Socio-economic and Environment Impacts on the Utilisation of umSimbithi Tree (*Milletia grandis)* in Eastern Cape: A Case Study of Mt. Thesiger Forest Pondoland

by

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ABSTRACT

Wood products from *Milletia grandis* (E. Mey) skeels (umSimbithi), a prominent tree in the coastal scarp forests of Pondoland, form an important economic base for the craft workers in Umzimvubu District of the Eastern Cape. The local carving industry draws considerable income in a place where employment opportunities are scarce, poverty is rife and financial burden and dependency is high. Despite the curio trade being perceived as important by the local communities, little is known about this craft work industry or its impact on the forest especially the sustainability of the wood resource base.

Resource availability and impacts of harvesting were assessed at Mount Thesiger Forest Reserve (MTFR) through sampling plots and social surveys of local carvers and curio traders. Stem size-class distributions of standing trees and stumps were used to investigate the present quantity, past harvesting patterns and distribution of *M. grandis* within the forests. Line transects sampling confirmed umSimbithi as a forest margin species penetrating to about 50 metres into the forest from the edge and its current use was found to be unsustainable.

Current monitoring and management of most State forests in the Eastern Cape is inadequate, and although a harvest ban has been served, it has only led to and encouraged poaching. Social surveys indicated that the quality of monitoring and sustainability of wood stocks in the Headmen forests appear better than in State forests and this raises hope for successful co-management structures in the area.

Craftwood production and derived income varied from one month to another depending on wood availability, size and shape of stems, with straight stems being most preferred. Monthly income per carver was estimated between R960 to R1100 while the annual yield for the estimated 100 carvers in the communities surrounding MTFR approximated R1.1 million. It was observed that higher sales could be obtained if (1) the amount of wood wasted during harvests and carving could be minimised and (2) the craft products were marketed in the lucrative up markets such as Johannesburg, Durban and Maseru.

Interviews with 30 carvers pointed to several problems most of them originating from the stoppage of harvest permits following the ban on umSimbithi. Various recommendations addressing carver's needs and promoting sustainable resource management are proposed. These include (1) establishing an appropriate land tenure system, (2) reviewing the permit system, (3) strengthening the institutional capacity of the Forest Department and (4) enhancing efforts on community forest outreach through the extension system. Above all, and to achieve sustainable forest management in Pondoland, tenurial rights needs to be addressed and the options of co-management, community management and privatisation are discussed. It was noted that for sustainable development to be realised in Pondoland, co-management of natural resources is important and this must be supported by introduction of other economic activities that would alleviate pressure off the forests.

PREFACE

The research described in this dissertation was conducted at the School of Environment and Development and the Forest Biodiversity Programme (Department of Zoology and Entomology) at the University of Natal under the supervision of Dr. Mike Lawes (Depart. of Zoology and Entomology) and Dr. Ed. Granger (Depart. of Botany).

These studies represent original work by the author and have not otherwise been submitted in any form for any degree or diploma to any other University. Where use has been made of the work of others, it is duly acknowledged in the text.

John A.F. Obiri

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The original idea behind this project was an observation by Dr. Keith Cooper (Director Wildlife Society of South Africa) on resource use conflict in the indigenous forests of Pondoland. I thank him for sharing his ideas and wealth of experiences on conservation.

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To the people of Caguba, Vukandlule and Sicambeni especially my old friend Douglas Cwaba, I am indebted for their hospitality and patience with a young student foreign to their land. In some small way I hope this thesis will contribute to alleviating their problems. My tasks would have been harder without the help of my energetic and skilful interpreter Buyisile Stuurman.

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LIST OF ABBREVIATIONS AND ACRONYMS

CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBNRM	Community Based Natural Resource Management
CFM	Community Forestry Management
GNP	Gross National Product
GDP	Gross Domestic Product
IMF	International Monetary Fund
KIFCON	Kenya Indigenous Forest Conservation Programme
LIFE	Living In a Finite Environment
MTFR	Mount Thesiger Forest Reserve
NRMP	Natural Resources Management Project
PSP	Permanent Sample Plot
RDP	Reconstruction and Development Program
SANCO	South African National Civic Organisation
TDI	Transkei Development Information
UNEP	United Nations Environment Programme
WCED	World Commission on Environment and Development
WCMU	World Conservation Monitory Union
WWF/SA	World Wide Fund for nature/South Africa

CHAPTER ONE: ENVIRONMENT, RESOURCE UTILISATION AND SUSTAINABLE DEVELOPMENT

1.1 Environment and Sustainable Resource Use

Ten years after publication of the Bruntland Report, *Our common future* (WCED 1987), the principles of environment and sustainable development have gained considerable recognition. Despite this wide acceptance there is still however much unsustainable use of resources and consequent environmental damage occuring in many places. For instance the world tropical indigenous forests continue to deplete at alarming rates. The annual rate of global deforestation in 1989 was 142000 km^2 almost double that in 1979 of 75000 km^2 (Myers 1991). Sustainable use requires a balanced relationship between the resource capacity and harvesting. The Bruntland Report, which emphasises this relationship, advocates the use of natural resources within the limits of environmental capacity that meets needs for present generations, particularly the poor, without compromising needs for the future generations.

Although the term sustainable development is widely used, several authors (Dixon and Fallon 1989, Shearman 1990, Wiersum 1995) have remarked that its broad concept is open to disparate interpretation and misunderstanding. A fundamental difficulty in understanding this term is because its transverses the paradigms of ecological systems and socio-economic dimensions. While ecological inputs like forest ecosystems are subject to negative feedback loops and homeostatic processes, social systems are predominantly dominated by positive feedbacks and time dependent factors in response to mankind needs. The challenge is dealing with multiple causative links between environment, economy and social spheres within a political and institutional framework. This framework in turn determines the resource use and impacts on sustainability (ecological and economic) of development processes.

Present global trends of resource use are excessive and unsustainable. In Africa, the indigenous forests have been decimated necessitating urgent corrective measures. Several authoritative sources (WCED 1987, Worldbank 1992,1993) attribute deforestation and degradation of the

environment to the actions of the rural poor. Others (Redclift 1987, Hayter 1989, Pearce *et al.* 1991) argue that this is tantamount to blaming the poor and shifting attention from the basic socio-economic factors such as inequality in land ownership, security of tenure and landlessness. These factors result in conflicts between the human society's actions and the surrounding environment. Chief among these are the conflicts between environment and development. Indeed, many factors; politics, subsistence peoples, commercial interests among others are involved in the multi-tiered process of forest destruction. These conflicts are addressed in this dissertation.

1.2 The Environment and Development

The definition of environment has undergone several changes within the last century. Perhaps the most embracing is that given by the World Development Report (1992) as " the totality of natural resources, including the cultural heritage and infrastructure for socio-economic activities". The concept in the broadest sense encompasses biophysical and socio-economic components. Exploitation of environmental resources for socio-economic purposes is usually linked to development growth. The latter is sometimes confused with economic growth (Okidi 1993). Basically, development may be defined as a process of provision of essential needs such as health, education, nutrition, shelter and opportunities to contribute to the process through gainful employment. Unlike growth which is quantitatively expressed in terms of Gross National Product (GNP) and Gross Domestic Product (GDP), development is expressed in terms of qualitative indicators like birth rate, life expectancy and literacy levels.

Caldwell (1984) remarked that environment and development were once thought as having conflicting activities. This view was further noted by Tisdel (1985) who stated that mainstream economists had failed to realise the important relationship between these two. Shearman (1990) suggested that the two need not be in perpetual conflict but could coexist. Indeed, the relationship between environment and development has been viewed by WWF (1993) as complementary rather than substitutional. The environment provides the basic materials for development. Economic growth and socio-economic status which are important components of development, depend on the environment (Arrow *et al.* 1995) as it supplies natural resources and absorbs wastes created by production and consumption. Without the environment

economic activities would be at risk and so would development.

Development has sometimes been misconstrued by the quantitative indices it is measured with (Max-Neef 1995). For instance, it has in many cases been gauged in terms of GNP and GDP yet these do not reflect the quality of life nor mention the damage caused to the environment (Tinbergen and Hueting 1991). Economic growth activities have often ignored potential negative environmental consequences. For example, Afromontane *Podocarpus* forests in South Africa were heavily exploited in the early twentieth century for purposes such as railway construction and mining industry (King 1941, Geldenhuys 1975) in order to boost GDP (economic growth) and the consequent environmental damage was largely overlooked. This damage includes; loss of vegetation and water catchment areas and an increase in the surface flow of water and erosion. Development projects have also traditionally failed to take account of the value of natural resources, because these resources have for a long time been erroneously regarded as infinite and substitutable with man made capital (Daly and Cobb 1990). This failure is not only reflected by urban projects but also by those in rural areas. The value of aesthetic natural forests, clean air, water and biota are not included in many conventional cost-benefit analyses of development projects. The latter under values the environment and encourages resource depletion and activities that damage the environment. In South Africa, many formerly large indigenous forests have given way to either agricultural or urban development. For example, the coastal lowland forests were replaced with sugarcane plantations. The uses of these forests is discussed in the Chapter two under Section 2.6

1.3 Sustainable Development and Use of Indigenous Forests in South Africa

Since at least the last major cold episode about 18 000 years ago, indigenous forests in South Africa have not been expansive (Feely 1986, Lawes 1990). Effects of unfavourable climate have limited the forests to approximately 330 000Ha which equals 0.2% of South Africa's land area (Dept. of Water Affairs and Forestry 1995). Over the last two centuries, Sim (1907), King (1941) contend that most of these forests have been destroyed. Various reasons have been given for this destruction, Stow (1905) associated it to "invasion of successive waves of Bantu speaking Negro farmers migrating into southern Africa between three to four hundred years ago." This view has been supported by other authors (Acocks 1953, Tainton 1981, and White

1983) all who strengthened the anthropological argument of early forest destruction. However more recent researchers (Downing 1972, Maggs 1980, Feely 1986) hold different views and state that the present forest distribution existed over 300 years ago and neither the Bantu farmers nor the white settlers caused changes to the forest area. In certain areas however, forests were destroyed but perhaps of greater significance is that human exploitation may not have significantly obliterated forests but they certainly led to the profound changes in species composition.

The Department of Water Affairs and Forestry (1996) notes that substantial changes in both the forest structure and size has occurred to some indigenous forests along the Eastern Cape. This department further notes that exploitation of these forests has continued at a high rate mainly because over 40% of South Africans live in the rural country sides and are highly dependant on indigenous wood resources. Moreover, this wood is cheap, desirable and readily available (Cunningham, *et al.* 1988).

Massive felling of trees and over exploitation of forest resources in South Africa was initially noticed towards the middle of the last century and the first laws were then enacted to limit utilization. Among the first included the Natal Ordinance Number 2 of 1855 which prevented unlicensed squatting and regulated occupation of land by natives (Sim 1907). It later became the Squatter Rent Law of 1884. These were followed by the 1888 Cape Forest Act 28 which conferred all forest management to the forest officers (King 1941). As stated by King (1941), this act was superseded by the Native Trust Land Act 16 of 1913 which extended the Union's control of forests over the central Transkei and into the entire Pondoland.

Currently, all policy formulation and management of forests fall under the Department of Forestry and Water Affairs. The Eastern Cape Forestry Department draws a distinction between a forest reserve and a Headman forest. Historically, this is traced to the frontier wars of 1779-1819 when tribes defeated in the wars had their land annexed. These became crown land which are today known as forest reserves (Johnson 1983). However, chiefs who accepted colonial rule were given the authority to oversee resource use in the annexed forests. These became the Headmen forests which today still play an important role in the socio-economic

needs of the rural people. They provide resources like building poles, kraal construction posts, thatching grass, basket weaving materials, craft work timber and medicinal plants. As most of these resources became increasingly threatened, the Forest Act of 1969 and Nature Conservation Act of 1971 were passed to protect all indigenous forests. Presently over 72 tree species are protected among which is the highly used *Milletia grandis* (E.Mey) Skeels (umSimbithi).

Despite the various decrees and protection status created, indigenous forests continue to decrease as a result of over-exploitation. A more recent example is the Dwesa Nature Reserve on the Transkei coast (Dept. of Water Affairs and Forestry 1996) which has been heavily exploited by surrounding communities. Similarly the coastal forests north and south of Port St. Johns have been heavily encroached and exploited. The most used species is *M. grandis* (umSimbithi) which is used to make craft works that contribute significantly to the socio-economic status of the Mpondo people in this region. Despite its high importance, little prior study has been conducted on this species as most research has concentrated on the inland indigenous forest trees (Cawe and Mckenzie 1989a,b,c,d).

As South Africa moves into the new political and social age, conflicts concerning resource use by rural communities and with nature conservationists are bound to increase. In order to solve these conflict of interests, the needs of the local communities have to be clearly identified and weighed against the objectives of environmental conservation with the aim of integrating the two.

1.4 Aims and Objectives

Some of the main problems currently facing the former homelands in South Africa are increasing demographic pressure, poverty, food shortage and soil erosion all which have a toll on the indigenous forests. In the Transkei some of the indigenous forests have been heavily exploited with little regard to sustainable utilisation (Cooper and Swart 1992). Appreciating the interaction between these problems is a starting point toward their solution. Sustainable resource use is proposed as the primary means of ensuring that the balance between the biophysical environment and the human component is maintained and the environment is thus

not further degraded. Fundamental to achieving this balance is the recognition and identification of socio-economic initiatives that should act as a foundation for rural development. The primary aim of this thesis is, therefore, to investigate the socio-economic and environment factors associated with use of *M. grandis* and their impact on the sustainability of the species in the coastal Pondoland forests of the Mt. Thesiger region. The objectives are:

1. Establish which forest zones are exploited and the level of exploitation.

2. Quantify the volume of wood harvested for the local craftwood industry.

3. Establish the current wood resource availability.

4. Investigate the extent of regeneration of *M. grandis* and thus its sustainability and that of the craft work trade.

5. To obtain an understanding of the functioning of the study area's society and economy and its dependance on *M. grandis*.

6. Develop an understanding of the people's perception of conservation and management of the forest resources with an aim of establishing appropriate land tenure that will enhance sustainable development of the umSimbithi craft work trade.

CHAPTER TWO: THE STUDY AREA

2.1 Location

Transkei which forms part of the Eastern Cape Province has a total area of 43653 km^2 that is bordered by the Indian Ocean in the south east (Figure 2.1). Administratively, it is divided into nine regional authorities, 28 magisterial districts and 182 tribal authorities. The area of study falls under Pondoland tribal authority within Umzimvubu District of the Nyanda Regional Authority. This district covers an area of 63 km^2 within 31° 30 / and 31° 45 / south and 29° 15/ and 29° 30 / east on the coastal region of Transkei (Figure 2.1). The case study was confined to the Mount Thesiger Forest Reserve next to the small coastal town of Port St. Johns and the adjoining three villages within Caguba Location (Figure 2.2).

2.2 Topography and Geomorphology

The following description of the main geological and geomorphological characterisation of Transkei have been derived from Du Toit (1917) and Kruger (1983). The topography varies tremendously from the inland mountain range reaching 3000m to the sharp decline towards the sea. The most outstanding topographical feature is the Drakensburg which rises to about 1270 to 1520 metres above the ground from its base. The region is described by Du Toit (1917) as having two main plateaus; the inland plateau which is a belt of ground about 1250 metres above sea level and a coastal plateau with a general altitudinal seaward fall to about 800 metres. It is comprised of formation such as the Beaufort group, Ecca group and Dwyka in the northeast. The formations are distributed in a manner where the older crop out of the east and pass westward below the younger ones. In certain areas these formations are penetrated by Karoo dolerite. All formations of the Karoo group, from the youngest (Dwyka) to the oldest (Drakensburg) outcrop in Transkei but the Beaufort group are the most represented. Cretaceous formations also lie scattered in narrow localities along the sea-shore from Umngazana River Mouth through Umzimvubu District northward and they are the parent structures of soils on which the coastal scarp forests are found.

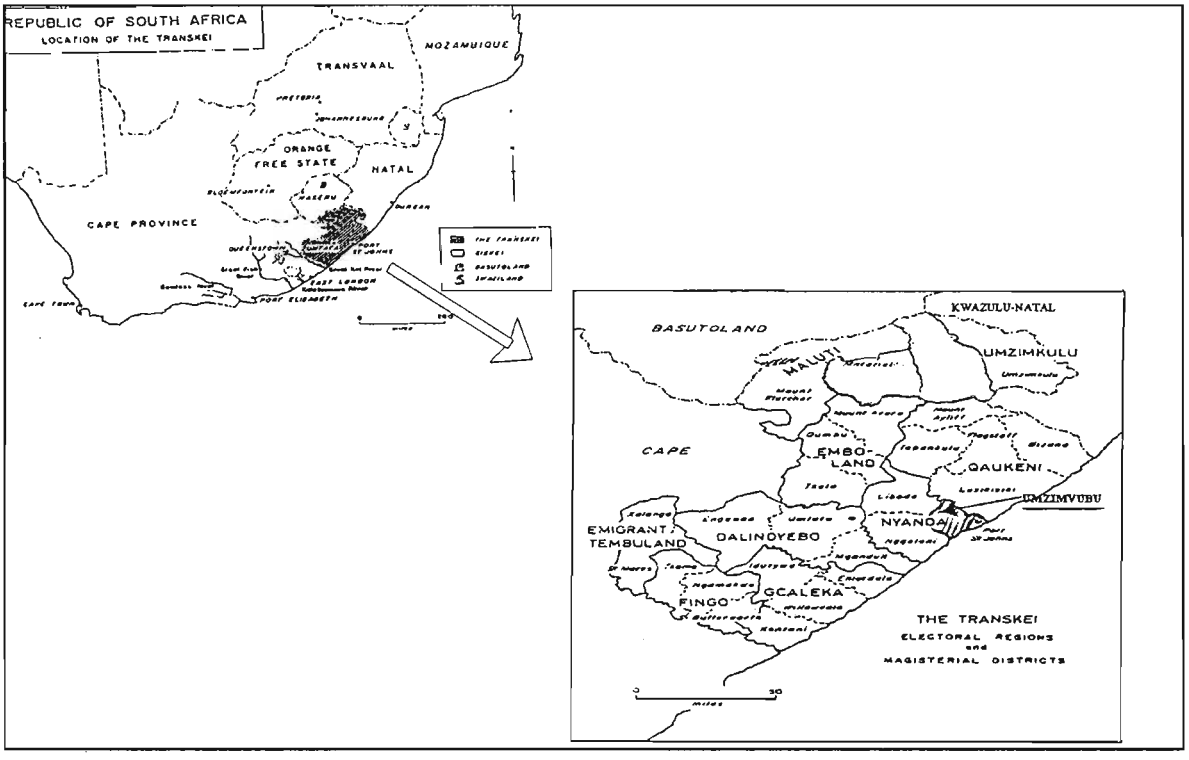

Figure 2.1: Map of the study area (Umzimvubu District) in relation to southern Africa and Transkei

