century, forest management and research must be positioned in a broader, more inclusive ecological, economic and social context. Forest managers must challenge and adapt their traditional thinking and past societal roles, to be helpful in current adaptation to an urban, post-industrial society, as they were in the industrial revolution (Kennedy *et al.*, 2001). This does not imply rejection of traditional values and beliefs, rather a maturation and integration of much traditional conservation thinking into a broader sustainability context and post-industrial, global socio-economic systems (Obiri *et al.*, 2002; DWAF, 2002; Hopley, 1996; Grundy & Cocks, 2002).

The inability of villagers to predict wood shortages in the future (such as in Pirrie Mission State Forest) means that without outside intervention people from this village will continue to use the forest unsustainably (Appendix 3). In Pirrie Mission, people do not regard conserving fuelwood supply as the top priority. They are concerned with many other acute survival problems and give immediate priority to the problems of water, food and cash income. The supply of energy from wood and the negative consequences

of excessive collection and the resulting deforestation are not seen as an important priority. This may continue until degradation has become so serious as to be practically irreversible. The role of traditional management practices in the management of natural resources is significant in ensuring sustainable utilisation of resources in this study area. The practices may include conservative use and selective maintenance of particular species (such as was done in Pirrie Mission village prior to the 1994 Government elections). The customary practices and taboos need to be still respected and observed. These practices have also been observed by Shepherd (1992) and Clarke *et al.*, (1996).

Lack of trust between local village people and Government authorities has resulted in people from Pirrie Mission village resisting any suggested form of management especially if Government authorities are involved. People have therefore responded by not claiming ownership over natural resources and therefore a situation of open access exists both in the State Forest and the communal woodland studied. With a scenario like this it means that common property resources and participatory regimes are likely to face some difficulties in these two study areas. Matose & Wily (1996) has reported this tendency, where villagers in Zimbabwe deliberately used wasteful and destructive methods of harvesting in retaliation to what they consider as unfair and unnecessary harassment from the State officials. Overall, the effect of removing control of natural resources from traditional local level to the State has been one of the causes of poor natural resource management. This means there must be devolution of powers from Forestry authorities to rural people in these areas. However, devolution involves the willingness of central authorities to give up power to those at local levels, a course of action that often clearly presents difficult choices. According to Agrawal & Ostrom (1999), devolution is more likely to take place by providing strategy whereby central Government can pursue its goals. This usually results in uncertainty and conflicts between Government authorities and local people.

Other factors that might contribute to these difficulties are the increasing pressure to commercialise forest and woodland products by local community villagers. This means that the relative strength of more powerful interest groups might continue to prevail over

decision-making on resources. Another factor might be the complex and heterogeneous structure of villages. Inequities within communities such as social, economic and cultural activities are likely to cause problems in terms of co-operation. Otherwise, some form of incentive driven co-operative forest and woodland management will be necessary to uproot the uncontrolled use of resources and bring about social responsibility for natural resource management. On the other hand a paradigm shift from the Departments who own the lands (an ownership that is operationalised through the Forestry Departments) and understand the history, culture and value system based on top-down, centralised processes to the bottom-up systems might contribute to the difficulty to the transition to the Joint Forest Management of resources (Hobley, 1996). This means that in order for PRA to succeed there should be collaboration between stakeholders involved in natural resource management at national and provincial levels with other Departments such as Land Affairs and Environmental Affairs amongst others.

## 5.2 FUTURE PREDICTIONS

Without careful use and management, both the State Forest at Pirrie Mission village and the woodland at Woodlands village will continue to be degraded. This will further be accelerated by lack of volunteers to be involved in management strategies due to social pressures. It was also emphasized on semi-structured interviews that lack of interest by the youth in the woodland and forest resources presently indicates that in the future very few local community members from the next generation will be willing to partake in the woodland and forest use and management practices. Most households will be abandoned by future generations of youth who will migrate to big cities to pursue their tertiary studies or to seek jobs. This group of people will only come back during holidays for rituals. This implies that these people will not be available to participate in any form of decision-making about their forests and woodlands. Only those who cannot get jobs in towns will continue to rely on woodland and forest resources.

Although no data was presented (in Pirrie Mission specifically), the influence of institutions that were mentioned as existing in the village (Chiefs, Tribal Council and Headmen) are operating in an uncoordinated way. Under normal circumstances these

institutions are expected to provide assistance in terms of provision of livelihoods but they are failing. Apart from the management of natural resources, the role of traditional and modern governing institutions in the provision of rural livelihoods is quite limited. There is little that Headmen and tribal chiefs can offer in terms of financial, human and physical capital assets that the community needs to secure their livelihoods. The local Government and other governmental institutions have little or no significant role in the provision of livelihoods in these two study areas. The physical and human capital assets have not been developed in these areas. The poor infrastructure (especially in Woodlands village) and lack of schools in this village have led to low levels of education. This has resulted in increased unemployment and high poverty levels in this village. Unless the Government introduces incentives with the concept of collaborated management in these areas, this trend will continue to be the problem in these study villages.

In both study areas, the collaborative management of protected forests has not previously existed. It was apparent during group discussions that in the case of Woodlands village, local communities have started planning on having programmes of social forestry that will deal with development activities. These would be done in order to conserve the woodland and to reduce the dependence of this community to the forest resource. However, this was not the case in Pirrie Mission.

The effective and meaningful involvement of local communities in natural resource management has been attempted under Collaborative or Joint Forest Management in India by linking socio-economic incentives and forest management (Badola, 1999; Tewari, 1992). Many countries in the world have undertaken a series of initiatives aimed at devolving management, control and ownership of natural resource and woodland resources to local communities. In India, resource degradation has led the Government to enter into partnership agreements with communities whereby the responsibility for forest management is placed with communities. In return, these communities are allowed to harvest certain species in certain areas and to receive fixed percentage of revenues from harvesting by the State Forest Department (Mukerji, 1992). This suggests that in future



the State Forest in Pirrie Mission needs to adopt the style of entering into partnership with the government.

In other countries in Africa, national forest policies towards community-based forest management have been changed. For instance, in Ghana, a collaborative management scheme has been adopted in order for the community to benefit from the forest resources (Prah, 1997). In Zimbabwe, the CAMPFIRE programme ensures that revenues derived from wildlife reach councils and communities (Scoones & Matose, 1993).

Elsewhere in Africa, community-based approaches to forest management have been adopted; Woodlands in Mali (Skinner, 1998), the Kilum and Ijim montane forests of Cameroon (Nurse *et al.*, 1994) and in Tanzania the Duru- Haitemba and Mgori forests (Sjoholm & Wily, 1995). Collaborative management is also emerging as a strategy for conservation and sustainable use as in Sri-Lanka (Carter *et al.*, 1994). However, in other countries, the concept and strategy of Collaborative management is still under the fluid state for example in West Africa (Mukerji, 1992).

From previous studies, it is evident that the potential for collaborative management varies as a consequence of experiences and that Collaborative management approaches that work elsewhere may not necessarily be applicable in the two study areas (Woodlands village and Pirrie Mission village). This depends on the current legal and policy provisions of forests and the attitudes and perspectives of local people towards the use, management and conservation of the forests. Despite this, it seems that there is potential of Collaborative management at Woodlands village. Reasons pertaining to this are firstly, the willingness of community members to work and listen to researchers from elsewhere, and secondly, their enthusiasm in initiating social forestry programmes to deal with development issues and activities (Motinyane, 2002). The role of community leadership from these social programmes is one important factor that can possibly affect the success of collaborative management in this village. These should be encouraged to establish a direct relationship with the Government structures and interact with the forest authorities and conservation services. It is from the above view that the following

recommendations for the two study areas and other South African rural populations are being made:

### 5.3 RECOMMENDATIONS

Rural areas in South Africa have a history of restricted resources, forced settlement, lack of democratic control of development and poor education. These are all issues to be addressed through integrated rural development strategies. Forestry has an important contribution to make regarding integrated rural development. Because of the transition to the New South Africa, people need to be given time to make decisions as they normally resist pressure from Government consultancy (Critchley, 1994; Kameni, 2002).

In order to make use of the forest sustainably in both study areas, it is proper to link the forest produce with local enterprises, for both wood and non-wood products. Encarnation, 1999 supports this view. The development of alternatives to resource use could be an important complementary strategy for improving the livelihoods of these communities. Enabling access to some resources in the forest alone cannot solve the livelihood problems of the communities. Substitution activities can provide for some of the preferred and requested resources as a remedial strategy to low resource availability. Alternative activities could include local cultivation of indigenous tree and shrub species for the production of medicinal plants, poles and wooden products in both study areas, following the example of the Guira Bansa projet in Ghana (Prah, 1997).

In response to wood requirements, local communities in these two study areas could be encouraged, trained and provided with appropriate materials to establish their own sources of wood products. Forest projects in the region would, for example, aim at reducing the fuelwood and pole requirements. For example, they could develop business enterprise such as brick-making to substitute use of poles for thatching purposes. In case where forests are vital to livelihoods (such as medicinal plants), the forest must be managed with this view in mind. This implies that traditional healers and leaders must effectively and successfully enforce the full spectrum of woodlot management in these

areas. Other recommendations for both study areas and rural populations in South Africa are:

- Financial incentives to encourage tree planting on both private and communal lands should be used on a regular basis as in other developed countries (Grundy & Cocks, 2002). Various sponsored schemes in the form of grants and tax exemption should be made available to motivated and interested applicants
- The Government needs to make sure that these incentives are strong enough to be visible to everyone in these communities and these incentives should not be offset by substantial deontives.
- Government should provide local organisations to which they devolve responsibility with sufficient real authority and support to enable them to exercise their rights and manage their forest effectively.
- Unlike in the past where control was exercised by an outside agent usually a Government or statutory body, a degree of local participation should not only be encouraged at stages of project implementation and maintenance but also in planning (Ham & Theron, 1999).
- Clear roles on forestry activities (such as maintaining or utilizing woodlots) should be given especially to chiefs, tribal authorities or local people in order to increase knowledge about the management and utilization of valuable assets in their areas.
- Local community members need to be trained on how to use and manage their woodlands and forests. Clear boundaries of what is expected in forest management need to be established (Borrini-Fereyerabend & Buchan, 1997).
- A pattern of continuous consultation and feedback amongst stakeholders ensuring that lessons learned could be applied to modify the process of forest management needs to be maintained (DWAF, 2002; Harrison, 2002).
- There should be proper planning of the production of wood for commercial purposes as well as meeting local needs for fuel wood, poles, food, fodder and other purposes. This means that these areas have to be managed sustainably. These areas need to be set aside as plant or wildlife reserves or for recreational or environmental purposes and then be protected (Harrison, 2002).

- In principle, rather than withdrawing from forest control and management in favour of local users the Government must reshape its responsibilities to ensure the largest measure possible of involvement by the latter, and to ensure collaboration rather than conflict between the two (Berkes, 1997).
- Forest management should promote a balanced fair and gender sensitive approach. This will help alleviate any conflicts that may arise during decentralisation of responsibility (DWAF, 2002).
- As was previously mentioned in the interviews the management needs to be done both by local users and Government in these two villages in order to avoid that benefits of Community forestry projects are not manipulated in favour of elite leaders, affecting the interest of poor people in the community (Burkey, 1993).
- The Government should introduce the stipulations in the New Forest Act (1994) to both study areas, which allows people to develop themselves using the woodland and the forest. This should be of value especially at Woodlands where most of the community members do see the need for management; therefore they need community-partnership approach.
- Government, NGOs and other stakeholders should collaborate in soliciting research funds for determination of sustainable harvesting levels. Ways for rural communities to participate in the regular monitoring methods of trees and other natural resources should also be identified.
- Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their Indigenous Knowledge Systems and traditional practices. States should recognise and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development (DWAF, 1995; Hopley, 1996).
- Forest management should be based on Batho Pele principles (which emphasise on the recognition of peoples interests, transparency and involvement in all decision making processes) and be implemented with a common vision amongst stakeholders (DWAF, 2002). This should help to uproot previous experiences of past Government policies, which used to exclude communities in decision-making about their woodlands and forests.