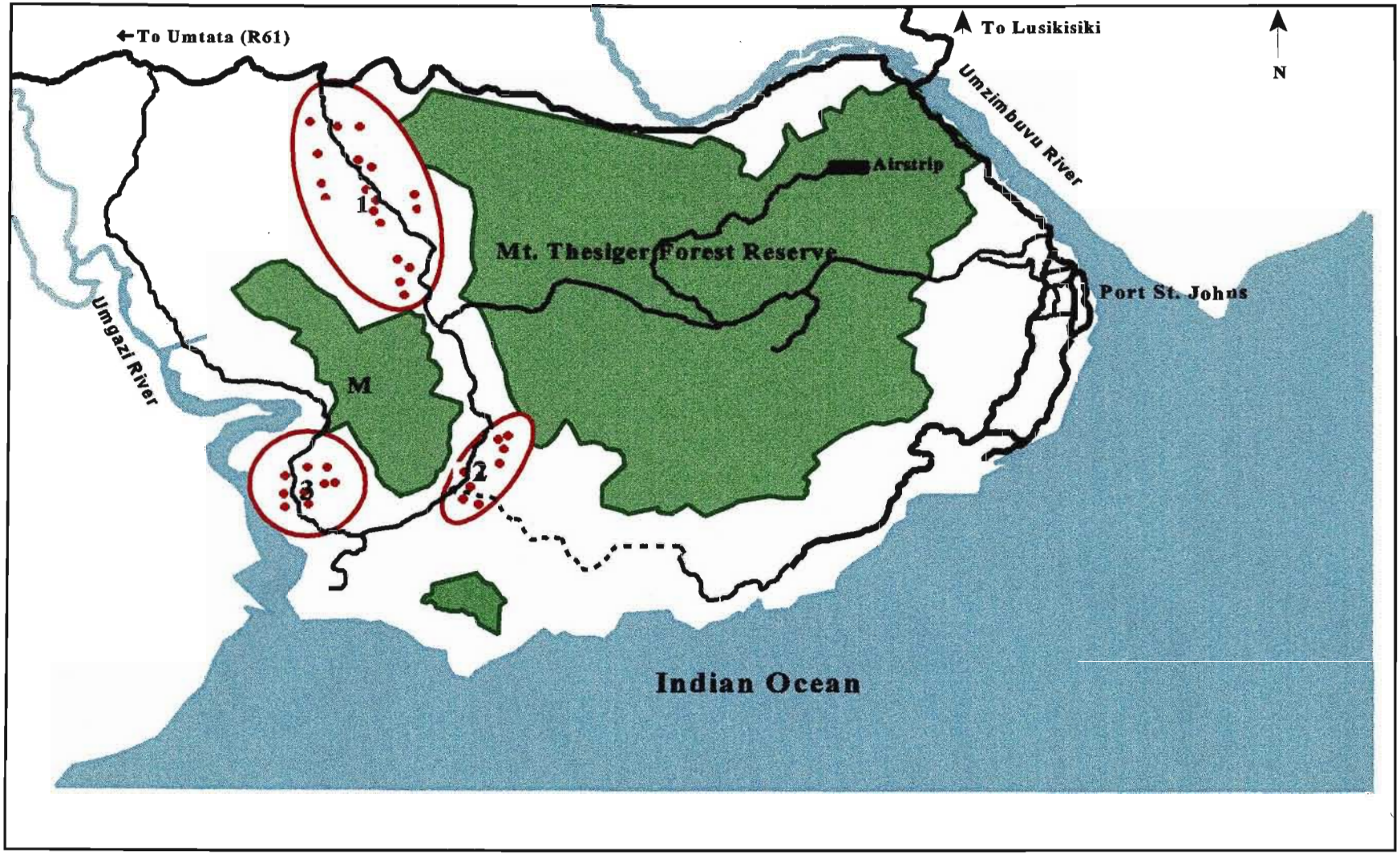

Figure 2.2: Schematic diagram of the study area showing Mt. Thesiger Forest Reserve, Mkwolwane Forest (M) and the adjoining villages of Caguba (1), Sicambeni (2) and Vukandlule (3)

2.3 Climate and Soil

Transkei falls within the summer rainfall zone of southern Africa and generally receives high rainfall compared to most of South Africa with most occurring between October to March Tyson (1986). Eskteen *et al.* (1979) note that annual rainfall declines in a east-west trend from the Indian Ocean. Though variable, this trend is most noticeable along the steep gradients. In Umzimvubu District, the annual average rainfall is above 1000 mm. The average daily maximum temperature along the coast is 23.2 °C while the average minimum is 16.7 °C. This relatively high rainfall and temperatures supports prolific growth of coastal forest species as compared to the drier inland regions. Eskteen *et al.* (1979) have suggested that this climate however, accelerates erosion and vegetation damage as one moves inwards from the coast. An example is the coastal escarpment region which is drained by Umzimvubu, Mngazana and Umtamvuna that have resulted massive gulleys from soil erosion (Dardis and Moon 1988).

2.4 Sociological Profile

The basic socio-economic structure of the area given below was obtained from primary and secondary sources. These included referenced material of Umzimvubu district and Port St. Johns development plans, interviews with villagers, traders and key informants on the Reconstruction and Development Programme (RDP).

2.4.1 Demography

In Umzimvubu District, the current population is estimated at 55 200 with over 80% being distributed in the rural areas (Goldfield/WWF-SA 1996). The population density is about 86 persons per square kilometre with an average household size of 8 people (Kieplei and Quinlan 1996). The Transkei Development Information (TDI) report of 1988 showed that the male to female ratio of the economically productive age group 15-64 years was 1:2, 32% male and 67% female. Current statistics still reflects a disproportionately balanced quotient as 57% of the community are female (Stavrou and Ridsdale 1996).

2.4.2 Cultural and Occupational Profiles

The rural area of Umzimvubu district falls under the Pondoland Tribal Authority. Traditional roots are still present although pressures from modern (western) culture are evident. The

standard of education is rural and still low. There are only seven secondary schools in the district. This, however, is an improvement from the single school that existed 10 years ago. There are no technical colleges or tertiary institutions and most students do not go beyond the matric level. Although some families still insist on traditional duties (cattle grazing and firewood collection) for their children, there is, a growing and positive attitude towards education.

Many village communities are found on the slopes or on top of the flat hills. Settlements are near rivers/streams and not far from indigenous forests. Except for a few iron roofed houses, most of the houses are traditional huts built from forests resources. *Acacia mearnsii* De Wild (Wattle) and *Eucalyptus* spp. are common tree species used for hut construction although indigenous species like *Buxus natalensis* (Oliv.) Hutch (umGalagala), *Chaetachme aristata* Planch. (umKhovoti) and *Milletia sutherlandii* Harv. (umQunye) are also used. In some cases, mature stems of *M. grandis* (umSimbithi) are split and used as kraal posts as they are termite resistant and long lasting (M. Thembakosi, 1996, pers. comm.[1]). It has been difficult to quantify the amount of indigenous wood used (Johnson 1982), however the department of forestry estimated that in 1981, 59285 m^3 of Eucalypts were used. Most of the forest species are reserved and therefore are not to be harvested. The only unreserved forest resource harvested without license permit is thatching grass. The popular grass types used include *Cymbopogon validus* Stapf ex Burtt Davy (Umqungu) and *Hyparrhenia* spp. (iDobo). The old land tenure system under the Headmen Authority is still practised. Every family has the right to cultivate and graze cattle on a piece of land that is allocated by the chief (R. Ngqukutu, 1996, pers. comm.[2]). The area around Mt.Thesiger is under Chief Fono who is highly regarded by the local people. Agriculture is the main activity in the rural areas. Livestock rearing and maize growing is practised on a subsistence level. Communities near indigenous forests indulge in craft work like basketry and wood carving and sell their products at Port St. Johns or Umtata Town. A total of 17 villages within Umzimvubu are involved in various art and craft work. The most

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[2]Mr. Robert Ngqukutu, Senior Forest Guard Umzimvubu District, Port St. Johns 4830.

prominent in carving is Caguba Village adjoining Mt. Thesiger/Sokwe Forest. This village with an estimated 250 households has the highest number of carvers and carries a long tradition of carving (N. Kaissling, 1996, pers. comm.[3]). Together with two other adjoining villages (Sicambeni and Vukandlule), the three villages form the Caguba Location with a total of 500 households who depend on this craft industry.

2.5 The Local Economic Status and Opportunities

The coastal settlement of Umzimvubu District is typical of rural life in South Africa; poverty, lack of formal employment opportunities, the inability of agriculture to meet subsistence household needs and reliance on natural resources for income (Hendricks 1989, McAllister 1989, Sharp and Spiegel 1990). Poverty is widespread and the monthly incomes vary from R100 to R1000 (Kieplei and Quinlan 1996). A socio-economic case study on Port St. Johns and its surrounding areas, commissioned by the Land and Agricultural Policy Centre (LAPC) in July 1996, showed that 87% of the people do not earn any income, 9.2% earn below R500 per month, 1.9% earn between R500 to R1000 and only 1.1% are earning above R1000 (Ridsdale and Kallman 1996). The economic dependency stands at 1:8, i.e. one economically active person to eight non-economically active people (Stavrou and Ridsdale 1996).This high burden of dependancy is reflected by the existing socio-economic problems and clearly these figures point towards the need for creating an employment strategy for this region. Women-headed households are the most vulnerable to poverty (W. Mtakati, 1996, pers. comm[4].) due to absence of the husband or male relations and limited opportunities for employment. Pensions and remittances from migrant workers form an integral source of income although there are informal sources like marijuana cultivation. About 94.6% of the people do not receive remittance at all, 5.4% receive between R100 to R500 per month and only 0.1% receive over R1000 (Table 2.1). The reason why remittances are low, unlike in the past, may be due to the declining migrancy patterns as more mines are downsizing their staff in retrenchment programmes.

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[3]Mrs Nozuko Kaissling, Amapondo Art and Culture, P.O.Box 38 Port St. Johns 4830.

[4]Mr. William Mtakati, RDP Forum P.R.O./ Mt. Thesiger Trust, P.O.Box 7 Port St. Johns 4830

Table 2.1: Sources of income and percentages of locals receiving them (adapted from Ridsdale and Kallman 1996)

Amount of Income Rands (R)	Percentage of locals receiving any form of income (%)	Sources of income and percentage of earners	
		Remittance Total (%)	Pension/Transfer Total (%)
0	87	94.6	95.0
0-100	2.5	3.2	3.2
101-200	1.6	1.4	1.4
201-300	1.5	0.3	0.3
301-400	1.6	0.3	0.3
401-500	2.0	0.1	0.1
501-1000	1.9	0.1	0.1
>1000	1.1	0.1	0.1

In the past, local food consumption was met by small farmers and some even exported fresh products including specialised crops like rice (J. Feely, 1996, pers. comm[5].). However, this has changed owing to problems associated with land tenure, poorly supported infrastructure, adverse physical conditions and inexperience on the part of land holders (Vandeverre 1989). Tourism remains the largest potential foreign exchange earner. For instance in 1985, there were over, 900 000 tourists who earned the former Transkei Government over R12 million (TDI 1988) and most visited Umzimvubu (Port St. Johns) District. Besides tourism, Umzimvubu has a rich resource of water and forestry. There are several indigenous forests which provide timber, medicinal plants and craft work resources.

A drop in tourist traffic and closure of many economic structures like the Cape Hermes Hotel and several cottages has caused the economic status of the district to plummet. In the late

[5]Mr. Jim Feely, Directorate of Nature Conservation, Eastern Cape, P/Bag X5002 Umtata 5100

1980's a negative image of this region deterred potential investors and tourists (Vandeverre 1989). To date there is very little active marketing and promotion of the town. Employment is limited to very few hotels like Umgazi River Bungalows (which employs about 80 locals) and other small unestablished businesses. Currently unemployment levels are estimated at 60% (Powell 1996) but the local RDP forum estimates it at over 80% (W. Mtakati, 1996, pers. comm.). Income derived from the "informal sector" like craft work remains an important means of survival for many people (Vandeverre 1989). Clearly, with limited employment opportunities, natural resources such as indigenous forests are heavily exploited in an attempt to offset economic burdens.

2.5.1 Service and Infrastructure

In order to raise the socio-economic status, basic infrastructure needs to be in place. Port St. Johns has a town council that oversees services like water supply and roads. The town has an air strip within Mt. Thesiger Forest and an active lighthouse by the Umzimvubu River Mouth. However, most of the socio infrastructural resources are degraded and under pressure from an increasing population. A large portion of the town population is untrained and unskilled and many do not pay their rates or taxes (Goldfield/WWF-SA 1996). The biggest barrier to economic growth is the lack of funding resources and strategic capacity skills such as marketing and training facilities.

2.6 Use of umSimbithi

Even though the coastal lowland forests were historically not highly valued like the Afromontane forests (Sim 1907), several species were and still are used for utilitarian and ornamental purposes. These include *M. grandis* (umSimbithi), *Mimusops caffra* E.Mey. ex A.DC. (umThunzi), *Strychnos henningsii* Gilg (umNonono), *Ptaeroxylon obliquum* (Thunb.) Radlk. (umThathi) and *M. sutherlandii* (umQunye). Chief among them is *M. grandis* which is a member of the pea Family *Fabaceae*. This tree has a pale yellow sapwood with a deep reddish-brown heartwood which is excessively heavy, hard and very durable (Pooley 1993). It is used for making walking sticks, knobkerries and police batons (Plate 2.1). The wood seasons well, works easily and has been used for furniture, making smoking pipes (Plate 2.2) and ornamental fittings. In the past, it was largely used to make wagon wheel spokes. The roots

and seeds have medicinal uses while the pods offer breeding grounds for other life forms like the Orange Barred Playboy butterfly, *Virachola diocles* (Pooley 1993). The tree foliage and flowers have been described by Immelman *et al.* (1993) as among the most decorative South African trees and it has been grown ornamentally in many parks and gardens.

The tree also has several features which gives it tremendous agroforestry potential for rural community development. It has a compact crown which is particularly suitable for planting in limited space like the small rural gardens. It does not compete vigorously with other crops and being a Leguminosae, it enhances soil fertility through its nitrogen fixing ability. Some farmers around Port St. Johns have realised its agroforestry potential (Peter Bangleman, 1996, pers. comm[6].) and have integrated it into their vegetable gardens (Plates 2.3 and 2.4). Further potential for agroforestry is its ease of propagation from either vegetative material or seeds.

In the Umzimvubu District, umSimbithi is a major species in the craft work industry and contributes substantially to the local socio-economic structure. It provides a major livelihood for the locals besides maintaining the carving traditions of the Pondo people. Most carvers specialising in umSimbithi come from villages within Caguba Location while basket makers from Mtheweni Location and mat weavers from Noqhekwani Location (R. Ngqukutu, 1996, pers. comm.).

[6] Mr. Peter Bangleman, Permicultural Farmer, Port St. Johns.

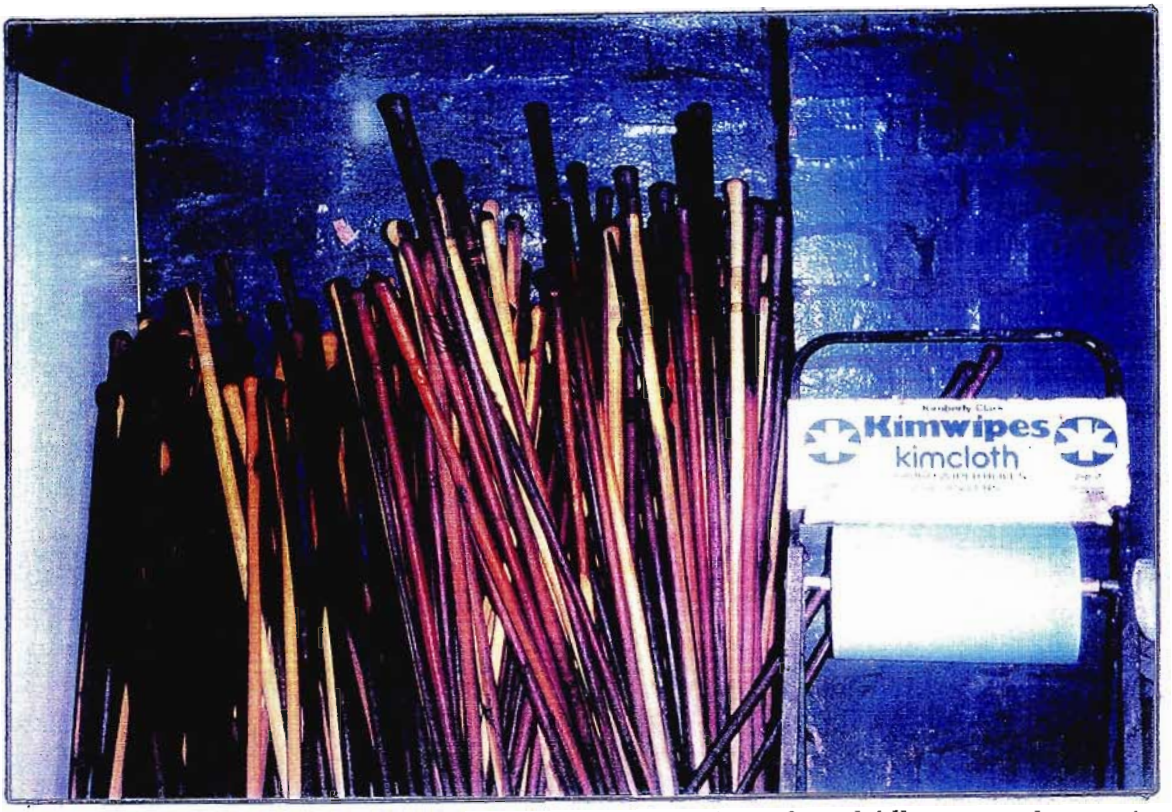

Plate 2.1: Walking sticks and Knobberies are main products from *Milletia grandis* wood