- Other forms of land use that interact with forestry must also be sustainable, for example, sustainable forestry will be impossible without sustainable agriculture which will in turn require programmes to limit human population (Hobley, 1996). This means that Department such as Department of Environmental Affairs and Tourism, Department of Water Affairs and Forestry, Department of Land Affairs and Department of Agriculture need to integrate and draw policies and principles binding them to work together.
- Incentives for community participation in forest protection and management should be done. This can be done in terms of income, goods and power to control the forest by local communities, employment in forestry department activities, provision of services such as improved roads and water supplies, and provision of financial and technical support to self help groups to enable them to develop non-forestry livelihood enhancement activities in these study villages (DWAF, 2002; Harrison, 2002).

## 6 REFERENCES

- Acocks, J.H.P. (1988). *Veld Types of South Africa. 3<sup>rd</sup> Edition*. Government Printer, Pretoria, South Africa.
- Agrawal, R.K. and Singh, S.P. (2001). Energy allocation for cooking in UP households (India): a fuzzy multi-objective analysis. *Energy Conservation and Management* 42: 2139-2154.
- Ainslie, A., Fox, R. and Fabricius, C. (1994). *Towards policies for feasible and sustainable natural resource use: The Mid-Fish River Zonal Study, Eastern Cape, Grahamstown*. Rhodes University. Institute of Social and Economic Research, South Africa.
- Ainslie, A., Kepe, T., Cinderby, S. and Petse, T. (1996). Rural Livelihoods and Local Level Management of Natural Resources in the Peddie District. LAPC working paper no 42. Johannesburg, Land and Agricultural Policy Centre, South Africa.
- Ainslie, A.R., Cinderby, S., Petse, T., Ntshona, Z., Bradley, P.N., Deshingar, P. and Fakir, S. (1997). *Rural Livelihoods and Local Level Natural Resource Management in Peddie District*. Stockholm Environment Institute, New York.
- Anon. (Republic of South Africa). (1995). Rural development strategy of the Government of National Unity. Government Gazette No. 16679, Notice No. 1153, 3 November 1995. Pretoria, South Africa.
- Anon. (1997). *Map of South African Indigenous Forests*. Forest Biome Project. Ecosystems Programmes. FRD. Pretoria, South Africa.

- Armesto, J.J. and Fuentes, E.R. (1988). Tree species regeneration in a mid-elevation, temperate rain forest in Isla de Chiloe, Chile. *Vegetatio* 74: 151 – 159. Kluger Academic Publishers, Dordrecht.
- Arnold, J.E.M. (1995). Socio-economic benefits and issues in non-wood forest product use. In: FAO. Report of the International Expert Consultation on Non-Wood Forest Products. Non-Wood Forest Products 3. FAO, Rome.
- Badola, R. (1999). People and protected areas in India. *Unasylva* 199: 12-14.
- Baines, S.B. (1995). A Game Reserve and Its Neighbours: An Anthropological Perspective on Resource Utilisation. MA Thesis. University of Stellenbosch, South Africa.
- Bazzaz, F.A. (1998). Plant in changing environments: linking physiological, population and community ecology. Cambridge University Press, Cambridge.
- Bembridge, T.J. and Tarlton, J.E. (1990). Wood fuel in Ciskei: A head load study. *South African Forestry Journal* 154: 88-93.
- Berkes, F. (1989). Common Property Resources- Ecology and community based sustainable development. Belhaven Press.
- Berkes, F. and Forke, C. (2002). Back to the future: Ecosystem dynamics and local knowledge. In Panarchy: Understanding Transformations in Human and Natural Systems (L.H. Gunderson and C.S. Holling, eds.). Island Press, Washington, DC. Pp 121-146.
- Bigalke, R.C. (1983). Forestry and resource conservation, what is the role of the forester in South Africa? *South African Forestry Journal* 126: 12-14.

- Boniwe, N. (2002 pers comm.). Fort- Cox College of Agriculture. Eastern Cape, South Africa.
- Borrini-Feyerabend, G. and Buchan, D. (1997). *Beyond Fences: Seeking Social Sustainability in Conservation. Vol. 2.* IUCN, Gland, Switzerland and Cambridge, UK.
- Brigham, T., Chihongo, A. and Chidumayo, E. (1996). Trade in woodland products from the miombo region. In: Campbell, B.M. (ed). *The Miombo in Transition: Woodlands and Welfare in Africa.* Centre for International Forestry Research (CIFOR), Bogor, Indonesia. pp 136-172.
- Bromely, D.W. and Cernea, M.M. (1989). The management of common property natural resources: some conceptual and operational fallacies. World Bank Discussion Paper, No. 57. Washington DC.
- Burger, D. (ed). (1999). *South African Yearbook.* Government Communication and Information System, Pretoria, South Africa. Available at: <http://www.gcis.gov.za>.
- Burkey, S. (1993). *People First; A guide to self- reliant, Participatory Rural Development.* Zed Books Ltd, London and New Jersey.
- Campbell, B.M., Luckert, M. and Scoones, I. (1997). Local Level Valuation of Savanna Resources: a case study from Zimbabwe. *Economic Botany* 51: 59-77.
- Carter, J. (1996). *Recent Approaches to Participatory Forest Resource Assessment.* Overseas Development Institute, London.



- Carter, J. Connelly, S., and Wilson, N. (1994). Participatory Forestry in Sri-Lanka: Why so limited. Change on the Horizon. *Rural development Forestry Network*. Document 17b. London.
- Cavendish, W.P. (1996). *Environmental Resources and Rural Household Welfare*. Mimeo, Centre for the Study of Africans. Oxford University Press, London.
- Cernea, M.M. (1991). *Putting people first: Social variables in Rural Development*. Published for the World Bank by Oxford University Press, New York.
- Chambers, R. and Conway, G. (1992). Sustainable rural livelihoods: Practices and concepts for the 21<sup>st</sup> century. IDS Discussion Paper 296.
- Chanyenga, T. and Kayambazinthu, D. (1998). Standing crop in 3 co-management blocks of Chimaliro Forest Reserve. FRIM Report No: 98002. Forestry Research Institute of Malawi, Zomba.
- CIA (Central Intelligence Agency). (2002). Map of South Africa. Available at: <http://www.nationmaster.com>
- Clarke, J., Cavendish, W. and Coote, C. (1996). Rural households and miombo woodlands: use, value and management. In Cambell, B.(ed). *The miombo in transition: woodlands and welfare in Africa*. CIFOR., Borgor.
- Cocks, M. and Dold, A. (2000). The Medicinal Plant Trade in the Eastern Cape Province. Unpublished Report for the Department of Water Affairs and Forestry, Pretoria, South Africa.
- Cocks, M., Dold, A. and Grundy, I. (2001). Challenges facing a community structure to implement CBNRM in the Eastern Cape, South Africa. *African Studies Quarterly* 5: 36-51.