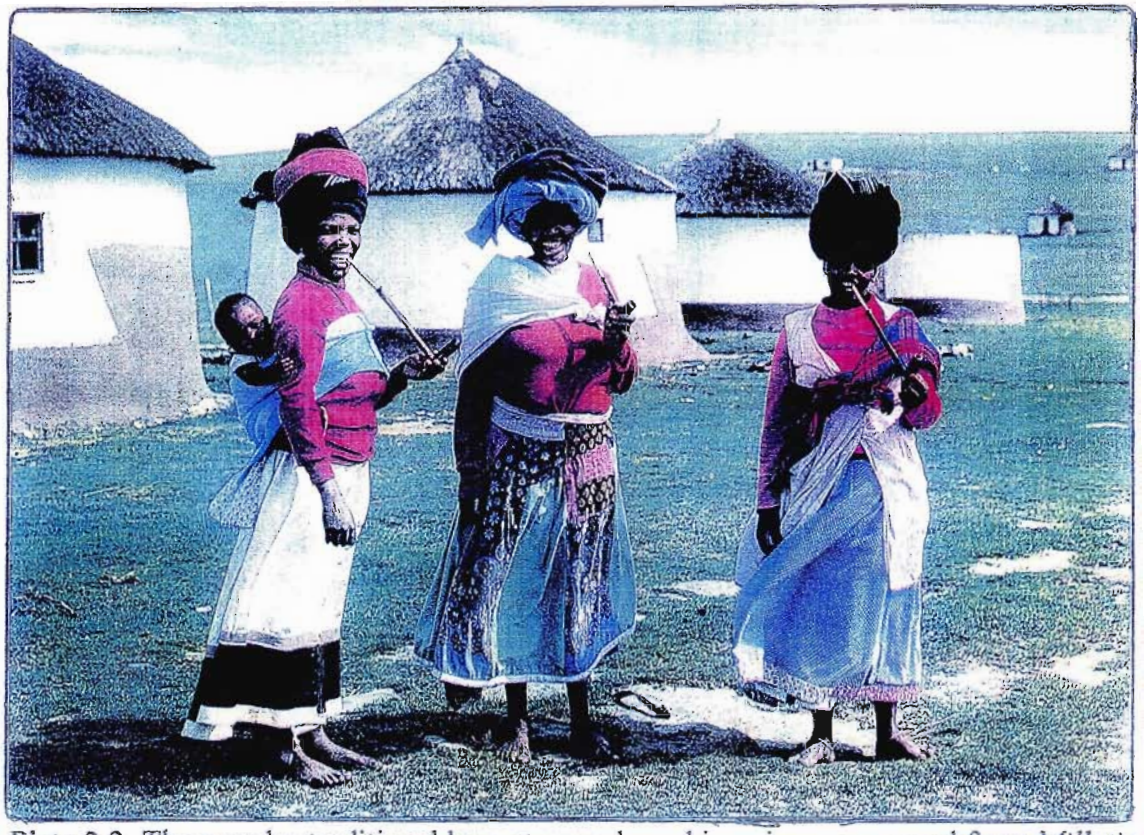

Plate 2.2: The popular traditional long stemmed smoking pipes are carved from *Milletia grandis* wood

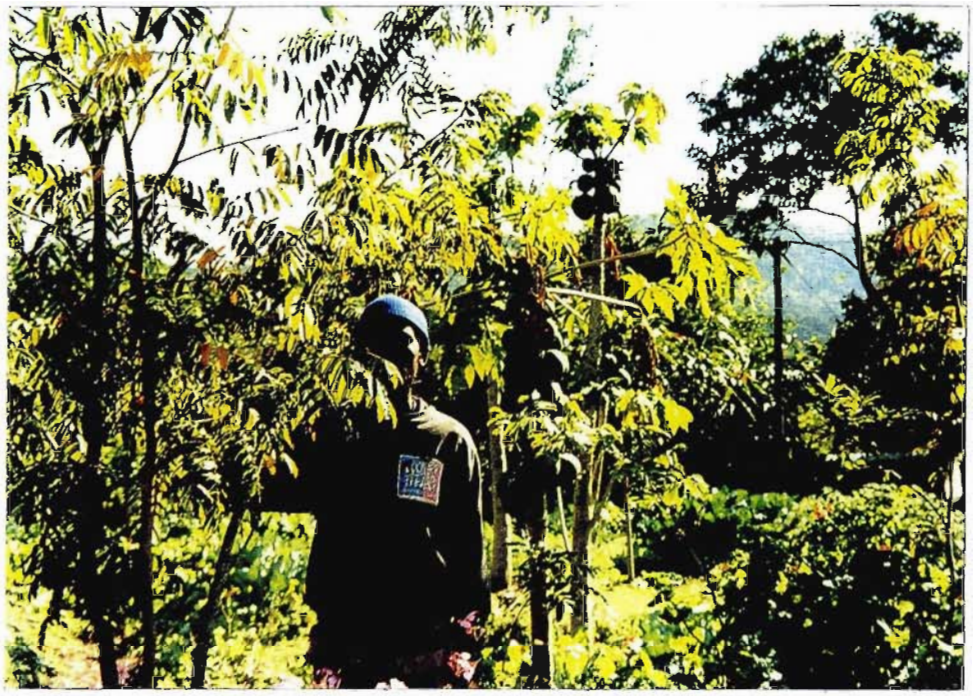

Plate 2.3: Local farmer with *Milletia grandis* (foreground) integrated into the fruit garden

Plate 2.4: Wind breaking rows of *Milletia grandis* trees have enormous potential for alley farming system of agroforestry

The craft work trade has steadily increased over the last decade. In 1986, the amount of umSimbithi sticks and basketry craft sold in Port St Johns raised about R100 000 (Cunningham *et al.* 1988). Current estimates from one middleman alone indicate annual income of R120 000 (G. Sinks, 1996, pers. comm[7]). In Port St. Johns the annual sales from three established middlemen is estimated to be over R500 000. If unrecorded sales by the villagers are considered, a much higher annual income value for this trade would be obtained. Presently an initiative to form a cooperative society for the local carvers is being pursued by the Amapondo Art and Craft Culture Centre (N. Kaissling, 1996, pers. comm.) whose main aim is to promote craft trade through sustainable use based on sound economic principles.

2.7 Conclusion

Although rich with dense coastal forests of tourism potential, Umzimvubu District of Eastern Cape still has a subsistence and rural economic base that is dependant on agriculture and forestry resources. The problems encountered in the study area (e.g poverty, poor infrastructure and service provision, increasing forest degradation and soil erosion) are characteristic of former "independent" states of South Africa. These problems are also recognised worldwide as challenges to sustainable development. Rising population and limited employment have stressed forests as they are increasingly providing material for carving, basketry and weaving. Carving is an important economic activity and traditional practise of the Amapondo people. Increased carving to meet economic needs has however led to more unsustainable use of *M. grandis*. To meet local needs, it is suggested that conservation concepts will have to include initiatives that address basic needs of the rural people. The chapters that follow examine these needs with a view to sustaining resource use in the MTFR study area.

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[7]Mrs. Gail Sinks, Mpondo People Craft, Tel. (0475) 441274, Port St. Johns.

CHAPTER THREE: AGE CLASS DISTRIBUTION AND QUANTITY OF UMSIMBITHI ON MT. THESIGER FOREST RESERVE (MTFR)

3.1 Introduction

Most indigenous forests in Eastern Cape are Afromontane comprising Mist Belt mixed *Podocarpus* forests and the Montane *Podocarpus* forests. However patches of Indian Ocean Coastal Belt forests occur in certain areas of the coastline. Cooper (1985) has categorised these Coastal Belt forests into six subtypes forests; dune, sand, swamp, coastal lowland, and coastal scarp forest. Within the Umzimvubu (Port St. Johns) District, the most dominant are the coastal scarp forests. This forest type occurs between the coastal forests and the mist belt forests found on the south and east facing slopes of the coastal escarpment. An example is the Mt. Thesiger Forest Reserve (MTFR) which covers over 1400 Ha (John Zibi pers. comm.[8]) and is among the largest indigenous forest blocks of the Pondo coastal forests in Umzimvubu District (Table 3.1). It has several important indigenous tree species among which are *M. sutherlandii* (umQunye), *P. obliquum* (umThathi) and *M. grandis* (umSimbithi). Along with these are important bird species like *Bycanites bucinator* (Temmincle) - Trumpeter Hornbill, *Tauraco corythaix* (Wagler) - Knysna Lourie, *Apaloderma narina* (Stephens) - Narina Trogon and mammals like the Samango Monkey and the Blue Duiker. These animal, especially the birds, enhance the tourism potential of MTFR. However, the close proximity of the forest to the town has resulted in high quantities of *M. grandis* being exploited by carvers especially from the neighbouring Caguba Location.

Issues concerning trends in the availability, use and sustainability of *M. grandis* can be addressed most precisely from the basis of an inventory of data and subsequent observations. Although no accurate trend data is available, it is evident that the level of forest use has increased over time due to increasing demand placed by a growing population, urbanisation, commercialisation and failure to control illegal and unsustainable use (M. Jonker, 1996, pers. comm.[9]). Without new systems capable of achieving sustainable forest management, the future pattern of forest use is likely to be a continuation of the present trend. This scenario motivated

[8]Mr. John Zibi, Principal Forest Foreman Umzimvubu District, Telephone: (0475) 44178

[9]Mr. M. Jonker, Forest Manager, Dept. of Forestry, Umtata

the need to determine the current quantities of *M. grandis* at MTFR and further establish the age class distribution patterns of the species in order to ascertain its future sustainability and that of the craft trade. In quantifying this resource, population density, regeneration, distribution profile, structure and functioning of the forest are a prerequisite (Von Gadow and Seydack 1979,Van Dijk 1987) and these are discussed in this chapter.

Furthermore, as forest exploitation, craft carving and trading is a continuous activity, periodic inventory on the forest resources is necessary as it provides updated information for forest managers. An inventory is an important component of a series of activities that ensure sustained use of forests and wood resources. It should contain information on distribution, area, density, growth dynamics, composition of forest types (Geldenhuys 1991) so that the potential and status of different resources can be determined and sustainable use management established. For instance, forests could be zoned into core areas of conservation such as fringes for local community use and the open areas for domestic grazing. With the exception of the Southern Cape forest reserves (Geldenhuys and Van Laar 1980, Van Daalen 1991), most indigenous forests in South Africa (e.g Hlatikulu, MTFR), largely lack inventories (Geldenhuys 1991). In the Eastern Cape, previous inventories done (Cawe and Mckenzie 1989 a,b,c,d; Cooper and Swart 1992) mostly provide information on tree communities and general description of the resource component. In forest stations where inventories were done most had insufficient information that was poorly recorded (J. Feely, 1996; M. Jonker, 1996, pers. comm.) mainly due to lack of skilled manpower and operating resources. Unlike in the past, inventories must not focus on the volume of useable timber alone but also on aspects of forest regeneration status and therefore the future stocking capacity. In establishing an initial inventory data at MTFR, the age-size class distribution profile of *M. grandis* was investigated (Section 3.2). In this way, the stock of standing and harvested trees was quantified (section 3.3). The availability of different sizes of umSimbithi in MTFR is discussed under section 3.4. In order to evaluate the extent of exploitation, size structure frequency distributions were determined for forests under exploitation and those least or not exploited.

Table 3.1: Major blocks of indigenous forest of the Pondoland coast in Umzimvubu District and their hectarage.

Forest Name	Size (ha)
Mt. Thesiger	1400
Mt. Sullivan	1100
Ntlopeni	544
Figo	450
Sonkwe	450
Bulawu	365
Mpande	350
Ngcanda	250
Macibi	205
Gxwaleni	183

3.2 Methods

Two sampling strategies were employed; (1) sampling to determine the edge profile *M. grandis* and (2) sampling to determine size class distribution and thus population structure of the forests.

3.2.1 Determining Distribution Profile of *M. grandis*

Prior to determining the size class distribution, the location and distribution profile of *M. grandis* trees within the forests was investigated. The tree is generally regarded as a forest margin species (Butchart 1989). To determine if its distribution is restricted to the edges or uniformly distributed in the forest, line transects running perpendicular to the forest/grassland border were placed at eight different sites within Mt. Thesiger Forest Reserve. Three plots of 30x14 metres (m) with a spacing of seven metres between them were located along each transect (Figure 3.1). The heights and diameters of all *M. grandis* trees and saplings in all plots were measured and seedlings counted. Diameters were measured 0.3 metres above the ground

which is the stump height at which tree felling is done at MTFR. Ten diameter size classes were considered, the smallest being 5.0 centimetres (cm) or less and the biggest comprising of stems equal to or bigger than 45 cm. Intervening classes all had equal class intervals of 5 cm. For each diameter class the number of standing stems and those harvested per hectare were counted.

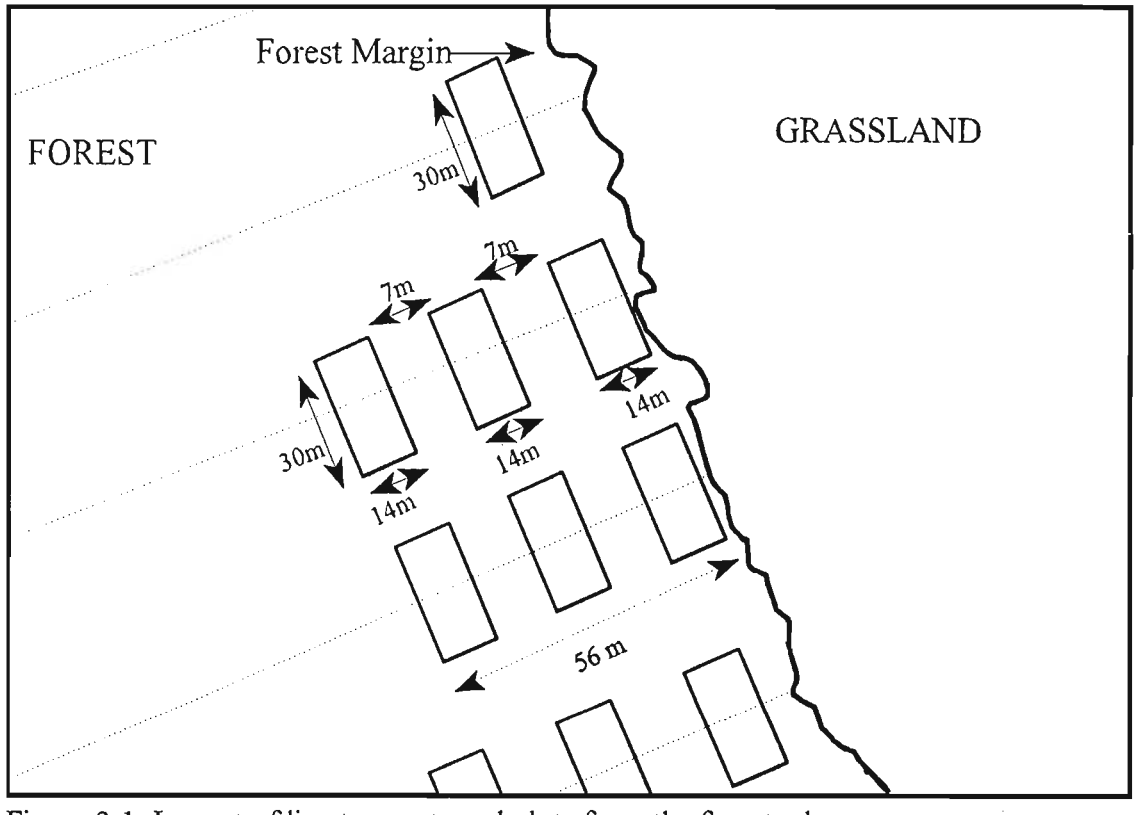

Figure 3.1: Layout of line transects and plots from the forest edge.

3.2.2 Determining Size-Class Distribution and Population Structure

The population density of trees within MTFR was estimated by assessing the number of standing trees and those harvested using rectangular sample plots of 30MX14M (Figure 3.1). Thirty of these sample plots were placed at ten different sites around Mt Thesiger Forest. These were used as they are the standardised size within the forest biome (Van Daalen 1988). Tree heights and diameters (at stump heights or 0.3 m) were taken for all trees and saplings with a diameter over 5 cm. All saplings and seedlings less than 5 cm diameter were counted and recorded. The stumps of *M. grandis* trees were identified by a forest guard and counted to determine the number of harvested trees. Data collected from forests under two different utilisation pressures; exploited (harvested) and unexploited forests were used to draw the size class frequency distribution tables in order to determine population profile and quantity of *M. grandis* under the different size classes. An area representing exploited forests was chosen from that part of the forest reserve neighbouring Caguba Village. This area was pointed out by the villagers as among their main source of umSimbithi wood. A second area on the steeper slopes of Mt. Thesiger Forest Reserve and the neighbouring Silaka Reserve was selected as an unexploited zone. It was also pointed out by the villagers as an area least exploited for harvesting umSimbithi trees and this was confirmed by the forest guards. Chi-square distributions tests (Steel and Torrie 1980) were use to compare the differences between the densities of standing trees, and thus harvesting, in the exploited and unexploited forests. The difference in stump distribution between the two forests was also analysed using the Chi-square tests.

3.3 Results

3.3.1 Distribution Profile of *M. grandis*

The number of *M. grandis* trees in all the diameter classes decreases from the forest edge inwards into the forest (Figure 3.2). Most of the trees were found within 15 metre of the forest edge. No seedlings, small or large trees were found beyond 35 metres from this edge. Similar observations have been noted by Pooley (1993) and Butchart (1989) who state that this species dominates in forests fringes and often forms riverine vegetation. Most of the seedlings and saplings occur within 0-15 metres of the forest edge. Few were found within the range of 21-35

metres while none after a distance of 35 metres from the same edge. However, a few medium to large sized trees (20-40 cm) were observed from the edge up to a distance of 50 metres into the forest. No trees larger than 45 cm were observed beyond 35 metres from the edge, although stumps were noted.

3.3.2 Size-Class Distribution and Population Structure

The diameter size class distribution profile shows a decrease in the density of plants as the diameter size classes increase (Figure. 3.3). There are very many seedlings and small diameter trees while very few large trees especially those with diameters above 30 cm. This is a typical Deevey class III or inverse J type of growth distribution (Harper 1977, Silvertown 1982) and is common with uneven aged forests where trees of different sizes and ages are intermingled (Leak 1964).

A comparison of the stem distributions, in the ten diameter size classes, on exploited and unexploited forests at MTFR showed that the density of trees was higher in the unexploited forests (Figures 3.4) although this was not significant when analysed using the chi-square tests (χ^2= 0.54 d.f.=9 P>0.5). Stump density, like that of trees, was higher in the exploited forests (Figure 3.5). These stumps, which were noted in eight of the ten size classes, also showed no significant difference in the density between exploited and unexploited forests (χ^2= 0.85 d.f.=7 P>0.5). There were, however, significant differences in the number of stumps observed between the different size classes ($p<0.01$). Most stumps were noted in the size class of 20-25 cm which is the most harvested stem size. No stumps over 45 cm diameter were observed as most trees are cut before they reach this size. A few large trees of over 45 cm were observed on the steep slopes of Mt Thesiger or areas bordering the well guarded Silaka Nature Reserve under the control of Nature Conservation Department.

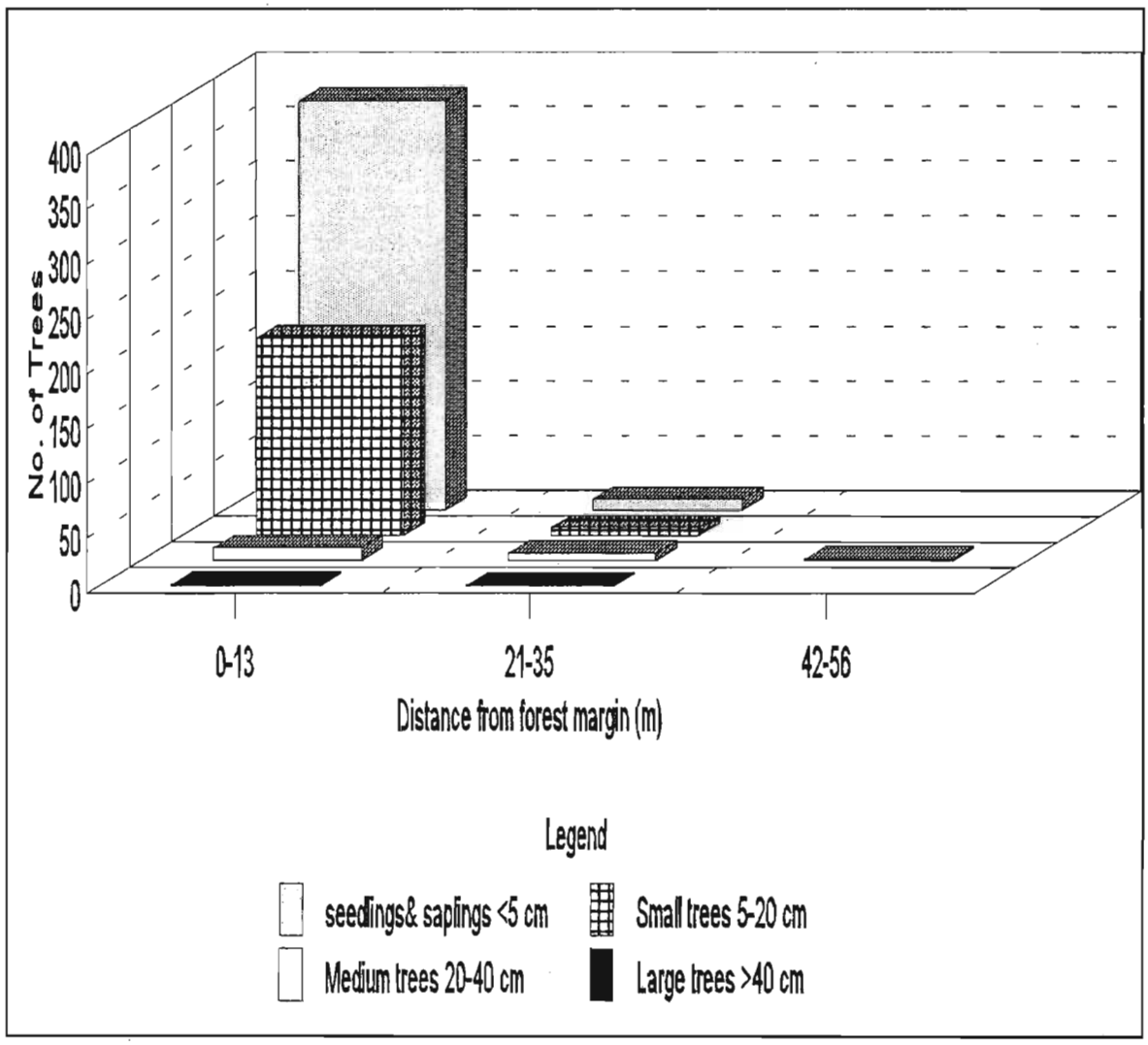

Figure 3.2: Distribution profile of *M. grandis* size classes with distance from the forest edge.

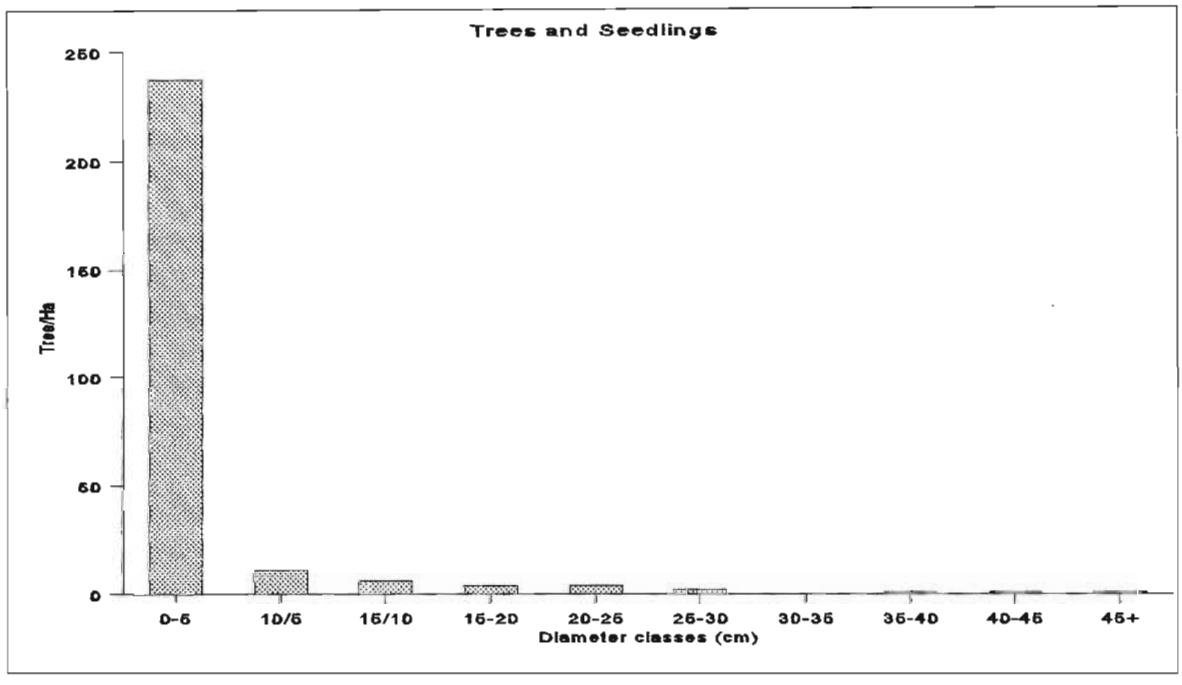

Figure 3.3: Size class distribution of *M. grandis* seedlings and trees collected in 30 sample plots at Mt.Thesiger Forest Reserve (overall observation in exploited and unexploited forests)

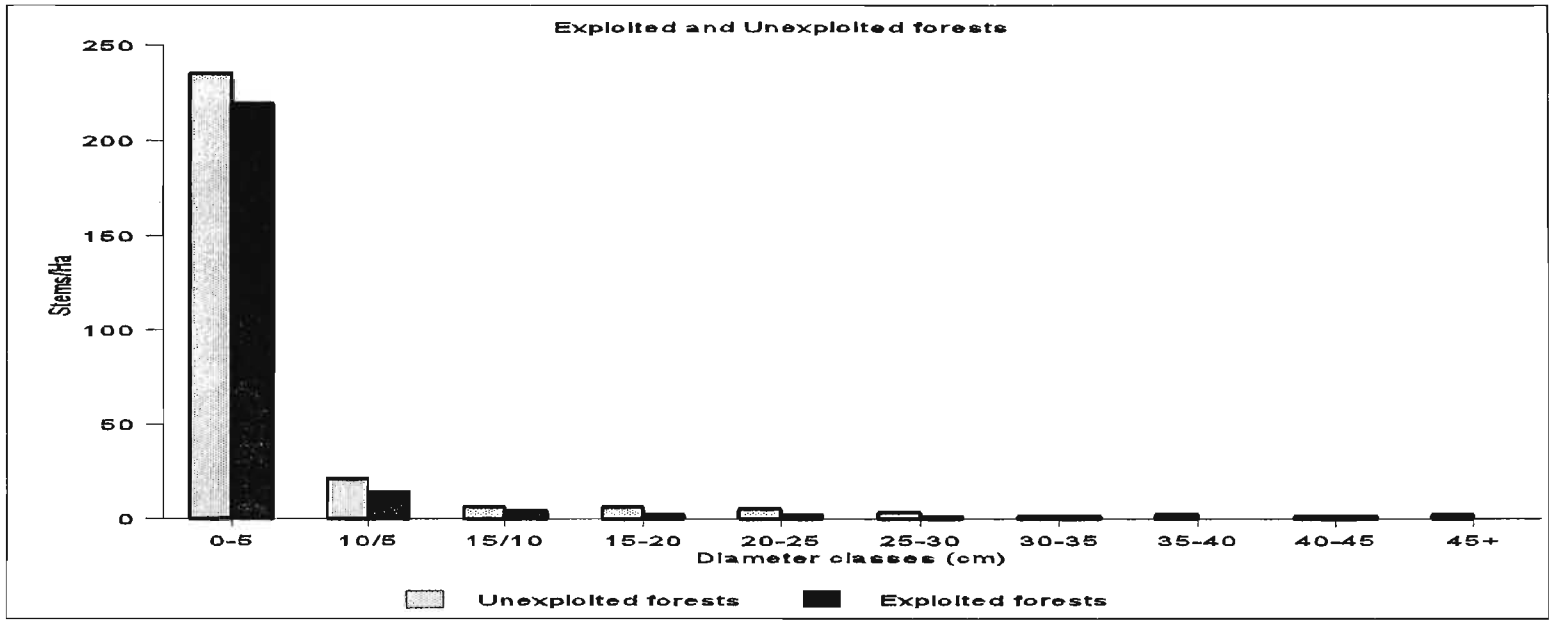

Figure 3.4 Size class distribution of *M. grandis* in exploited and unexploited forests

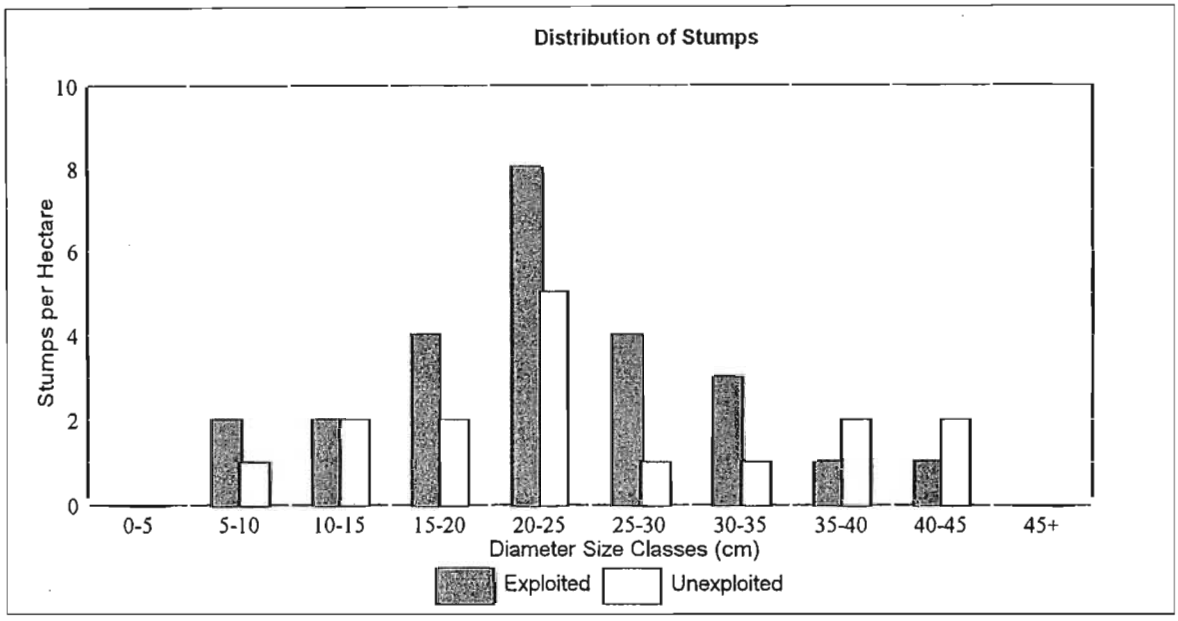

Figure 3.5: Stump size distribution of *M. grandis* in exploited and unexploited forests

3.3.3 Relationship of stem availability and harvesting

To establish a sustainable yield management plan for MTFR, information on stem availability and harvesting rates are a prerequisite. The comparison of stem availability and harvesting over time is indicated on Table 3.2. The table gives indices defined as the number of stems harvested to the number of accumulated harvestable stems (stumps plus remaining harvestable stems). Since stumps remain at the same point and decompose *in-situ*, they are a good indicator of previous harvest levels accumulated over the years. Indices comparing stem availability with harvesting for various diameter sizes ranged from 0 to 0.5 (0-50%). The five size classes between the diameter range 20-45 cm were the most exploited as each had an index ratio of 0.5 (Table 3.2). Although the five had the same index (0.5), the size class 20-25 cm was calculated from a bigger sample and hence experienced more absolute harvesting. Two size classes (0-5 cm and >45 cm) showed indices of 0% indicating that stems of these sizes were not used. This lack of use is due to their small size (saplings) and the inaccessibility of reaching the large stems on steep slopes. In comparing resource availability with harvesting, it would have been more ideal to use annual stem availability and harvested amounts so as to develop a resource use model. This is currently not feasible for MTFR as it is difficult to determine the

age of the decomposing stumps and thus the harvesting rate. Furthermore, estimates of stem availability are hindered by lack of important information on growth rates of stems and recruitment from coppices. These are all vital inputs for modelling forest resources. There is a need to establish permanent sample plots (PSP) and start collection of this data to develop a dynamic resource modelling system for MTFR and Pondoland forests.

Table 3.2 : Indices comparing stem availability and harvesting of various diameter classes at MTFR. The index is expressed as a ratio (A:C) of cut stumps (A) to the number of accumulated harvestable stems (cut stumps plus harvestable stems-C)

Diameter class	No of Stumps/ha. (A)	Trees/ha.(B)	Stumps + Trees /ha.(C)	Index (A / C)
0-5	0	237	237	0.00
5-10	1	11	12	0.08
10-15	1	6	7	0.14
15-20	2	4	6	0.33
20-25	4	4	8	0.50
25-30	2	2	4	0.50
30-35	1	1	2	0.50
35-40	1	1	2	0.50
40-45	1	1	2	0.50
45+	0	1	1	0.00

3.4 Discussions

3.4.1 Size Class Distribution and Population Structure

The size class distribution tables at MTFR indicated that there were more seedlings and saplings in the forests compared to the large trees. Size class distributions tables have been used in many studies of forest population structure (Harper and White 1974, Ogden 1985, Everard *et al.* 1995). However they are static and only give an indication of growth at one instant in time. They do not give dynamic growth rates or permit the use of dynamic life tables. Deriving data suitable for the latter is difficult for long lived trees in natural forests, and thus age structure is determined from size-classes observed at single sampling dates (Silvertown 1982, Shackleton 1993). Use of size class distribution in forestry should not be seen as a problem since the reproductive condition of trees, and resource users interest in them, is based more on

size than age. Furthermore, it is difficult to determine the age structure of a population of trees without dendrochronological data and information on how size relates to age although there is generally a poor relationship between size and age as trees under the canopy are always suppressed (Silvertown 1982). Muir (1990) further notes that even when an even aged cohort is established, differential growth occurs causing skewed distribution with few dominant trees. With these limitations, use of size class distribution is preferred. It should however be noted that age and time related management procedures like harvesting cannot be easily identified in size class data (Harper 1977, Silvertown 1982). Nevertheless, Harper (1977) and Ogden (1985) have noted that size class distributions are useful predictive tools in forestry.

The high number of seedlings and saplings observed along the forest margins and the few trees beyond 35 metres from the edge suggests that *M. grandis* is a forest margin species. If so, there must be a periodic event that influences this marginal characteristic. Continuous recruitment of seedlings into a gradually expanding margin could be the influencing event and the stumps seen within the forest are remnants of the previous marginal inhabitants.

As most seedlings of *M. grandis* were observed growing under the canopy, the tree can be assumed to be a shade tolerant species. An abundance of shade tolerant species in a forest would indicate a fine grained forest structure. In fine grained forests one would expect to find that most of the species found in the canopy are represented on the forest floor or subcanopy (Midgley *et al.* 1990) and most trees would have an inverse J shaped distribution. The amount of variation from one forest patch to another would be small and it would show a fine grain. Although the inverse J distribution suggests that *M. grandis* is a fine grained species, Everard *et al.* (1995) have shown that the coastal scarp forests where it occurs are not fine grained but coarse grained. They showed that only two other species (*M. sutherlandii*; *Garcinia gerrardii* Harv. ex Sim) have fine grained characteristics while all the other dominant trees showed different patterns. Forest grain is relevant in management of forest communities as it relates to the scale on which dynamic regeneration processes occur. If forests are coarse grained, regeneration would occur over a large scale and thus large tracts of these forests need to be protected for sustainability to be maintained (Everard *et al.* 1995). Knowledge of forest grain

can assist forest managers to undertake decisions on forest resource use. For instance, fine grained forests which normally have a high number of stems for most species (Everard *et al.* 1995) can be exploited if well managed without negative long term effects. However, in coarse grained forests such as MTFR, supply of stems may be confined to only a few shade tolerant species like *M. grandis* that grow abundantly under the canopy. Thus, sound management of forests needs information on factors like age size class distribution, grain and resource availability.

3.4.2 Resource Availability

Although carvers classified two types of forests based on the magnitude of harvesting in them (i.e. exploited and unexploited forests), these showed no significant difference in the densities of trees when analysed through chi-square tests. Similarly there were no significant differences in the stump densities of the two forests. Thus, forest areas that were distinguished as exploited and unexploited both had similar densities of trees and stumps in the various diameter size classes. Therefore, even though the local umSimbithi users and forest guards identified certain areas within MTFR as unexploited forests (with an abundance of *M. grandis* trees), these areas are actually under harvest just as in the others identified as exploited forests. In essence, the intensity of harvesting in both exploited and unexploited forests appears to be similar and hence there may not be any area (except the few steep slopes) which is truly unexploited as claimed. However further studies covering larger areas would be needed to fully ascertain this.

In drawing management strategies for MTFR, forest managers should not view MTFR as having forest patches under different levels of exploitation (i.e. unexploited and exploited forests) but rather, these forests should be considered as one continuous forest block facing similar external pressure and therefore requiring similar management plans.

At MTFR, harvesting is selectively done for straight stem forms which are mostly middle size trees (diameter 20-25 cm). Similar trends of selective harvesting in indigenous forests have been noted in Hlatikulu Forests of KwaZulu-Natal (Muir 1990) and in the southern Cape (Geldenhuys 1975). The few large sized trees of over 45 cm that were observed at specific sites of MTFR, like those neighbouring Silaka Nature Reserve, could have escaped harvesting

because of the steep slopes and rugged terrain which makes accessibility difficult. Trees of the diameter class 20-25 cm are the most exploited and makeup more than 30% of the total harvest within the Mt. Thesiger Forest Reserve. In this diameter class, an average of four trees per hectare are felled. Even though this may appear a small number of trees, it is in fact very high since only five trees on average, of this size, were observed per hectare in areas where there was little or no harvesting.