- Cocks, M.L. and Moller, V. (2002). Use of indigenous and indigenised medicines to enhance personal well-being: a South African case study. *Soc.Sci.Med.* 54, 387-397.
- Cocks, M.L, Dold, A.P. and Grundy, I.M. (2004). The Medicinal Plant Trade in the Eastern Cape. In Lawes, M.J., Eeley, H.A.C., Shackleton, C.M. and Greach, B.G.S (eds.). *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*. University of KwaZulu Natal Press, Pietermaritzburg. pp 473-492.
- Constitution of South Africa. (1996). Act 108 of 1996. Government Printers, Pretoria.
- Cousins, B. (ed). (2000). *At the Crossroads. Land and Agrarian Reform in South Africa into the 21<sup>st</sup> Century*. Programme for Land and Agrarian Studies (PLAAS), University of the Western Cape, South Africa.
- Critchley, W., Mosenene, L. and Turner, S. (1994). The Green Sector: Ncedisizwe Development Organisation and Environmental and Developmental Agency, Matatiele and Mount Fletcher Districts, South Africa. In: Edkins, D. (ed). *Successful Natural Resource Management in southern Africa*. Gamsberg, Macmillan Publishers (Pty) Ltd, Namibia. pp 30- 52.
- Delali, B.K., Dovie, D. and Witkowski, T.F. (1999). Reviewing Participatory Approaches in data collection for studying forest and woodland resource utilisation, valuation and livelihoods. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 210- 224.

- Deshingar, P. and Cinderby, S. (1997). Natural resources management in semi-arid areas of South Africa- Peddie study area. *Renewable Energy for development 10*.
- de Villiers, D. and White, R. (2000). The distribution, status and conservation management of indigenous mammals in Transkei Coastal forests. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 115- 123.
- Dovie, D.B.K., Shackleton, C.M. and Witkowski, E.T. (2000). Accessing natural resources: implications for sustainable management and livelihoods. A paper presented at the International Symposium on 'Contested Natural Resources: Challenges to Governance of Natural Resources in Southern Africa'. University of the Western Cape, South Africa. pp 18-20.
- Dovie, D.B.K., Shackleton, C.M. and Witkowski, E.T. (2001). Valuing non-timber forest products – indicator for interplay between poverty, livelihoods and the environment. Paper presented on the Meeting of the Global Environmental Change Research Community. Rio de Janeiro.
- DWAF (Department of Water Affairs and Forestry). (1995). Appendix- the state of forestry in South Africa today. Government Printer, Pretoria, South Africa.
- DWAF (Department of Water Affairs and Forestry). (1996). White Paper on Sustainable Forest Development In South Africa. Department of Water Affairs and Forestry, Pretoria, South Africa.

- DWAF (Department of Water Affairs and Forestry). (1997). *National Forestry Action Programme*. DWAF, Pretoria, South Africa.
- DWAF (Department of Water Affairs and Forestry). (2002). *Indigenous Forest Management*. DWAF, King Williams Town, South Africa.
- Eckhardt, H.C. and Biggs, H.C. (1999). Medium and Long- term changes in woody vegetation cover in the Kruger National Park, South Africa. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 145- 148.
- Edkins, D. (ed). (1996). *Successful Natural Resource Management in southern Africa*. Gamsberg, Macmillan Publishers (Pty) Ltd, Namibia.
- Encarnacion, C.S. (1999). Community based enterprises and conservation: the Kalahan Forest Farms Development Projects. *Unasylva* 199: 15-17.
- Everard, D.A., van Wyk, G.F. and Midgley, J.J. (1994). Dynamics of some forests in KwaZulu -Natal, Southern Africa: lessons for their utilisation. In Huntley, B.J. (ed). *Strelitzia 1. Botanical Diversity in Southern Africa*. National Botanical Institute, Pretoria, South Africa. pp 275-285.
- FAO (Food and Agricultural Organisation). (1989). *Food and Agricultural Legislation* 38 pp 122-125. FAO, Rome.
- FAO (Food and Agricultural Organisation). (1992). *Community Forestry: ten years review, revised edition*. FAO, Rome.

- FAO (Food and Agricultural Organisation) (1994). Tree and land tenure: Rapid appraisal tools. Community Forestry Field Manual no 4. FAO, Rome.
- FAO (Food and Agricultural Organisation). (1995). Non-wood Forest Products for rural income and sustainable forestry. Non-wood forest products 7. FAO, Rome.
- FAO (Food and Agricultural Organisation). (2001). 25 years of Community Forestry. Food and Agriculture Organisation of the United Nations, Rome.
- Falconer, J. (1994). Non-timber forest products in Southern Ghana: main report. Republic of Ghana Forestry Department and Overseas Development Administration, Natural Resource Institute, Chatham, UK.
- Fissein, Y. (1987). Basic features of rural- small-scale forest-based processing enterprises in developing countries. Forestry Paper. 79. FAO, Rome.
- Foy, T.J. and Willis, C.B. (1998). A forest Policy for South Africa: Why we should have one and what it should contain. *Southern African Forestry Journal* 181: 33- 37.
- Fuggle, R.F. (1983). Nature and Ethics of Environmental Concerns. In Fuggle, R.F and Rabbie, M.A. (eds). *Environmental Concerns in South Africa: Technical and Legal Perspectives*. Juta and Co, Ltd, South Africa. pp 1-8.
- Furness, C.K. (1979). Estimating indigenous resources for fuel wood and poles and plantation requirements in the tribal trust lands of Zimbabwe Rhodesia. *Suid-Afrikaanse Bousboustydskrif* 117: 6-9.
- Gander, M.V. and Udit, P. (1989). Evaluation of hot boxes in rural and peri-urban areas. *Development Southern Africa* 6: 216-226.
- George, D. and Mallery, P. (2000). SPSS for Windows- step by step. Allyn and Bacon, Boston, UK.