- High exploitation of stems in the size class (20-25 cm) is due to several cost-effective factors the size class has compared to others. Firstly, in comparison to stems above 15 cm in diameter, this size class is the most abundant with 5 trees/ha in the forests. Other size classes such as 25-30 cm have three trees per hectare while those above 30 cm have on average only two trees per hectare. Secondly, this size class is mostly distributed along the forest margin (Figure 3.2) and is not found on the steep inaccessible slopes like the larger sized trees. It is thus much easier and cheaper for carvers to locate and remove these sizes of stems (20-25cm) compared to the others. Thirdly, carvers incur less log transporting costs on the 20-25 cm logs compared to the larger sized ones. As logging is banned, the poached logs are not pulled on oxen sledges as before, instead carvers carry them on their shoulders passing along concealed forest tracks. Some hire others villagers on a casual basis to do the carrying whereby the large heavier logs cost more to transport. Yet these large logs do not necessarily yield more sticks in comparison to the medium sized (20-25 cm) ones as they sometimes have rotten centres (D. Cwaba, 1996, pers. comm[10]). Furthermore, medium sized trees usually have straight stems that yield more of the longer sticks which are desired in the craft markets. Beside the transport difficulty, most carvers contend that larger logs tend to have cracks and insect borings in their stems. These act as entry points for pathogens especially fungus which cause stem decay. This is common on large sized stems and can be very costly to carvers because standing trees appear unaffected and rotten stem cores are only discovered during carving (D. Cwaba, 1996, pers. comm.). Similarly, woodcarvers in Gazankulu (Mpumalanga) who use the Kiaat wood (*Pterocarpus angolensis* DC.) have complained of the same heartwood diseases caused by fungi (Shackleton

[10] Mr. Douglas Cwaba, Makhuzeni Store, P.O.Box 4830 Port St. Johns.

1993). These problems and cost factors incurred by carvers are further discussed under section 4.3.3.2.

If the logging ban were to be lifted, it is debatable how preference of stem size would average. Carvers would probably choose the large stemmed trees with more volume (D. Cwaba 1996; R. Ngqukutu, 1996, pers. comm.) and use the cheaper oxen transport rather than manpower. Even though large trees are not always straight and thus less suitable for stick carving, they could still be used to makes other products other than sticks such as small ornamental curios (bowls, key tags, spears etc.). However, in my view, local preference for stems would still remain on the middle sized trees since in addition to their straight stems, they show less insect and fungal wood damage and are thus more valuable to the carvers. Therefore choice based on stem straightness combined with reduced incidences of wood damage in middle sized trees would prevail over higher volume in large sized trees. That medium sized trees would still be preferred even after lifting the logging ban would however result in management problems as continued selection for medium trees would adversely alter the forest structure. In this regard forest managers need to monitor cutting of the various diameter size classes and ensure that the composition of age size class and forest recruitment remains unaltered.

3.5 Conclusions

Cooper and Swart (1992) have identified MTFR as an important coastal scarp forest and have stressed the need for management of highly used species like *M. grandis*. However, management at MTFR has been undermined by poor inventory records and lack of basic information on forest composition and structure.

In this chapter, the size-class distribution profile of *M. grandis* at MTFR was outlined, its availability quantified and indication of being a forest margin species ascertained. Its grain and regeneration conformed to the inverse J type of growth that is typical of most coastal indigenous forests where seedlings and saplings outnumber trees. The current harvesting showed that the highest demand and exploitation was among the middle sized trees since they were more cost effective to the carvers in comparison to other tree sizes. Forest exploitation is not confined to certain areas of MTFR, as is suggested by carvers and forest guards, but it

occurs in the entire forest reserve. Therefore managers should not zone MTFR into exploited and unexploited areas (requiring different management plans) but instead consider the forest as being under similar exploitation and therefore requiring a single management plan.

CHAPTER FOUR: RESOURCE USE AT MT. THESIGER FOREST RESERVE (MTFR)

4.1 Introduction

This chapter investigates the fate of harvested timber of *M. grandis* at MTFR, the carving activities and the local craft work trade. Knowledge of the quality and quantities of the resources used is not only important for monitoring resource availability but also for modelling the wood resources that can be used to forecast future scenarios under various harvesting regimes.

Several reasons motivated the focus on resource use at MTFR. Firstly, although records of harvest and permit allocations were collected by the Transkei Forest Department over the past 15 years, these were poorly handled and were not analysed to monitor the trend of wood demands. Thus there has been no study to quantify the past or current demand and harvesting pressure on umSimbithi and its sustainability. Secondly, the current ban on harvesting umSimbithi, which was enforced in 1995, was decided upon without factual information on the quantity or availability of the species (M. Jonker, 1996, pers. comm.). Contrary to the original aim, the ban has increased unsustainability as poaching has escalated to high levels. Furthermore, while use of other species such as *P. obliquum* (umThathi), *M. sutherlandii* (umQunye) and *M. caffra* (umThunzi) concentrates on dry dying or dead material, that of *M. grandis* is mainly focussed on the live middle sized trees that form an important part of the forest edge structure. Consequently over exploitation of these middle sized tree would negatively affect the composition and therefore structure of forest. Due to the above factors, there is no proper management plan for this species yet it remains a leading economic resource in many parts of Pondoland.

Inevitably, the future use of umSimbithi shows conflicts between long term conservation interests (e.g. genetic conservation, catchment protection) and short term socio-economic interests (immediate provision of local family incomes, rural employment). Such conflicts are not unique to South Africa but have been noted in many developing countries like the rich indigenous forests of Usambara Mountains in Tanzania (Hamilton and Bested-Smith 1989), Kakamega Forest in Kenya (Wass 1995) and the Adwenarse Forest Reserve in Ghana

(Poffenberger 1996). In drawing guidelines for sustainable forest management, governments have the responsibility of assuming the role of protector of resources for the future which involves the prohibition of over exploitation. Even more important, a balance must be sought between the conflicting interests such that overall management carries the support of the local communities. To achieve this balance, information on local wood resource use and availability of the wood resource itself must be quantified. Moreover factors that enhance and degrade forest sustainability should be investigated and these are explored in this chapter.

4.2 Methods

Interviews were held with villagers residing in three different villages (Sicambeni, Caguba and Vukandlule) in Caguba location (Figure 2.2) which were selected as they were nearest to MTFR and craft work markets in Port St. Johns. The interviews were done through a Xhosa-English interpreter with the guidance of a structured questionnaire (Appendix I) having open ended questions to prompt interviewees to put forward their own views and recommendations. The district forest officer, principal forestry foreman, forests guards, middlemen and traders in Port St. Johns were also interviewed to establish factors that influence sustainability on State and Headmen forests.

To investigate if umSimbithi was being used sustainably at MTFR, sustainability factors on State and Headmen forests were analysed to compare their levels of exploitation. Two forests neighbouring Caguba Location were selected for this study. Mkwolwane Forest under Chief Fono and a part of the Mt. Thesiger Forest Reserve (Figure 2.2) were selected because carvers from Caguba location harvest wood from them and sell their products to Port St. Johns town and the neighbouring regions.

Forest inventory records on permit issues and sales receipts were obtained from the Umzimvubu District forest station at Port St. Johns and this was augmented with field surveys. Whereas field surveys mainly involved laying out sample plots at various sites on the state and Headmen forests, interviews were also held with forest workers at the substations situated next to these forests. An initial field survey was done in August 1996 to view the logistics of the study area. Thereafter another survey was done in late August/September 1996 where the

questionnaire was pretested and inventory information collected. Further social surveys were done in October 1996 and February 1997. Topocadastral maps of the project area at a scale 1:50 000 (Port St. Johns 3129 DA and Tombo 3129 CB) and 1:10 000 orthophoto maps were used as a main source of reference during the survey.

4.3 Results

4.3.1 Permits and Resource Regulation

The permission to harvest forest products in demarcated and undemarcated forests fall under the forest department and the chief's authority respectively. There are about 335 different indigenous tree species in the coastal forest, of which 72 are reserved or protected. Some of the most important ones to the local carving industry are shown on appendix II. Permission to harvest any of the restricted species on either the state or Headmen forests is granted by the Forest Department. Harvest Permits are applied for through the Principle forest foreman at the district headquarters (Port St. Johns) from the Director-General's office in Umtata. The duration permitted for harvest depends on the type of species sought. For umSimbithi, one year harvest permits are granted. The harvested trees are valued depending on the volume cut. Scaling (measurement of timber volume) is done by the forest guards using *Eucalyptus grandis* volume tables derived for commercial forestry. Although use of the latter results in a margin of error, it does however, give the best available method under the present limited means of volume assessment.

Within the Headmen forests, a nominal fee of R2 is charged by the tribal authority on locals harvesting poles for construction, fencing or craft work. However, due to their small sizes, harvesting in the Headmen forests is minimal. Data on permit issues of umSimbithi wood from Mt. Thesiger Forest Reserve for the period 1994-1996 is indicated in Table 4.1. The permit data, however, give only an indication of the request for resources and not the amount harvested. There is a need to have a proper inventory system that would quantify the resource removed (Section 5.4.3).

Table 4.1: The number of permits requested for the three year period 1994-96

Year	1994	1995	1996
Number of Permits	5	30	20

Since June 1995, a provisional ban has been placed on harvesting umSimbithi on both the state and Headmen forests (M. Jonker, 1996, pers. comm.). However, the field survey showed that this species is still heavily exploited and its products openly sold in markets throughout Umzimvubu District and the rest of Transkei. The task of policing against umSimbithi poaching in State and Headmen forests fall to the Forest Department guards. In Umzimvubu, policing is extremely poor with only four guards patrolling over 10 000 ha. This patrolling is further weakened by lack of transport facilities and thus many forests are not inspected at all.

Even though the period since implementation of the umSimbithi ban is more than one year, the survey indicated that many of the carvers in Caguba Location were unaware of it or had been vaguely informed. Thirty carvers interviewed were aware of the ban and claimed that they continued to "harvest" as this was their only source of income. Many stated that they were never stopped nor met forest guards during their harvest. Clearly, the implementation of the present ban is ineffective. There is no effective mechanism to enforce the law and exploitation continues to rise as the resource remains accessible. Indeed, it is unclear whether the harvesting can be controlled through permit restrictions.

4.3.2 Sales Record

Beside permit records, the demand for *M. grandis* was estimated through the record of wood volume sales done by the Forest Department (Figure 4.1). The record was compiled from the monthly sales receipt books and inventory sheets from the forest substations within MTFR for the period of 1992 to 1994. At MTFR, the forest revenue or pricing system is calculated from volume based stumpage charges and most of the sales occur within the first half of the year (January to June) with little or no sales occurring in the second half (Figure 4.1). Reduced sales

during the latter period maybe due to the fact that it is the period of land preparation / planting and most villagers concentrate on their gardens.

A six year record of harvest sales (Figure 4.2) shows that there has been a gradual increase of sales peaking in 1991 when over 18m^3 were sold. Thereafter sales have declined and apparently

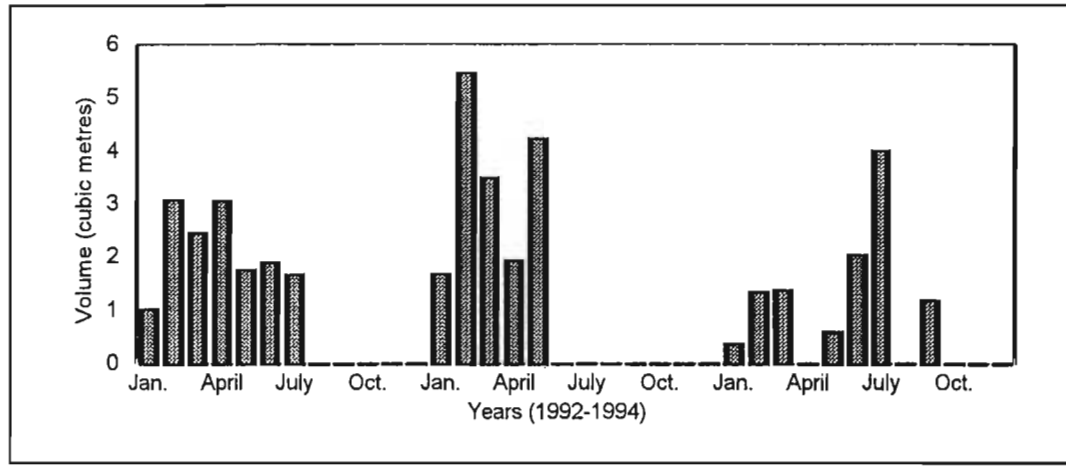

Figure 4.1: Monthly volume sales of *M. grandis* (M^3) for the period 1992-1994

stopped in 1995 when the provisional ban was introduced. Before this ban, the average annual rate of cutting, estimated from the 1992-1994 season (Figure 4.1), was 14.1m^3 with most of it occurring between the months of January to June. In spite of the 1995 ban, several requests for umSimbithi wood are still forwarded to the Forest Department (Table 4.1). As the requests are currently not honoured, poaching has become the alternative to securing umSimbithi. Observations during the field survey indicated that this poaching causes a lot of wastage and damage since only the straight lower portion of the stems are removed while the rest of the cut trees are left to rot while leaning on other trees. Sometimes an entire tree is cut, but then, for various reasons, left. In order to reduce poaching and control harvesting, there is a need to review this ban and the land tenure systems surrounding this resource. This issue is discussed in detail under Section 5.3.

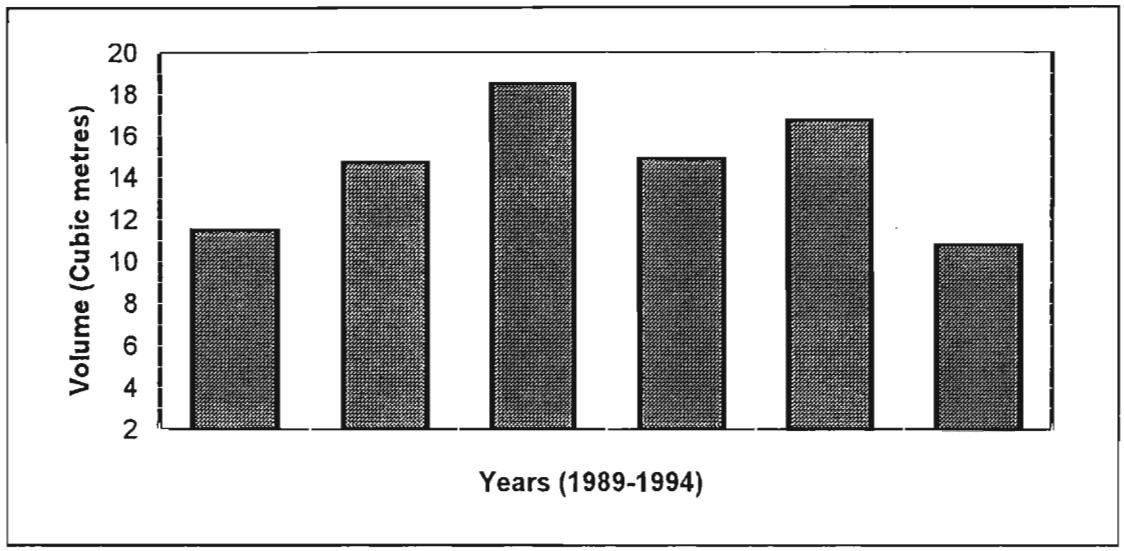

Figure 4.2: Yearly volume sales of *M. grandis* (M^3) during the period 1989-1994

4.3.3 Economic Potential of *M. grandis* in the Craft Work Industry

Amongst the three villages of Caguba Location it was estimated that about 100 people are directly involved in carving (D. Cwaba, 1996, pers. comm.). The monthly quantities of wood harvested per carver and value of craft work products sold, was estimated from interviews with 30 carvers. The results obtained in this study were compared with work done by Cooper and Swart (1992) and information offered by a key informant from the Amapondo Craft and Culture Centre in Port St. Johns. (Table 4.2).

Most of the carvers in Caguba Village hire two to three casual workers although in some areas like Ntsubane they may hire as many as five (Cooper and Swart 1992). In some cases the carvers may use helpers from their immediate or extended family members. In total an estimated 200 to 300 people are directly employed in carving activities. The number of trees felled per month depends on the size of the carving group. A group of two may harvest and use five trees per month while those operating alone can use three trees. Most carvers stated that they used trees of the diameter range 20-30 cm especially those with straight stem forms. This statement was confirmed by the field survey as most of the stumps observed in the sample plots were in the diameter size class of 20-25 (Figure 3.5). The monthly average number of sticks made per carver varies from 75-100. Carvers interviewed contend that this depends on the distribution and ratio of the dark coloured heartwood to light sapwood and whether the stem

core is rotten or intact. Many claimed that more sticks could be carved from logs having a higher amount of the dark heartwood.

4.3.3.1 Markets

There are two types of craft work markets, rural and urban markets. Rural markets exist within the villages and along the R61 road linking Umtata and Port St. Johns. Value of sticks in the rural market is R7 per stick. Buyers in this markets are the villagers although middlemen from Port St. Johns and Umtata Town are also involved. The urban markets are controlled by middlemen with warehouses in Port St. Johns and Umtata where the value of the same sticks vary between R11-R15. Middlemen claimed to put a mark up of 60% on the original prices bought from carvers (D. Upton, 1996, pers. comm[11].) although the survey showed that this was sometimes over 100%. In Port St. Johns, the urban trade is controlled by three main traders who transport craft work to cities like Durban, Johannesburg, Cape Town and Maseru (Plate 4.1) where prices can surpass R50 (D. Upton pers. comm.). There are new incentives by the Amapondo Art and Culture Centre to initiate similar marketing facilities for the local carvers. Most carvers operate from their homes in the villages and indicated that their expenses involved buying carving equipment, wood finishing oils such as vaseline and transport to urban markets. This amounted to about R110 per carver every month. Monthly profit from sales depend on the type of markets the carvers deal with. This study showed that the current rural market sales yield a monthly profit of R415 per carver while that of urban markets is R715 per carver (Table 4.2). This estimate approximates that calculated by the Amapondo Art and Culture Centre where profits of rural and urban markets are R560 and R960 per carver respectively (N. Kassling, 1996, pers. comm.) Although the urban sales are more profitable, most of the carvers prefer selling their products to middlemen at the lower rural prices to avoid the problems of going to the towns. The latter may be due to their limited marketing skills, lack of transport and also an urge to remain at home and attend to homestead duties.

Inevitably, to improve the sustainability of this trade, there is an urgent need for the carvers to sharpen their marketing skills. Carving activity and trading is highest between January to October and the annual income per carver dealing with urban markets can reach a maximum

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[11]Mr. Derrick Upton - Manager Port St. Johns Basketry Company, P.O. Box 73 Port St. Johns.

of R11 000. This is a very meaningful contribution taking into account that the average monthly income is about R500 and most of it comes from unreliable sources. In Caguba Location with its estimated 100 carvers, the annual sales of umSimbithi sticks in Port St. Johns and Umtata markets yields approximately 1.1 million rands with a net profit of over R960 000. If the crafts were to be sold in upper markets based in Johannesburg Cape Town and Durban, where the price of sticks triples to R50 and above, these products could yield more than R3.6 million annually. Yet this estimation is only for one location and considered under the present condition where the trade is illegal and umSimbithi wood is wastefully cut in the forests.

4.3.3.2 Craft Work and its Related Problems

For the 30 carvers interviewed, the majority indicated that they preferred making walking sticks to knobkerries or ornamental materials as these are more marketable. Most stated that they previously carved knobkerries but the recent government ban on carrying traditional weapons (Edmunds 1996a) had reduced demands. According to D. Upton (1996 pers. comm.), this ban may assist umSimbithi conservation as the knobkerrie consumes a lot of wood and its carving produces more waste. Large wood blocks below the knobkerrie head are chipped and thrown away as waste while shaping the handle. Despite the greater volume needed for the knobkerries, their price remains similar to that of sticks which consumes less wood. Carvers listed five major problems associated with their trade; (1) Lack of harvest permits, (2) poor marketing, (3) scarcity of desirable straight stems, (4) rotten stem cores and (5) increased operating expenses (Figure 4.3). The most cited was lack of permits and licenses since the temporal ban of the Forest Department was imposed. All the carvers complained that without permits they could not market their products effectively as they are considered poached and therefore illegal. As a result, most have been forced to sell their products at very low price to middlemen and subsequently exploit the forests further to meet their economic needs. About 80% of the 30 interviewed carvers mentioned poor marketing skills as a problem. Many supported the need for a cooperative to jointly market their products. This is further discussed under Section 5.3.2. The study indicated that, 30% of the carvers were concerned about the

Table 4.2: Table showing quantity of trees harvested per month per carver and the monthly profits (Rands-R) from sales in urban and rural markets.

Information source	Study area and year	Diameter of trees used (cm)	Mean No. of carvers in group	Trees harvested per month	Total No of sticks per group	No of sticks per tree	Mean monthly sticks per carver	Mean monthly expenses per carver (R)	Monthly Sales[12]		Monthly profit (R) per carver dealing with	
									Rural markets	Urban markets	Rural markets	Urban markets
Current study (1996)	Mt.Thesiger/ Caguba Village 1996	Medium (35-43)	2	5	150	30	75	110	525	825	415	715
Amapondo Art, Culture centre	Caguba Village1996	Medium (35-43)	1	3	100	30-35	100	140	700	1100	560	960
Cooper and Swart (1992)	Ntsubane 1990	Large (45+)	5	10	500	50	100	333	200	500	-	167

[12] The 1996 rural and urban prices of a stick in Umzimvubu District are R7 and R11 respectively.

Plate 4.1: Bags of umSimbithi sticks on the village roadside wait to be transported to city markets in Durban, Johannesburg and Maseru

scarcity of long straight desirable stems while 10% complained of stems with rotten cores (Figure 4.3). With the ongoing exploitation rates, these complaints are bound to multiply further. Only 10% complained of the previous stumpage fee charges of R10 per cubic metre as expensive. On the contrary some indicated their willingness to pay a higher price (e.g. R15) to the Forest Department provided they were given permits. The complaints related to scarcity of straight trees can be linked to increased felling of trees as the number of carvers have gradually escalated. Increase in number of carvers has in turn been related to fewer jobs in the mines (W. Mtakati, 1996, pers. comm.) since most mine companies are undertaking retrenchments. With reduced opportunities many youths are therefore opting for the local carving industry.

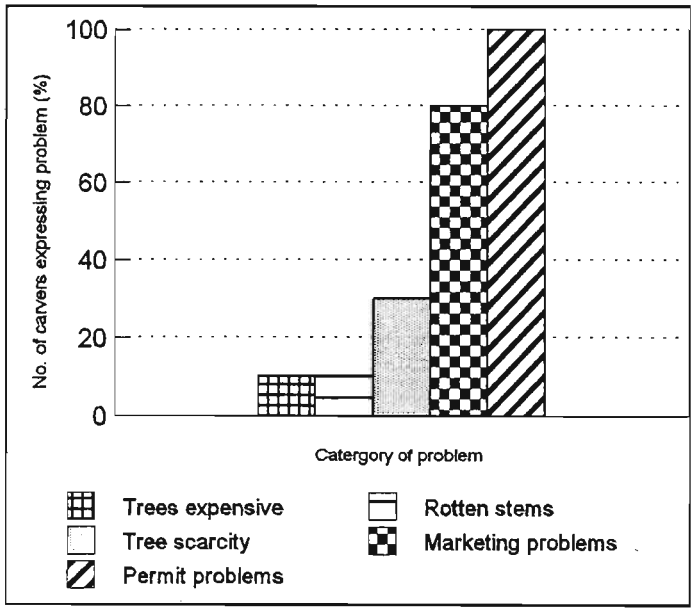

Figure 4.3: Types of problems and the percentage of carvers experiencing them (n=30)

4.3.4 Sustainability Factors and umSimbithi Use at MTFR

The amount of forest use, forest degradation and deforestation depend on local needs, perceptions, commercial interests and institutional arrangements guiding the stewardship of the forests (Cunningham 1985, Ostrom *et al.* 1993). Ostrom (1990) and Arnold (1993) stress the importance of, and provide approaches for analysing community structures at the local level in order to understand and possibly mitigate the negative environmental and societal cost of deforestation. They emphasise that sustainability depends on local needs, use patterns and incentives created by the local, regional or national institutions. Ostrom *et al.* (1993) suggest that ten factors determine the sustainability of forests. These include:

1. Distance of forest products from markets
2. Population pressure of the communities surrounding forests
3. Population growth rate near forests
4. Type of monitoring, sanctions, conflict resolution and governance of forests
5. Access and expense involved in resolving conflicts between users and their official contact
6. The sustainability of institutions governing forest systems and their understanding (perceptions) by forest users
7. The nature of punishments and their enforcement on users violating governing rules
8. The efficiency of institution governing forest systems in minimising opportunities for free riding and corruption through effective procedures of monitoring forest users and official
9. The nature of participation of forest users in designing the institutions that govern the use of forests
10. Individuals who implement the governing rules are included in the group that modify the rules

Becker *et al.* (1995) have considered the first three factors as economical/population factors while the rest as institutional design and governing factors. In using sustainability factors to draw management plans for tropical indigenous forests, they have used a scoring system where factors that enhance sustainability are positively scored while those that degrade are scored negatively. They further suggest that these factors are additive and forests of high sum of

sustainability factors show less access to exploitation and degradation than those with low sums. For instance, a forest with a sum of all ten positive sustainability factors is least accessible to exploitation while that with none is most vulnerable. Without changes in sustainability factors (i.e institutional factors and people's action), forest degradation should occur rapidly in the forests with low sustainability factors. Using the scoring system of Becker *et al.* (1995) the sustainability of *M. grandis* wood resources at Mt. Thesiger Forest Reserve was evaluated using a set of ten factors listed under Section 4.3.4.

4.3.4.1 Economic and Population Factors

The economic and population factors that influence forest sustainability (distance of markets from carvers, population growth rate of communities neighbouring forests and their encroachment pressure) did not differ in both the State and Headmen forests. The relationships between distance of markets to the amount of wood harvested at various stations around Port St. Johns showed a significantly strong negative correlation (Table 4.3). Forest substations that are near the markets (Port St. Johns) sold more umSimbithi than those further away. Records of umSimbithi sales at forests like Bulolo and Nomathumbu which are nearest to Port St. Johns showed higher sales compared to distant forests like Qabanga and Ntsonga.

Besides the close distances of markets to the carvers, increased population growth and encroachment pressure around the forests have enhanced exploitation. For instance, within a period of 20 years, the population of people around forests bordering Port St. Johns (e.g. Bulolo and Nomathumbu) have more than tripled and so has the exploitation rate (R. Ngqukutu, 1996, pers. comm.). Thus these factors (market distances, population growth rates, forest encroachment pressures) contribute a negative effect on sustainability of both the State and Headmen forests and were therefore given negative scores (Table 4.4).

Table 4.3: Relationship of wood volume sold (1993-94) in various forest areas to distances of the areas from Port St. Johns

Forest Area	Distance from Port St. Johns (km)	Total Vol (m^3) sold
Ntlopeni	4.5	4.70
Bulolo	4.8	15.2
Nomathumbu	5.9	6.10
Sonkwe	10	2.36
Isinuka	10	1.36
Gxwaleni	12	1.20
Ntsonga	15	0.80
Qabanga	15	0.39
Correlation (r) of amount of wood sold to distance of markets r = -0.748 d.f.=6 p=0.05		

4.3.4.2 Institutional Factors

Factors concerned with institutional stability differed in the State Forest (MTFR) and the nearby Headman Forest (Mkolwane) (Table 4.4). The empowerment of the locals to participate in policy formulation and establishment of monitory and sanction systems differed between the two forests. The monitory, sanction and conflict resolution at the village level is under the control of the village elders and the headmen who compose the tribal authority that meets weekly (Fridays) with the government forest guards. Issues relating to forest use are handled during these meetings and serious matters regarding government policies are referred to the principal forestry officer at the district headquarters. As a result of this, factor 4 on monitory structure, was given positive scores in both forests (Table 4.4). Resolution of conflicts in the Headmen forests are handled by the local elders before being forwarded to the chief. This structure allows rapid means of conflict resolution unlike in the State forests. Headmen's forests were therefore given a positive score on factor five while the State (MTFR) scored negative.

The other factors were also noted to differently influence the sustainability of the two forests. These factors; institutional stability and understanding (perceptions) of the villagers, quality of monitory, enforcement of sanctions, local participation in design and modifications of rules were all positively ranked in the Headmen's forests and negative in the State forests. Positive ranking of the former is because villagers are aware of the rules governing the Headmen's forests and they respect the Chief's authority. Furthermore most of them were highly interested in knowing the government's new policy on sustainable use of indigenous forests. All interviewed villagers indicated their interests in knowing the outcome of this study and participating in similar studies in the future. With the State forests, many villagers were not sure of the current regulations. Unlike in the Headmen's forests, rules governing state forests have varied with the various political systems in Transkei. Before the Transkei Government in the early 1970s, authority to harvest forests resources was granted by the district forest officer based at Port St. Johns. Later this changed under the Transkei Government where permits were sought from the Director General in Umtata and currently the policy is yet to be clarified. Furthermore, the method of volume assessment using log volume tables and pricing is not understood by most villagers. Thus, the local understanding of the state forests as compared to the Headmen's forests is poor and this factor was given a negative sustainability score.

Enforcement of sanctions are well organised on the Headmen's forests compared to the State forests. There are weekly meeting of village elders to review the rule breakers. The Chief being in a position of responsibility is able to stamp his authority on these sanctions. A relatively heavy fine of R10 is paid per every stolen pole which would normally cost R1. Although similar fines are supposed to be charged on State forests, most villagers indicated that this is not done. There is thus more illegal felling of umSimbithi occurring in the State forests.

Surprisingly, therefore, the quality of monitoring is clearly better in the Headmen's forests compared to State forests. While there was an element of community policing in the former, villagers openly poached wood from the latter. Monitoring of State forests is poorly managed partly due to under-staffing of forest guards.

The operating rules of Mkolwane Forest are mainly drawn by the Chief, his Headmen and village elders. However, the other locals can contribute towards modifying these rules during the village meetings. For instance, rules allowing increased harvesting of forestry products during the festive seasons have been allowed due to the requests of locals. This type of request is not considered under State forests. Thus, rural participation in the running of forests scored a positive sustainability factor for Headmen forests and negative for State forests.

Table 4.4: Comparisons of factors considered to influence the sustainability of Headmen and State forests. A plus sign denotes that the factor increases probability that the forest would be sustained in its current condition. A minus sign denotes the factor reduces the probability of sustainability of the forests

Sustainability Factors	Forests	
Economic and Population Factors	**Mkolwane (Headman's)**	**Mt. Thesiger (State)**
1. Distance of markets from carvers and their products	-	-
2. Population growth rate near forests	-	-
3.Population Pressure in surrounding community	-	-
Institutional and Design Governing Factors		
4.Monitory, sanction, conflict resolution and governance organised through multiple layers of tiers	+	+
5.Access to rapid low cost conflict resolution	+	-
6.Sustainability of institutions and understanding by forest users	+	-
7.Governing rules enforced against violators	+	-
8.Quality of monitoring forest users and officials	+	-
9. Forest users design institution governing forests	+	-
10.Implementers of rules participate in modification of the rules	+	-
Sum of sustainability Factors	7	1

Overall, the socio-survey indicated that Mkolwane Forest under the Headman's authority showed a higher number of sustainability factors compared to the state's Mt Thesiger Forest Reserve. It

was also better monitored with enforced rules and the locals contributed towards its governance. In contrast, State forests did not involve the local's views in management and had undefined sanctions that were poorly enforced.

4.4 Discussions

4.4.1 Permits and Forest Regulation

In most indigenous forests technical data have nearly always been inadequate to permit scientific estimates of sustainable yields such that the amount of licensing is based on the impression of local officers as to the capacity of forests to sustain the off take (Grut *et al.* 1991). Before 1995, harvest permits on the Pondoland Coast were unrestricted because the resources were then thought to be in surplus. Although an average of 30 permits per annum would be issued for one forest block like MTFR, this did not reflect the true picture of *M. grandis* harvested as more trees would be removed through poaching. Discrepancies existed and still do, between the volume that is authorised for harvest through permits and that which is actually harvested; with the later far surpassing the former. This problem is not unique to MTFR and the Eastern Cape only but has been observed at other forests like Hlatikulu in KwaZulu Natal (Muir 1990). In the latter case, Muir (1990) states that more wood is removed from the forest than that licensed on permits. Similar sentiments have also been noted in other regions like the Trans-Mara/Mau Forest Complex (Thomson 1993) and Kakamega Forest (Emerton 1994) in Kenya. If these are indeed the cases, then the question that must be posed is "why these harvesting discrepancies?" Two explanations are suggested.

Firstly, the one year permit duration in reserves like MTFR is too long and it encourages tree harvesters to delay cutting or removing of their logs from the forests. This makes it difficult of forest managers to regulate the felling cycle efficiently. The ideal duration is one month as practised in the well managed reserves like in the Tsitsikama/Southern Cape forests (Geldenhuys 1980,1982) and some coastal forests reserves in Kenya (Wass 1995). Short permits period ensure that the licensees cut and remove their trees quickly within stipulated time and this eases resource monitoring. Shorter harvest durations of one to three days per month have been suggested by Ostrom (1990). Under Ostrom's scheme, harvesting could be allowed on specified days at specific

forests and thereafter nobody would be expected in the forests. This system can facilitate community policing as anyone seen in the forests (on the non harvesting days) would be reported to the authorities. Thus, the work and need of forest guards would be lessened. Moreover, foresters would easily monitor tree harvesting and sales when cutting is done at specified sites of the forest. Short permits have been successfully used in Japan and Switzerland (Ostrom 1990) and since they are cheaper to monitor, they are ideal for forest institutions (like the Eastern Cape Forest Department) which have limited monitory funds.

Secondly and perhaps a bigger cause of discrepancies (between permitted tree harvests and the actual harvests) is that the level of policing is very poor such that harvesters easily remove more than they are authorised to take. This is the case at MTFR as it was observed (in some of the exotic plantations being felled) that forest guards are hardly ever present at the harvest sites during the felling operations and they are usually called much later to calculate volumes and fee charges. Factors like this have burdened management of *M. grandis* on the Pondoland coastal forests such that the Forest Department has found it easier to introduce a temporal ban on the tree with the hope of drawing better management plans. However this ban is not an immediate or long term solution to sustaining *M. grandis* forests as the locals still depend on this species for their economic survival. The ban may instead increase unsustainability like in Thailand and Ecuador where logging bans increased deforestation (Gillis 1991). Perhaps one solution is to introduce what Johnson (1996) recommends as community based natural resource management (CBNRM) since the locals are best placed to manage the resources which they have always depended on. That CBNRM would be the way forward for MTFR is supported by the positive results of sustainability indices that are indicated on Table 4.4.

Johnson (1996) has recognised that many of the methods of resource management traditionally used by the southern African rural people can be infinitely more effective as sources of conservation than foreign policies which alienate locals from their resources. However, a key issue to community management is addressing the security of land tenure. It is difficult to expect an individual or community with no long term tenure or legally backed rights to manage resources in a sustainable manner (UNEP 1993). At MTFR the most important issue in selecting tenurial

rights is to assess the extent to which a particular right precludes sustainable resource use or hinders the maintenance of vital ecological processes. These are further discussed in section 5.3.

If the ban on *M. grandis* were to be lifted and the permits reintroduced, an important factor would be to develop a rotational system that minimises uneven harvesting. However, the rugged topography at MTFR and the current harvesting patterns on access tracks and along ridges would make it difficult to subdivide the forest into rotational blocks of regular sizes. In such an environment, Muir (1990) suggests that individual ridges and valleys that are known to both resource users and managers may instead be used as blocks or rotational units. However this initiative may not be supported by villagers because a rotational system means that they may have to travel new and perhaps longer distances to harvest in the allotted blocks. For example, the Vukandule villagers, who currently harvest in forests closest to them, would need to travel over 25km if the allotted rotation unit were to be near Port St. Johns. A possible solution to this would be to establish rotation units for each village. At MTFR, three different rotation systems would be needed for the three villages in Caguba Location.

4.4.2 Forest Pricing

Revenue from MTFR is generally very low compared to what it should be due to deflated forest prices and poor collection systems. Prices of forest products at markets in Port St. Johns and Umtata show that the current value of trees does not reflect the realistic market value. For instance, this study showed that one cubic metre of *M. grandis* wood cost only R10 yet the same can yield up to 30 sticks with a total market value of R450 or more.

Forest pricing policies remain unfulfilled. Realistic prices that reflect forest output are required to encourage conservation, efficient use and discourage wastage. Grut *et al.* (1991) suggest that low forest fees, in most countries, are due to the fact that prices are set years ago and inflation drops their real values to fractions of what they were. For example, the current prices of *M. grandis* were set more than five years ago based on a strong South Africa Rand during the old Transkei Government (M. Jonker, 1996, pers. comm.). Although the Rand has since undergone depreciation, prices of *M. grandis* logs have yet to be revised accordingly. The market value of craft work products and the profits shown on Table 4.2, for instance, are based on the old

unrevised log prices. A review of the log prices is currently being done by the Forest Tariffs Instruments Committee.