- Geldenhys, C.J. (1992). The use and diameter distributions in sustained- use management of forests: examples from South Africa. *The Ecology and Management of Indigenous Forests in South Africa*. Oxford University Press, Cape Town.
- Geldenhuys, C.J. (2000). The need for monitoring recruitment, growth and mortality in the indigenous forests: examples from the Northern Province. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management based on Scientific Understanding of Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna, South Africa. Department of Water Affairs and Forestry, South Africa. pp 17- 28.
- GOSA (Government of South Africa). (1996). Sustainable forest development in South Africa. The policy of the Government of National Unity. White Paper. Department of Water Affairs and Forestry. Pretoria, South Africa.
- Govere, E.M. (1997). Legal, Institutional, Policy and Socio- Economic shortcomings hindering sustainable forest management. *Southern African Forestry Journal* 179: 35- 37.
- Grundy, I.M. (1995). Wood biomass estimation in dry miombo woodland in Zimbabwe. *Forest Ecology and Management* 72: 109-117.
- Grundy, I. M. and Cocks, M. (2002). Community use and management of woody vegetation in the Eastern Cape, South Africa. In: Seydack, A.H.W., Vorster, T., Vermeulen, W.J. and van der Merwe, J.J. (eds). *Proceedings of Multiple Use Management of Natural Forests and Woodlands: Policy refinements and scientific*

- progress*. Natural Forests and Savanna Woodlands Symposium III Mpumalanga Promotions, South Africa. pp 385-396.
- Grundy, I.M. and Cruz, M.R. (2001). Impact of harvesting for building poles on the woodland structure of Derre Forest, Mozambique. In: Proceedings of the International Workshop Miombo Woodlands in the New Millennium. Casa Ms'ika, Manica, September 26-28. Department of Forestry, Eduardo Mondlane, Maputo, Mozambique. pp 78-96.
- Grundy, I., Turpie, J., Jagger, P., Witkowski, E., Guambe, I., Semwayo, D. and Solomon, A. (2000). Implications of co-management for benefits from natural resources for rural livelihoods in north-western Zimbabwe. *Ecological Economics* 33: 369-381.
- Ham, C. and Theron, F. (1998). Community forestry- Project implementation through communities as a whole or through interest groups? *Southern African Forestry Journal* 181: 45- 49.
- Ham, C. and Theron, F. (1999). Community Forestry and Woodlot Development in South Africa: The Past, Present and Future. *Southern African Forestry Journal* 184: 71- 79.
- Harrison, G. (2002 pers comm). Department of Water Affairs and Forestry. King Williams Town, South Africa.
- Hassan, R. and Haveman, J. (1997). *The values and rates of harvesting of natural forest and woodland products for direct use by communities in the Eastern Cape Province*. Unpublished report, Development Bank of South Africa, Midrand.

- Heinsohn, R.D. (1991). The potential for cultivation of *Juncus kraussii* and other wetland species used for craftwork in Natal/KwaZulu. Unpublished Report. Institute for Natural Resources, Pietermaritzburg, South Africa.
- Hobley, M. (1996). *Participatory Forestry: The process of Change in India and Nepal*. Rural Development Study Guide 3. Overseas and Development Institute, London.
- Hoffman, M.T., Todd, S., Ntshona, Z. and Turner, S. (1999). Land degradation in South Africa. Final report. National Botanical Institute, Claremont, South Africa.
- Hoskins, M.W. (1988). Readings in Sustainable Forest Management. Rome, Italy.
- Huntley, B., Seigfried, R. and Sunter, C. (1989). *South African Environments into the 21<sup>st</sup> Century*. National Book Printers, Cape Town, South Africa.
- IFAD. (1995). Common property resource and the rural poor in Sub-Saharan Africa. CDCS. Vrije Universiteit, Amsterdam.
- Jayaraman, K. (2000). A statistical manual for forestry research. FORSPA- FAO Publication No. 25/ 2000. FORSPA, Bangkok.
- Kameni, C. (2002 pers comm.). Department of Water Affairs and Forestry. Stutterheim, South Africa.
- Kennedy, J.J., Thomas, J.W. and Peter, G. (2001). Evolving forestry and rural development beliefs at midpoint and close of the 20<sup>th</sup> century. *Forest Policy and Economics* 3: 81 -95.
- Knowles, P. and Grant, M.C. (1983). Age and size class structure analyses of Engelmann spruce, Ponderosa pine, Lodgepole pine, Limber pine in Colorado. *Ecology* 64: 1 -9.



- Kruger, L.M., Midgley, J.J. and Cowling, R.M. (1997). Resprouters vs reseeders in South African forest trees: a model based on forest canopy height. *Functional Ecology* 11: 101-105. British Ecological Society. Great Britain.
- Leakey, R.R.B., Temu, A.B., Melnyk, M. and Vantomme, P. (1996). *Domestication and Commercialisation of Non-Timber Forest Products in Agroforestry Systems*. FAO, Rome.
- Lent, P.C., Scogings, P.F. and van Averbeke, W. (2000). Natural Resource Management and Policy in Eastern Cape Province, South Africa: Overview Paper. Agricultural and Rural Development Research Institute, University of Fort-Hare, Alice, South Africa.
- Liedholm, C. and Mead, D.C. (1993). The structure and growth of micro-enterprises in Southern and Eastern Africa. Working Paper no 36. Growth and Equity through Micro Enterprise Investments and Institutions (Gemini) Project. Bethesda, Maryland, USA.
- Lotter, M. (1999). The functional classification of Op-de- Berg forest (Blyde River Canyon Nature Reserve). In: Seydack, A.H.W., Vorster, T., Vermeulen, W.J. and van der Merwe, J.J. (eds). *Proceedings of Multiple Use Management of Natural Forests and Woodlands: Policy refinements and scientific progress*. Natural Forests and Savanna Woodlands Symposium III Mpumalanga Promotions, South Africa. pp 239- 244.
- Low, A.B. and Rebelo, A.G. (1998). *Vegetation of South Africa, Lesotho and Swaziland*. Department of Environmental Affairs and Tourism, Pretoria, South Africa.
- Luken, J.O. (1990). *Directing Ecological Succession*. Chapman and Hall, Great Britain.