In most countries, forest fees are established by legislation so that revision requires amendment or new legislation (Grut *et al.* 1991). In South Africa, establishment and revision of forest fees is done by the Forest Tariffs Instruments Committee that is composed of four national forest directors[13], a marketing specialist together with inputs from local representatives concerned with the forest resource. Before new prices are released to forest managers, they have to be approved by the Treasury Department in the Ministry of Finance to ascertain that they are correctly priced in relation to current market value of forest products. Grut *et al.* (1991) contend that revisions of forest fees in many sub-Saharan countries are not always up to date and in many cases they are delayed because they get lowest priority in clogged legislative pipelines where revision is occasionally postponed, for perhaps, a season or two. In solving this issue, they suggest that procedures for automatic annual or biennial adjustment of fees according to the inflation of previous years can be written into the legislation establishing or amending the forest fees. Fortunately in South Africa new regulations have been established to ensure revisions are undertaken annually.

Poor forest fee revenue is also due to low collection rates which arise from mainly weak, inefficient forest administration and revenue collection systems. Revenue collection system of Umzimvubu District is one such example as it is hampered by lack of vehicles to transport the foresters into the field. Forest guards have little or no incentives to monitor harvesting sites which in some cases are as far as 50 kilometres and widely scattered. Furthermore, little field subsistence or travelling allowance is offered to workers commuting between their homes and distant forests. Most salaries being low some do extra odd jobs to survive. Under such circumstances the staff are vulnerable to accepting favours from harvesters in exchange for undercharging forest trees. This emphasizes the point that for sustainability to be achieved it is equally important that the management institutions are as sufficiently supported as the resource itself.

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[13]Director of Commercial Forestry, Director of Community Forestry, Director of Conservation and Chief Director of Forestry

4.4.3 Sustainability Factors at MTFR

4.4.3.1 Socio-Economic Factors

Increase of sales in *M. grandis* wood with shortening of distances to Port St. John is linked to economic factors such as cheaper transport costs and bigger markets. Observation of similar studies in other areas indicate that distance of forests from markets dictate the extent of exploitation. For instance, socio-economic surveys carried out on indigenous forest in Kenya indicate that primary dependance and use of wood is concentrated among the communities living within 1.5 km from the forest edge and that the level and range of use declines sharply at distances greater than 5 km (Wass 1995). Wass (1995) further states that the distance which the resource users penetrate forests is limited to 5 km and similar sentiments were given for Pondoland coastal forests (J. Zibi, 1996, pers. comm.). The general pattern is for those communities living within 5 km zone around the forest boundary penetrating for up to 5 km to procure forest goods. The implication of this is that only the very large forests would have an untouched core zone and this would be those with their inner cores at more than 5 km from the boundaries. A forest would need to have an area of 8 000 ha. (of circular or polygonal shape) to maintain an untouched inner core (Wass 1995). Clearly, this is unlikely as most indigenous forests are irregularly shaped (some being long and thin) and penetration can easily occur along the thin elongated areas. In Pondoland, all the coastal forests are irregularly shaped with areas less than 8 000 ha. (Table 3.1) and most of their inner cores have been penetrated. However, in some few cases, certain forest zones (like the steep slopes of Mount Thesiger) have escaped this penetration because of their rugged topography.

4.4.3.2 Sales and Markets

Even though forest revenue from indigenous forests is low, the same cannot be said on the sales of forests products in the markets. The results showed that from the estimated 100 carvers at Caguba, their sales in Port St. Johns and Umtata yield over R1.1 million per annum while if sold in the lucrative upper markets of Johannesburg and Durban this estimate could reach R3.6 million. Higher sales could be achieved if the harvest and trade of umSimbithi were legalised. The current ban has undermined the value of sticks and other products as they are not outrightly sold in the open competitive markets. Knowing the legal implication of keeping unauthorised products,

carvers are not keen to store their sticks but the quickly sell to the nearest middleman. The consequence of this is reduced competition, poor marketing and lowered values for the carvings.

Reduced productivity per tree and thus losses to the craft work trade are incurred during the felling as the survey showed that only 75% of the tree in the form of the straight lower portion of the stems are effectively used. The other irregularly shaped portions of the stems and branches are often discarded. Yet these could still be used to make other smaller carvings like ornamental spoons, bowls and spears. These small carvings, in fact, have higher prices per unit volume in comparison to sticks. If it is so, why don't the carvers venture into smaller curios and ornamentals? The main stated reason is that unlike sticks ornamentals have low sales in the local markets and have to be sold in distant tourist markets. This factor calls for the need to establish a marketing strategy for these carvers. Other reasons are more cultural than economic as stick carving is an inherent tradition among the Amapondo people. In my view, perhaps the main reason why large portions of crooked stems are discarded in the forest is that cutters while poaching trees do not have the time to carry away everything. They just take what they consider as vital and these are the lower stem trunks. If the logging ban were to be reversed, it is likely that this wasteful trend would change with better use and higher economic returns being achieved. If a complete tree were to be used efficiently rather than the current 75% use, the returns to the Caguba carvers would certainly increase and so would the wood resource and opportunities for more carvers.

4.4.3.3 Tenurial Rights

Several authors (Hardin 1993, Turner *et al.* 1993) have argued that commonly owned projects tend to be more mismanaged. However, the results of comparing the Headmen's and state forests at MTFR indicated some positive elements in Headmen forests. The important question is why this is so especially after the early reports of destruction in Headmen forests (Cameron and Swart 1988). I suggest this could be due to the positive sentiments of ownership that locals have towards Headmen's forests as compared to State forests. There is a greater element of local empowerment and ownership with the former forests than the latter. Many views have be expressed on the issue of local empowerment with regards to communal management of natural resources (Chambers 1989, Murphree 1994, Warren and Cashman 1994) but in my view, these

do not only involve giving authority to the locals in the much publicised bottom to top approach. Rather, local empowerment and management of resources is a process people go through, learning from their mistakes and improving on them. AT MTFR and the Pondoland Coast, communities had resentment for the then apartheid and later military governments in Transkei (T. Gebuza, 1996, pers. comm.[14]) which blundered in their logic and practise by adopting an exclusionist, protectionist approach that inaccessibly set aside areas and resources in reserves and ignored their importance to rural survival. Several discords between some forest users and forests were developed especially after the withdrawal of rights to make use of natural resources. An example is the Dwesa Nature Reserve that experienced deliberate destruction of resources in local protests to these policies. Similarly, Ntsele Forest and Hluleka Forest Reserve in Eastern Cape faced this fateful deforestation (Cameron and Swart 1988). In Umzimvubu District most forested hillsides in the Headmen forests neighbouring MTFR were also severely deforested during this period and, the effect is that, some communities to date live in degraded environments. However, most have now learned from these past environmental mistakes (W. Mtakati, 1996, pers. comm.) and are now very keen on managing their resources carefully. Similar sentiments have been mentioned in other southern African countries with projects like CAMPFIRE (Communal Area Management of Indigenous Resources Programme) in Zimbabwe, NRMP (the Natural Resource Management Programme) in Botswana and LIFE (Living in a Finite Environment) in Namibia. In these cases, local communities have greater willingness to control and conserve their resources knowing that any negative environmental effects, that may occur, affects them most.

4.5 Conclusions

The temporal ban of harvesting *M. grandis* at Mt. Thesiger Forest Reserve and in Pondoland has greatly increased the demand of umSimbithi wood. Locals have reverted to poaching which the Forest Department cannot control as they lack an efficient monitoring and policing capacity. The wood carvers are either involved in rural or urban craft work markets of which the latter is more profitable. Most locals in this trade identify their main source of problem as emanating from the recent decision of the Forest Department to discontinue issuing harvest permits. This ban has subsequently led to other problems like illegal trading, poor marketing, low profits and thus

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further wasteful exploitation of the forests to meet local economic needs. Marketing problems can be linked to lack of expertise in small business skills and thus the need for training (through extension services) is highly recommended. A comparison of sustainability in State and Headmen's forests indicate that the state forests are more vulnerable to exploitation as they have fewer positive sustainability factors. However, further research encompassing field surveys over a much larger study area would be required to fully establish this. The current revenue from Pondoland forests is very low due to deflated tree prices and poor revenue collection systems. Establishment of realistic forest wood prices and strengthening local participation in forest management were also noted as important factors if sustainable resource management is to be achieved.

CHAPTER FIVE: FOREST MANAGEMENT STRATEGIES

5.1 Introduction

Human activities have always modified the forest environment and in the recent years the scale and intensities have increased significantly. The World Conservation Monitory Union (WCMU) attributes the increase of forest loss to economic activities, socio-cultural actions and poor policies such as those on land tenure systems (Groombridge and Jenkins 1996). This forest loss is most common in the developing countries where government policies have tended to misdirect incentives and thus encouraged misuse of natural resources (Repetto and Gillis 1988, Grut *et al.* 1991). For example in West and Central (tropical) African countries management policies on forests tariffs, taxes and concessions designed to control deforestation have instead resulted in negative incentives on the sustainable use of forests (IIED 1988, Gray 1997). Such misdirected policies have led to market failures where forests have been greatly underpriced and over-exploited. Besides, the land tenure policies enforcement of forest legislation in developing countries especially those in tropical Asia and African countries have been very poor and forest protection is a far cry from the desired standards. All these factors have lead to the recognition of two issues: (1) conservation of forests cannot take place in isolation of people, and (2) in many instances forest survival depends on their economic development. This is especially true with rural communities that greatly depend on the forests for their survival.

Around the world many countries are now experimenting with new ways of incorporating communities into management of public forest lands. One approach which has given mixed results has been collaborative forest management which involve social forestry, community forestry or co-management (also referred to as joint forest management-JFM). Of these three, social forestry did not develop well as it often paid superficial attention to the concerns of local people and it is due to this that alternative integrated approaches emerged under the names of co-management and community forestry. In India and Nepal, community management has made significant contributions to conservation efforts. India, for instance, has over 500 000 hectares of forests under community protection (Fischer 1995). In Canada similar success with co-management has been reported between the Nisga'a Tribunal Council and the British Columbia Federal Government whereby over about 200 000 hectares are under joint management (Poffenberger

1996). It is possible that some of these Asian and Canadian lessons on collaborative management could be tried in tropical and in southern African indigenous forests.

In South Africa, most of the indigenous forests are under government control and before the 1996 White Paper recommendation their management was fragmented, uncoordinated, non-transparent with little contribution from communities neighbouring the forests. There was no coherent information system and policies were spread between different institutions involved in land administration and planning of public land. Although policies are now in place, there are still management problems concerning highly used resources such as wood from the indigenous forests (Department of Water Affairs and Forestry 1996).

In the Eastern Cape, and despite the Forest Department having a policy on sustainable use of indigenous forests, the implementation of a sustainable management plan for highly demanded indigenous trees like *M. grandis, P. obliquum* and *M. caffra* remains unachieved. Even with the current harvesting ban placed on these species, poaching remains high throughout the reserve. Furthermore, poor quantification of available resources, ineffective policing and a lack of a constructive revenue collection system compound the problem. While attempting to solve these forestry problems, two pertinent questions must to be asked: (1) What are the causes of these problems, and (2) How should they be addressed? In setting appropriate management systems for MTFR, section 5.2 reviews the forest land tenure and its associated management options, highlights the current management inadequacies and suggest solutions towards sustainable harvesting of *M. grandis*.

5.2 The Two Questions

5.2.1 What are the causes of these forestry problems?

Throughout the developing countries and especially in Sub-Saharan Africa, economic activities such as agriculture, commercial logging, fuel wood gathering and infrastructural development are perceived as the main sources of deforestation. The same applies to South Africa where causal factors of deforestation are driven by economic, social and political forces in the broader context of political economy. As seen in the Eastern Cape, these forces manifest themselves through

market and policy failure, population pressure and poverty. The rise of population numbers, reduction of mining jobs (which previously contributed greatly to income in this region) has increased economic dependancy and pressure on local forest resources. Even though socio-cultural practices like craft work carving, basket weaving and use of plant medicines from forests still play a major role in traditional life of the Amapondo people, the old traditional rules that governed the use of forest resources and ensured sustainability are no longer practised. Except in the few Headmen forests, traditional monitory systems (discussed under section 4.3.4.2) are hardly ever practised on the Pondoland coast. The political system which has consolidated the control of forests under the government with little consideration to collaborative management with the local communities is another cause of forestry problems. Prohibiting locals to use these resources has created antagonism to conservation and encouraged poaching. The dynamic interaction of the social, economic and political factors have in total created competing demands for goods and services with subsequent destruction of forests. This has been compounded by the lack of clearly defined tenurial rights especially those affecting the local communities. These rights are further discussed in section 5.3.

5.2.2 How should forest problems be tackled?

Like many other forestry departments in South Africa, the Eastern Cape Forest Department faces two challenges; (1) to manage the existing forests, and (2) expand the forest resources through afforestation and reforestation campaigns. In trying to define a balance between the current use levels and the existing forests, forest managers confront further questions: What amounts of forests should be maintained to meet the required economic, social, environmental and conservational needs? How should the resources be managed so that they reflect both the productive and protective functions of the forests (e.g. forest reserves, protective water catchment role, forest recreational purposes, biodiversity preserve, forests for timber production and extraction of non wood products)? Furthermore to what extent should national concerns be reflected in the management decision taken by the provincial government? Solutions to these problems go beyond the scope of market forces. Ecological, social and political factors are involved as well.

In seeking answers Sharma (1992) suggests several approaches for efficient management of forest

resources. These include (1) establishing land tenure systems that encourage local communities to participates in collaborative management, (2) privatisation of the resources, (3) strengthening management for single and multiple species, (4) improving the forestry institutions especially the human resources and (5) expanding environmental/forestry education. Of these, perhaps the most important and that requiring immediate attention is establishing land tenure that facilitates both the public and private sectors involvement in forest management.

5.3 Land Tenure and Management Options for Pondoland Forests

Efficient management of natural resources require management regimes based on rights, duties and privileges. In South Africa, as in many other countries, land tenure has been a main issue of nationwide debate (Davis 1996, Dept. of Land Affairs 1996, Edmunds 1996b) as it forms the basis of resource allocation, social welfare and economic development. A major question has been; should the forests be privatised, put under co-management, community management or continue under the present status of government control? Several authors have noted the importance of tenurial rights in managing natural resources (Hardin 1993, Turner *et al.* 1993). The lack of tenure can cause environmental assets to be undervalued by both the markets and government policy (Pearce and Turner 1990) and also provides incentives to orchestrate a coordinated approach to resolving environmental difficulties. For instance, forest owners with well defined property rights have powerful incentives to manage their forest efficiently as a decline in the value of the forest results in a personal loss.

In the Eastern Cape, MTFR is an example of highly used and poorly monitored resource. Despite being State forest, control at MTFR is very poor with minimal restriction on the use of trees such that in reality the forests are a *de facto* open access resource. This unrestricted access to wood has reduced the carvers incentives to conserve. The scenario seen at MTFR is observed throughout Pondoland, the entire Transkei, and in the former homelands where the system of land administration inherited from the past government and the legacy of apartheid remains disorganised (Dept. of Land Affairs 1996). While economic approaches suggest that government action may be used to restore efficiency of a resource (Tietenberg 1992), it also suggests that inefficiency is not a sufficient condition to call for government intervention. Other corrective management options should be used especially if their costs are below the economic benefits to

be gained from correcting the inefficiency. These include (1) co-management, (2) community forestry management, and (3) privatisation. The strengths and limitations of each option are discussed in the next section.

5.3.1 Co-management

Natural resource conservation practises in the past have tended to put emphasis on exclusion of locals communities from areas under conservation. Fischer (1995) points out that this policy often had detrimental socio-economic effects to communities. A depressing example are the Ik people of the Kidepo Valley National Park in Uganda. Turnbull (1972) accounts how effects of drought compounded by exclusion from their traditional resources left the Ik in desperate conditions that led to the breakdown of their socio-cultural structure.

Even though mitigation efforts have been tried by developing buffer zones[15] between the communities and resources, these have often failed (Fisher 1995). Failure being that resource management and practice imposed by the buffer zone authorities are not adhered to. An example of these are the tea zones buffers planted around the indigenous forests in Kenya (e.g. Kakamega Forest) which failed to prevent communities penetrating into forests.

Contrary to exclusion of communities, the concept of including human populations as part of the biosphere preserve and involving them in co-management of natural resources has yielded conservation success (Wells *et al.* 1992, Western 1994). Unlike before, park and reserve authorities are now considering co-management as a strategy for resource management. Co-management incorporates shared decision making between local resource users and formally trained manager on policies guiding the use of protected areas and resources (Rao and Geisler cited in Fisher 1995). Both parties have common interest in conserving the natural resources in perpetuity, an interest which makes them 'appropriate allies'. That the interest of conservationists and communities **converge** is crucial for co-management to succeed. However, convergence does not always mean identical interests. In some cases the two parties may seen to have same interests but convergence is not always obvious. This mostly occurs where interests are considered over different time scales; short term interests normally do not converge with long term interests. For

[15](Communities are allowed to collect resource needs in these buffer zones.)

instance, in Nepal, the traditional Sherpas guides on Mt. Everest Park have at times had strained relationships with the Park authorities because their short term economic interests collide with the long term interests of the Park managers (Stevens 1993). Such conflicts must be keenly considered if co-management is to be implemented in Pondoland forests since most of the communities are poor and are therefore likely to consider their immediate interests rather than the long term conservation aims.

At MTFR it is likely that co-management would succeed. For instance, in the Headmen forests where weekly meetings between elders and forest guards are held, better monitoring of the forests has been observed. If co-management were to be fully implemented, the communities would benefit in several ways.

1. They would obtain employment as guards in the reserve. For example in Rwanda the Parc National des Volcan (13000 Ha.) which conserve the mountain gorilla (*Gorilla gorilla beringei*) is the country's prime tourist attraction. Guides and porters who take tourists through the forests are locals who were former poachers but now earn a salary from conservation (McNeely 1988). In this venture the local people are given employment preference to outsiders from distant places and this helps to keep locally generated wealth within the community and the adjacent reserve areas. At Silaka Nature Reserve (under the Department of Nature Conservation) a programme linking the management of parks with neighbouring communities has been successfully established. Many of the local people have been employed as clerks, cleaners and guards in running the park and its cottages.

2. Subsidy from outside sources (e.g. developers) with direct interests in a park/reserve would be also gained by the community. Developers may bring in incentives like schools, health clinic, community centre, piped water and electricity. Although paying for such incentives can be expensive, costs may be reduced by the government or other development agencies while locals provide labour. Such joint activities help build community spirit. They also provide a context for ensuring that the linkage between assistance and expected change in behaviour is reinforced.