- Mander, M. (1997). Medicinal Plant Marketing and Strategies for Sustaining the Plant Supply in the Bushbuckridge Area and Mpumalanga Province. DANCED/DWAF, Nelspruit, South Africa.
- Martin, P. (1996). Zwartkops valley nature reserve- managing bushveld adjacent to a township. Proceedings of the 2nd Valley Bushveld Symposium. Special publication of the Grassland Society of Southern Africa, Scottsville, South Africa.
- Masutha, T. (2002). Community Forestry and Rural Livelihoods: A case study of the Contribution of Natural Resources to Livelihoods of Rural Communities in the Northern Province, South Africa. Msc Thesis. University of Stellenbosch, South Africa.
- Matose, F. and Wily, L. (1996). Institutional arrangement governing the use and management of Miombo woodlands. In Campbell, B (ed). *The miombo in transition: woodlands and welfare in Africa*. Centre for international Forestry Research. Bogor, Indonesia.
- May, J. (1996). The structure and composition of Rural Poverty and Livelihoods in South Africa. In: Cousins, B. (ed). (2002). *At the Crossroads. Land and Agrarian Reform in South Africa into the 21<sup>st</sup> Century*. Programme for Land and Agrarian Studies (PLAAS), University of the Western Cape, South Africa. pp 21-34.
- McGregor, J. (1995). Gathered produce in Zimbabwe's communal areas: changing resource availability and use. *Ecology of Food and Nutrition* 33: 163-193.
- McKenzie, B. (1988). Guidelines for the Sustained Use of Forests and Forest Products. Workshop Report, Forest Biome Project, FRD: CSIR. Pretoria, South Africa.

- Mkebe, S. (2002). Msobomvu Consultation Agency. Eastern Cape, South Africa.
- Moshe, D., Bailey, C.L. and Scholes, R.J. (1999). The effect of elevated atmospheric Carbon Dioxide on selected Savanna plants. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savanna Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 142- 144.
- Motinyane, T. R. (2002). The Influence of Structure, Density and Direct Use Benefits on the Harvesting of Trees in the Rural Village of Pikoli, Eastern Cape, South Africa. MA Thesis. Rhodes University, South Africa.
- Mukerji, I.F.S. (1992). Greening of Himalayas through peoples participation in the State of Himachal Pradesh (Western Himalayas). Paper prepared for the conference on wise management of tropical forests. Oxford.
- Munslow, B., Katerere, Y., Ferf, A. and O'Keefe, P. (1988). *The fuel wood trap: a study of SADCC region*. Earthscan Publications, London.
- Ndayambaje, J.D. (2002). Potential for Joint Management and multiple use of Nyungwe forest, Rwanda. MSc Thesis. University of Stellenbosch, South Africa.
- Nel, E. and Binns, T. (2000). Rural self-reliance strategies in South Africa: community initiatives and external support in the former black homelands. *Journal of Rural Studies* 16: 367-377.
- Norusis, M.J. (1988). *SPSS-X Introductory Statistics Guide*. SPSS Inc,USA.

- Nurse, M., McKay, C., Young, J. and Asanaga, D. (1994). Biodiversity conservation through community forestry in the montane forests of Cameroon. *Rural Development Forestry Network*. Network Paper 18d. ODI. London.
- Obiri, J., Lawes, M. and Mukolwe, M. (2002). The dynamics and sustainable use of high-value tree species of the coastal Pondoland forests of the Eastern Cape Province, South Africa. *Forest Ecology and Management* 166: 131- 148.
- O'Keefe, P. and Munslow, B. (1989). Understanding fuelwood: A critique of existing interventions in Southern Africa. Natural Resource Forum. 2- 10. February 1989. South Africa.
- Padoch, C. (1988). The economic importance and marketing of forest and fallow products in the Iquitos region. *Advances in Economic Botany* 5: 74-89.
- Palm, C., Izac, A.M. and Vosti, S. (1993). Procedural Guidelines for the Characterisation and Diagnosis. ICRAF. Nairobi.
- Palmer, A. and Tanser, F. (2000). Vegetation mapping of the Great Fish River Basin, South Africa: Integrating spatial and multi- spatial remote sensing techniques. *Applied Vegetation Science* 3: 197- 204.
- Peart, R. and Wilson, J. (1998). Environmental Policy-making in the New South Africa. *Southern African Journal of Environmental Law and Policy* 5: 236-267.
- Perez, R.M. and Arnold, J.E.M. (1995). *Current Issues in Non-timber Forest Products Research*. Center for International Forestry Research, Bogor, Indonesia.
- Peters, C.M. (1996). Beyond nomenclature and use: A review of ecological methods for ethnobotanists. In Alexiades, M.N. (eds). *Selected guidelines for ethnobotanists research: A field manual*. Pp 241-276.

- Prah, E.A. (1997). Joint Forest Management- the Guira- Bansa experience. *Commonwealth Forestry Review* 76: 171-174.
- Probyn, J.W. (1997). An inventory of three blocks within Chilimaliro Forest Reserve, Designated for co-management: simple techniques for assessment. *FRIM Report\_No.* 97004. Forestry Research Institute of Malawi, Zomba.
- Qureshi, M. H. and Kumar, S. (1998). Contributions of common lands to household economies in Haryana, India. *Environmental Conservation* 25: 342-353.
- Rabie, M.A. and Erasmus, M.G. (1983). Environmental Law (1983). In: Fuggle, R.F and Rabie, M.A. (eds). *Environmental Concerns in South Africa: Technical and Legal Perspectives*. Juta and Co, Ltd, South Africa. pp 30-81.
- Rathogwa, N.R., Midgley, J.J. and Bond, W.J. (1999). Survival, mortality and coppice shoot production and growth patterns of *Colophospermum Mopane* Kirk Ex J, *Leonard* (Kirk Ex Benth) and *Androstachys Johnsonii* Prain after harvesting. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 163-171.
- RSA (Republic of South Africa). (1994). White Paper on Reconstruction and Development. Notice No. 1954 of 1994. Government Printer, Cape Town.
- Sah, S.P. and Dutta, I.C. (1994). Inventory and Future Management Strategies of Multipurpose tree and herb species for Non-Timber Forest products in Nepal. In: Leakey, R.R.B., Temu, A.B., Melnyk, M. and Vantomme, P. (eds).

- Domestication and Commercialisation of Non-Timber Forest Products in Agroforestry Systems*. FAO, Rome. pp 123-130.
- Scoones, I. And Matose, F. (1993). Local woodland management: constraints and opportunities for sustainable resource use. In: Bradley, P.N. and Namara, K. (eds). *Living with trees: policies for forestry management in Zimbabwe*, pp 157-198. World Bank Technical Paper 210. World Bank, Washington DC.
- Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). (1999). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa.
- Shackleton, C. M. and Mander, M. (2000). *The value of resources used in Woodlands*. South African Forestry handbook. Pretoria, SAIF. pp 635-641.
- Shackleton, C.M. and Shackleton, S.E. (1997). The Use and Potential for Commercialisation of Veld Products in the Bushbuckridge Area. Unpublished Report. DANCED Community Forestry Project. DWAF, Nelspruit, South Africa.
- Shackleton, S.E., Shackleton, C. M. and Cousins, B. (2000). Re-evaluating the communal lands of Southern Africa: new understanding of rural livelihoods. ODI Natural Resource Perspectives. Number 62. Overseas Development Institute, London.
- Shackleton, S.E., Shackleton, C.M. and Cousins, B. (2000a). The economic value of land and natural resources to rural livelihoods: case studies from South Africa. In: Cousins, B (ed). *At the Crossroads. Land and Agrarian Reform in South*

*Africa into the 21<sup>st</sup> century*. PLAAS/NLC 35-67, Cape Town, South Africa. pp 35-62.

Shackleton, S.E., Shackleton, C.M., Dzerefos, C.M. and Mathebela, F.M. (1998). Use and trading of wild edible herbs in the Central Lowveld Region, South Africa. *Economic Botany* 32: 251-259.

Shepherd, G. (1992). Forest management for forest production by indigenous communities. In Miller, F.R. and Adams, K.L. (eds). Wise management of tropical forest: Proceedings of the Oxford Conference on Tropical Forests. (1992). Oxford Forestry Institute, University of Oxford.

Sjoholm, H. and Wily, L. (1995). Finding a way forward in natural forest management in Tanzania. The emergence of village forest reserves. IRDC Currents 10, International Rural Development Centre. Swedish University of Agricultural Sciences, Uppsala.

Skinner, J. (1998). Toward better woodland management in the Sahelian Mali. *Pastoral Development Network*. Network Paper 25d. ODI. London.

Skottke, M. and Mauambeta, D. (2000). Participatory Development in Indigenous Forest Management. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 292-299.

Smith, F.H. (1998). The role of state forestry in managing and conserving ecological systems. *South African Journal of Environmental Law and Policy* 5: 35-52.

- Stanley, A.C. and Oliviera Castro, G.M. (1959). *Manual of Vegetation Analysis*. Harper & Bothers Publishers, New York.
- Stauth, R.B. (1983). Environmental Economics. In: Fuggle, R.F and Rabbie, M.A. (eds). *Environmental Concerns in South Africa: Technical and Legal Perspectives*. Juta and Co, Ltd, South Africa. pp 82-110.
- Steyn, G. J. (1990). The energy crisis in the rural Ciskei. *Africa Insight* 20: 56-59.
- Swanepoel, H. (1992). *Community development: putting plans into action*. Juta, Cape Town, South Africa.
- Taylor, D. A. (1997). Saving the forest for the trees. *Environment* 39: 3-7.
- Taylor, S.E. and Walker, B.H. (1984). Autecology of an invading population of the cactus *Cerus peruvianus* (queen of the night) in the central Transvaal. *South African Journal of Botany* 52: 397-402.
- Tewari, D.N. (1992). Joint (participatory) forest management. *The Indian Forester* 119: 687-689.
- Tinker, I. (1984). *The real rural energy crisis: Women's time*. Equity Policy Centre, Washington DC.
- Titi, V. and Singh, N. (1994). Adaptive strategies of the poor in arid and semi- arid lands: In search of sustainable livelihoods Working Paper. IISD, Winnipeg.
- Townson, I.M. (1995). Patterns of non-timber forest products enterprise activity in the forest zone of Southern Ghana. Report to the ODA Forestry Research Programme. Oxford Forestry Institute, Oxford.



- Trollope, W.S.W. and Cotzee, P.G.F. (1978). Vegetation and veld management. In Laker, M.C. (ed). *The Agricultural Potential of the Ciskei: a preliminary report*. University of Fort-Hare, Alice, South Africa. pp 45-88.
- Van Lieshout, M. (2002). Perspectives of community inhabitants on forest use and management in the former Ciskei, South Africa. MSc Thesis. Wageningen University, Wageningen, Holland.
- Van Rensburg, L., De Sousa-Correia., R.F. and Boyseen, J. (1997). Evaluation of three ways to grow indigenous trees for fuelwood. *South African Journal of Science* 93: 269-271.
- Venter, S. (1996). Non-Timber Indigenous Forest Utilisation- Basket- Making from *Secamone* Species in the Northern Province. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 246- 249.
- Vermeulen, W.J. (1999). Forest dynamics monitoring in the Southern Cape. In: Seydack, A.H.W., Vermeulen, W.J and Vermeulen, C. (eds). *Towards Sustainable Management Based on Understanding of Natural Forests and Woodlands*. Natural Forests and Savana Woodlands Symposium II Knysna , South Africa. Department of Water Affairs and Forestry, South Africa. pp 266- 269.

- Watts, W.S. (2002). *The Effects of Forestry Policy on the Sustainability of Forest Resources in Southern Africa*. Ph.D. Thesis. University of Stellenbosch, South Africa.
- Wells, M. and Brandon, K. (1993). *People and Parks: Linking Protected Area Management with Local Communities*, World Bank Publications, Washington DC.
- Westoby, P. (1997). *A soul food approach to community development: how to invoke depth and meaning into our vocation and our communities*. Olive Organisation Development and Training, Durban, South Africa.
- Willers, V.A. (1996). *Environmental Concerns in South Africa*. Ph.D. Thesis. University of Stellenbosch, South Africa.
- Zar, J.H. (1974). *Biostatistical Analyses*. Prentice Hall Inc., USA.
- Zinnes, C.F. (2004). *Natural Resources and the Environment*. University of Maryland-College Park.

**Appendix 1: List of Scientific and vernacular (local) names of tree species recorded in study areas, n=167.**

<b>Scientific name</b>	<b>Vernacular/ local name</b>
<i>Apodytes dimitiata</i>	Umdakane
<i>Ochna arborea</i>	Umthentsema
<i>Ptaeroxylon obliquum</i>	Umthathi
<i>Pappea capensis</i>	Ilitye
<i>Codia rudis</i>	Intsinde
<i>Ehretia rigida</i>	Umhleli
<i>Schotia Africana</i>	Umqonci
<i>Maytenus heterophylla</i>	Umqaqoba
<i>Olea europa subsp. Africana</i>	Umnquma
<i>Acacia karro</i>	Umnga
<i>Acacia mearnsii</i>	Umnga
<i>Podocarpus falcatus</i>	Umkhoba
<i>Olea capensis</i>	Ugqwangxa
<i>Cassine aethiopica</i>	Umthiwabafazi
<i>Scutia myrtina</i>	Isiphingo
<i>C. Sphaerophylla</i>	Umnqayi
<i>Euphorbia curvirama</i>	Umhlontlo
<i>Xanthoxlum capense</i>	Umnungumabele
<i>Erythrina caffra</i>	Umsintsi
<i>Aloe ferox</i>	Ikhala
<i>Podocarpus falcatus</i>	Umcheya
<i>Cassine crocea</i>	Umbomvane
<i>Ziziphus mucronata</i>	Umphafa
<i>Scolopia mundii</i>	Iqumza
<i>Dais cotinifolia</i>	Intozane
<i>Cussonia spicata</i>	Umsenge
<i>Diospyros whyteana</i>	Umkhaza
<i>Diospyros lyciodes</i>	Umbhongisa
<i>Acokanthera oppositifolia</i>	Intlungunyebe
<i>Gardenia amoena</i>	Umthongothi
<i>Tarchonanthus camphoratus</i>	Isiduli
<i>Allophylus decipiens</i>	Intlolokotshane
<i>Sideroxylon inerme</i>	Umqwashu
<i>Agave americana</i>	Ugalboom
<i>Celtis africana</i>	Umnono
<i>Rhus laevigata</i>	UmhlaKothi
<i>Pittispororum viridiflorum</i>	Umkhwenkwe
<i>Euclea undulata</i>	Umgwari
<i>Schotia afra</i>	Umgxam
<i>Canthium obvatum</i>	Umbombemfene
<i>Opuntia ficus-indica</i>	Itolofiya

## Appendix 2: Questionnaire on management of natural resources in Woodlands and Pirrie Mission villages, Eastern Cape.

Date of interview: \_ / \_ / 2002      Village..... House no.....

1. Who manages the forest?.....
2. Are there any rules set to manage the forest?.....  
.....  
.....  
.....
3. If yes, state them.....  
.....  
.....  
.....
4. Do people obey the rules if they exist?.....
5. Do you think there is a necessity to manage the forest?.....
6. Why?.....  
.....  
.....  
.....
7. Who do you think should manage the forest?.....
8. How should the forest be managed?.....  
.....  
.....  
.....
9. Can you still find all you need from the forest now?.....
10. What will you do if you cannot get what you need from the forest in the future?  
(i.e. do you see a problem of scarcity in the future? And if so how will it be  
solved).....  
.....  
.....  
.....  
.....  
.....

11. Are there people selling products from the forest in your village?.....
12. If so do they sell them locally or to the outsiders?.....
13. Do you buy products from the forest if you are able to collect them?.....
14. Will people always use the forest in the future?.....
15. If yes, what for?.....
16. If no, what alternative will be used in the future?.....

**Appendix 3: Household surveys in Peddie (Woodlands) and Pirrie Mission (State Forest)**

		Govt	Local	Govt and local	No Mgt	No Harvesting	Permits	Rotational Harvesting	Locally	Outsiders	Locally & outsiders	No selling	Will still use	Will not use	Traditional use	Yes	No	Not sure	Don't know	TOTAL
1 Who manages the forest?	Peddie	17	17		35													6		75
	Pirrie	28	21		20													23		92
2. Are there any rules set to manage the forest?	Peddie															22	37	16		75
	Pirrie															34	33	25		92
3. Do you think there is a necessity to manage the forest?	Peddie															57	11	7		75
	Pirrie															47	45	0		92
4. Who do you think should manage the forest?	Peddie	15	31	29														0		75
	Pirrie	25	27	17	17													6		92
5. How should the forest be managed?	Peddie					15	31	16											13	75
	Pirrie				29	3	29	18											13	92
6. Can you still find all you need from the forest now?	Peddie															35	23	17		75
	Pirrie															59	0	33		92

		Govt	Local	Govt and local	No Mgt	No Harvesting	Permits	Rotational Harvesting	Locally	Outsiders	Locally & outsiders	No selling	Will still use	Will not use	Traditional use	Yes	No	Not sure	Don't know	TOTAL
7. Do you see a problem of scarcity in the future?	Peddie															75	0	0		75
	Pirrie															40	52	0		92
8. Are there people selling products from the forest in your village? Do you sell them locally or outsiders?	Peddie								34	14	14	13						0		75
	Pirrie								0	35	31	0						26		92
9. Do you buy products from the forest if you are not able to collect them?	Peddie															44	31	0		75
	Pirrie															48	32	12		92
10. Will people always use the forest in the future?	Peddie												30	15	22				8	75
	Pirrie												36	16	25	15				92
11. Are there any alternatives to the forest products that can be used in the future?	Peddie															15	36	24		75
	Pirrie															40	52	0		92