3. The locals would benefit from other forestry linked initiatives like ecotourism or cultural tourism as they would be directly involved. For instance, there are currently some ecotourism/cultural tour operators around Port St. Johns who focus on the hikers and give them guided tours on the Amapondo cultural life and arrange accommodation among the villagers. These operators charge R70 per day, half of which eventually goes to the families hosting the tourists (S. Powell, 1997, pers. comm[16]). Furthermore, some of the village youth earn income as tour guides. Though small in their operations, such ventures form important informal businesses that could be strengthened if the forest reserves (and their potential resources that attract tourists) were co-managed by the rural communities and the Eastern Cape Forest Department.

5.3.1.1 Limitations of Co-management

As various parties are involved, co-management can turn out to be complicated and not implementable. For instance there may be the interests of indigenous people, carvers, herbalists, farmers on one hand against interests of tourism, commercial logging, mining or hunting on the other. There may also be large scale developers with interests which can change the biophysical environment but at the same time have enormous potential of offering local employment. Meeting needs of these different interests in a co-management structure can be complicate. Besides, finding an established body with authority to negotiate for such diverse interests is often difficult especially in the case of tribal people with different political and decision making authority. There is a likelihood of this being the case at MTFR as in the recent times there have been strained relationships[17] between the authoritative bodies (the Headmen, SANCO-South African National Civic Organisation, the local RDP) over the use of forest resources.

Another problem with co-management is that even though locals are employed as reserve guards in good faith, this may not be viable as they may not have the will to arrest some poachers especially when these are their relatives (R. Ngqukutu, 1996, pers. comm.). As Robert Ngqukutu, a senior forest guard puts it, the nature of their jobs "put them and their families in potentially

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[16]S. Powell, Cultural Tour Guide, Port St. Johns

[17](While the elders governing the Headmen forests and the local forum of RDP support conservation of the forests, SANCO has advocated the conversion of forests into human settlement.)

dangerous position with villagers whom they arrest."

Despite these hindrances, co-management certainly has a role to play at MTFR and the other forest reserves of Pondoland. The only big limitation is the lack of trust between the forest authorities and the local communities. Ways of building trust between the two need to be encouraged and regular channels of communication must be opened. Due to historical distrust the whole process is bound to be long and slow. Many issues need to be laid on the table and discussed. For this reason the process should be allowed to take its own rate to ensure that the final resource management strategy is commensurate with the cultural values and perception of resource users.

5.3.2 Community Forestry Management

Community Forest Management (CFM) broadly describes local residents who have developed a system with rules and regulation, fines and fees to sustain the forest resource which may involve one, two or more communities protecting and using a specific forest region (Poffenberger 1996). In CFM, unlike co-management, local residents have more control over their resources and perceive they have special rights and responsibilities even though the forests may be under the legal jurisdiction of a regional or the central government.

Different authors have supported and also criticised communal management (Hardin 1993, Chambers 1989, Warren and Cashman 1988). Communal management allows empowerment and participation, enabling locals to provide themselves with goods and services with minimal external sanctions of the government and this yields more long term benefits to conservation (Wade 1986). However Turner *et al.* (1993) suggest that communal management of resources, like indigenous forests, often break down because of incentives to free ride, i.e. to try and make individual gains without contributing to the collective management of the resource.

That the South African government places high importance on communal management of resources is indicated by the entrenchment of **Community Property Association Act** in the land tenure reform policy. This act provides a legal mechanism to accommodate the needs of people who wish to hold land collectively (Dept. of Land Affairs 1996). In Caguba Location, the carvers

have realised the need for communal management of their craft trade and thus started initiatives to form an association. Through joint trading, they hope to improve the value of craft works and increase their profits (D.Cwaba, 1996, pers. comm). An organised forest association would create employment for the locals who would be deployed within the frame work of the craft work business. In such an association, there would be need to specify that local labour is to be used as much as possible rather than mechanical means. Other benefits from such an association include:

1. A greater access to credit facilities and sources of funding as most fund donors will only deal with organised groups. For example in Port St. Johns groups like the Mngazi Rural Farmers Cooperative, the Umzimvubu Banana Project and the Amapondo Art and Craft Culture have received funding on this basis.

2. It offers a more powerful voice for the craft workers to advocate their needs. This has been observed in other areas like in Mpumalanga where the Mhala wood workers have strengthened their bargaining power through formation of associations (Shackleton 1993).

3. Promotion of the craft work industry as a whole through brochures or exhibitions would be better achieved.

4. It would open up a channel for negotiation and better communication, fellowship among the craft workers and help expel internal corruption or distrust and enable them to be better custodians against over exploiters

However, if community management were to be introduced and successfully established in Pondoland, it is important to ensure that proper structures are put in place to avoid power slipping into the hands of a chief or a few elders. Perhaps this would be achieved by decentralising forestry powers from the chief and establishing a broad based management committee that is representative of the village structure. An ideal committee would comprise of at least two village elders (of both genders), religious leaders[18], local RDP leaders and a representative from both the

[18] (It is important to include religious leaders in this committee as the locals have high faith and regard for the religious elders.)

local carvers and traders. This committee would meet regularly and oversee the daily running of the forest.

5.3.2.1 Limitations of Community Management

While communal management would improved marketing and result in higher prices for craft works, this would also would create a new dilemma as it would give incentives for more tree cutting. Should the current local prices of R7 per stick rise towards the higher urban prices (R11-15), this will undoubtedly motivate carvers to increase production and even draw more people into the carving trade. Even though issuing permits and enforcing harvest regulations through forest guards has been suggested for the proposed communal management (D. Cwaba, 1996, pers. comm.), this may still be unattainable under the present overstretched resources of the Forest Department (Section 5.4.4). Other problems of communal management are:

1. It may encourage free riders in the community. These are individuals who do not partake in efforts of communal management like guarding forests or afforestation but continue to enjoy benefits from the forests.

2. Introduction of improved harvesting techniques such as using fuel powered chain saws rather than bow saws can result more exploitation since these tools can get widely spread and used under the structures of community management.

3. A particular hindrance that may arise with community management is the perception by some villagers that forests take long periods before harvesting and are therefore not profitable. As such, some of the locals may not opt for this but prefer agriculture instead.

Despite the stated problems, community forest management like co-management also has a place in MTFR especially in view of the economic benefits to be gained. If it were to be introduced, a first step would be to build upon the currently existing Headmen forests. In reducing its limitations, the government needs to establish economic incentives like providing tax relief, grants and loans to development projects initiated by local people. Other incentives may involve simple

approaches like supplying free or subsidised tree seedlings and offering free advice on how to establish and manage small community woodlots. This is further discussed under Section 5.4.5.

5.3.3 Privatisation of Indigenous Forest

An often repeated policy prescribed to problems of resource overuse under common property and open access is to privatise (Pearce and Turner 1990, Tietenberg 1992). This may be done in several ways, the most common being conferment of land title deeds to owners or giving a developer exclusive rights through a lease agreement The latter is currently under practise in Mpumalanga Province where the Parks Board intends to give a 50 year lease of exclusive commercial development rights to the Dolphin Group of developers (Arenstein 1997). Although not stated, it is likely that the Eastern Cape Department of Nature Conservation may adopt the same policy. It has been argued that a better conservation approach would be to privatise these resources into local ownership who are more conversant with the resource. However, this is not always feasible because locals usually lack sufficient funds. The importance of extending privatisation into rural communities has already been realised by the South African Government and currently the Department of Land Affairs has proposed the establishment of grants to support the land reform program. These include:

1. **The Settlement/Land Acquisition Grant** which sets a maximum of R15 000 per beneficiary household to be used for land acquisition, enhancement of tenure rights, investments in infrastructure and home improvements according to the beneficiary plans. With this grant local Pondoland communities may have an opportunity to purchase part of the reserve land if it were to be sold.

2. **The Settlement Planning Grant** which ensures that locals can obtain services of planners to assist them in drawing-up the settlement and development plans on the acquired land.

3. **The District Planning Grant** enables an integrated management planning of resources at the district level to be done. This grant is particularly important as it ensures that views of various parties are integrated since they share resources such as rivers, dams, forest watersheds that must be jointly managed. In Pondoland the grant is ideal since it enables

the resources for land reform and settlement to be adequately allocated and helps the rural poor especially women and their families to improve their settlement and tenure conditions.

Even though the stated grants are provided by the state, the funding amounts are too small to enable each local to purchase sizeable land that can achieve meaningful or efficient farming. The question then is; what type of privatisation is feasible for the local Pondoland people? Two approaches are suggested:

1. Instead of directly buying portions of the reserve, locals should be given the priority of buying shares in the development companies that are interested in putting up big projects (e.g. on tourism, horticultural farming) in the region. For instance, some private game farms in northern Kenya have allowed local communities to buy shares in the farms.

2. Locals may group their resources together and form partnership between themselves or with bigger established organisations involved in ventures like cultural / ecotourism or profit storing schemes of craft workers.

5.3.3.1 Limitations of Privatisation

Although economists have argued that privatisation of state land like the intended Mpumalanga nature reserves can yield high profits, this is unsuitable on the coast of Eastern Cape for several reasons:

1. It may carry with it problems because the developer may ignore negative external effects imposed on local people living close to the reserve. These include loss of collective benefits of the forests such as water management benefits, erosion control benefits and common property benefits for communities dependant on traditional forest medicines, fruits, nuts fuelwood and game. Even when prior contracts are laid out to prevent conflicts or losses; more often than not, these are poorly followed or not implemented at all once developers begin their projects. For instance Arenstein (1997) has reported that rural communities neighbouring the Blyde River Canyon Reserve are already outraged for

being ignored by the Dolphin developers in the Mpumalanga Parks Board Privatisation deal. A similar situation could occur in the Eastern Cape since such conflicts have surfaced before in place like the Dwesa Nature Reserve (Dept. of Water Affairs and Forestry 1996).

2. In the Transkei the renown wild coast nature reserves like Mkambati, Dwesa, Silaka and Hluleka, unlike those of Mpumalanga, are a very unique national asset to be privatised. For example Pooley (1993) describes these reserves as having rare and unique flora such as the endemic family of Rhynchocalycaceae, five endemic genera (*Dahlgrenodendron, Jubaeopsis, Pseudosalacia, Pseudoscolopia* and *Rhynchocalyx*) and 30 endemic tree species. These coastal forests are also home to rare endemic birds species such as the Green Tinker Barbet (*Pogoniulus simplex*) and the Yellow Streaked Bulbul (*Phyllastrephus flavostriatus*). If the natural resources of Transkei were to be sold the state would not afford to buy them back.

3. Once the forests are bought, the developers may opt to convert them to other land uses like agriculture. This aspect may fragment the original forests and cause edge driven effects in the forest environment and structure, thus affecting dynamics of species interaction (Murcia 1995).

Privatisation therefore, may merely change ownership of the forest resources while leaving the core problems of unsustainability unchanged.

5.4 Recommendations for the Management of Pondoland Forests

How can the management of the Pondoland forests be improved? Several issues will have to be considered and these include (1) developing a harvesting criterion, (2) reviewing the permit system, (3) establishing a forest inventory, (4) addressing staff needs, and (5) introducing forest extension.

5.4.1 Developing a Harvesting Criterion

In districts like Umzimvubu where operating funds are limited, it is difficult for forests managers

to prioritise management factors and give them immediate attention. Perhaps an even more difficult decision is determining if and under what conditions to harvest a particular forest or defer it for the future. In attempting to answer these issues, the use of decision trees is suggested (Figure 5.1). Decision trees manipulate information in a qualitative and deductive way rather than a quantitative approach (Starfield and Bleloch 1986). They are most ideal in cases where extensive quantitative data is lacking and they provide a simple management model with qualitative arguments that lead to one decision rather than another. In the case of Pondoland forest, the key question and decision a forest manager would have make is whether to harvest a given forest patch and under what conditions (i.e. harvest under normal supervision, under strict supervision, defer harvesting or not to harvest at all). In such a model the most important and initial question confronting managers would be; what is the resource availability in a particular forest patch, i.e. is the forest presently over-exploited or are there still sufficient trees to harvest? Other subsequent questions would be; has an inventory been done and if so what is the density of trees, which type and numbers of stem sizes are available and what is the trend of permit demands (Figure 5.1). A decision tree would be an ideal guide for newly appointed (inexperienced) officers or those transferred to new stations where they are yet to familiarise with the forest resource use and sustainability patterns. For the experienced foresters it would serve as a useful checklist in their routine work. The model given in Figure 5.1 is an experimental prescription for MTFR, if it were to be implemented, further studies on other qualitative factors would be needed and furthermore the structure would change with time.

Despite having a decision tree model, there would be still further questions linked to resource use. For instance, who would be allowed to cut trees? Would it be the forest department the locals themselves or a combination of both? If the locals are to be involved how would the permit system operate? Two models of harvesting are suggested, (1) only the forest department cuts and sells the logs to prospective carvers at the roadside or at a central yard or, (2) open the cutting license to all locals.

5.4.1.1 Selling Timber at Roadsides or at Logs Yards

In this model the Forest Department would be responsible for all the forest operations of allocating areas for harvesting, the logging and overseeing the regenerations/reforestation process.

As logging would be done by the department itself or by contractors hired by the department, permits would not be required at all. This factor removes the problems of issuing and monitoring the permits. Timber sales could be done at the roadsides at fixed prices or through auction. Alternatively logs could be transferred to a central yard in Port St. Johns where they would be sold through open auction, by sealed tender or fixed prices. This model has proved successful in Scandinavian countries like Sweden, Norway and Finland and also in Tanzania (Grut *et al.* 1991.). In South Africa the first trial on this method was successfully done in 1995 in the sale of *Ocotea bullata* (Burch) E.Mey (stinkwoods) in the Southern Cape forests (Söhnge 1995). With the increasing number of carvers and demands of wood in Umzimvubu it could be worthwhile adopting the same model in the Pondoland forests.

5.4.1.2 Open Cutting

Under this model the Forest Department would be in charge of issuing the logging permits, determine places to be harvested, and ensure that logging is properly done and loggers undertake reforestation. To ensure that loggers participate in reforestation, conditions for permit renewal would be based on their active involvement in replanting efforts. Despite involving extra monitoring, this requirement that loggers participate in replanting (for permits to be re-issued) has resulted in more reafforestation in Canada (Grut *et al.* 1991). However it has failed in other developing countries like Kenya and Tanzania (KIFCON 1992).

Of the two models the first (where government cuts and sell logs from one point) is proposed as more appropriate for MTFR as it does not require permits which are usually difficult to monitor. Moreover, with one consistent logger (e.g. the Forest Department) the logging system would be uniform, damage minimised and the rotational harvesting system better implemented. Guarding would also be easier since nobody would be expected to cut a tree within the forest. However, if the alternative is suggested and locals are authorised to cut trees themselves, then a permit system and its operation would become an important factor and this is discussed in the next section.

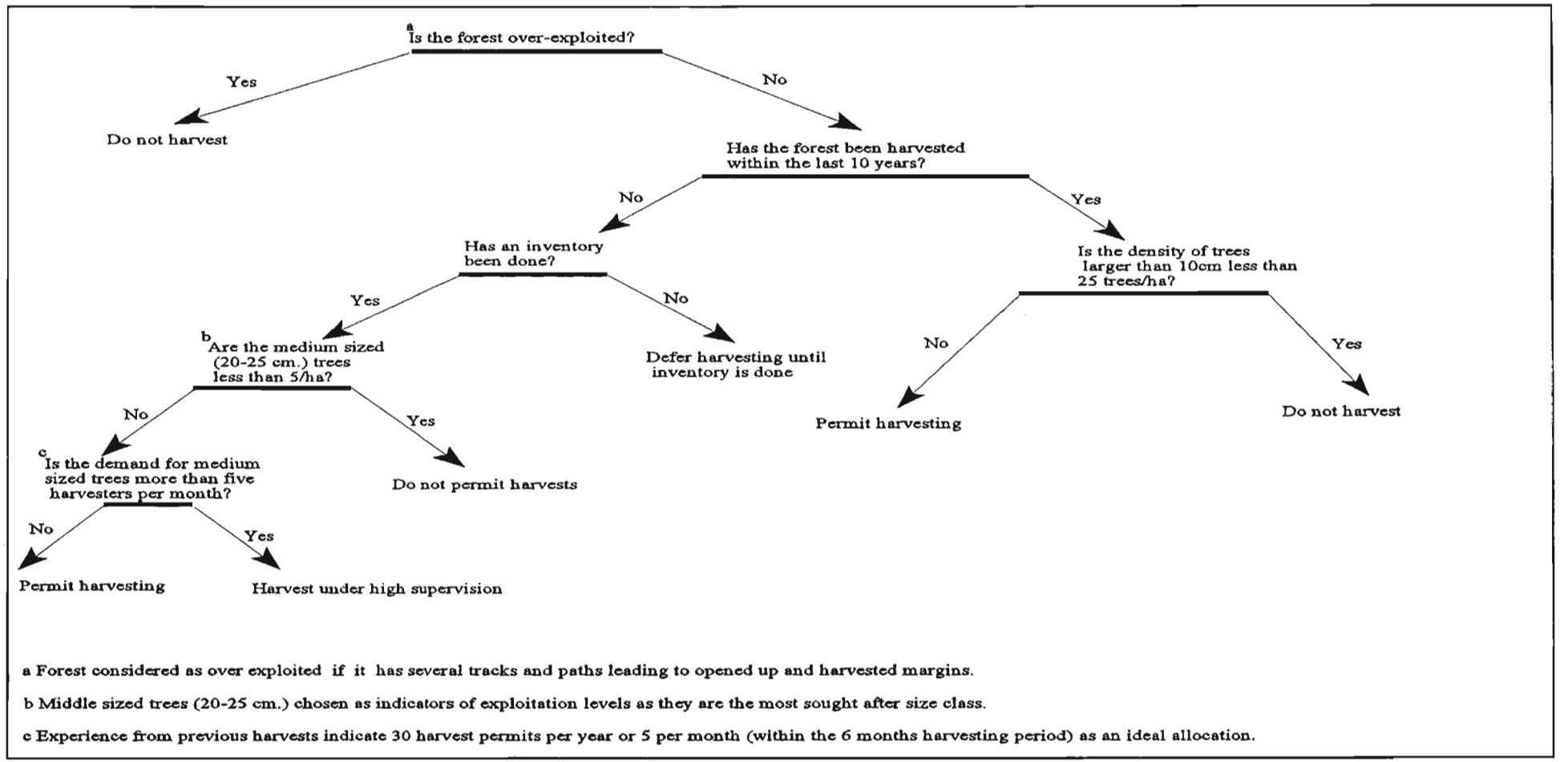

Figure 5.1: A decision tree for determining if and under what conditions to harvest *M. grandis* at MTFR and in the coastal Pondoland forests

5.4.2 Review of the Permit System

The purpose of a permit system in forest management is to monitor and thereby control forest resource use. In most South African indigenous forest, the permit systems have weaknesses (Section 4.4.1) and permits have not been effectively used as monitoring tools (Muir 1990). While permits give an indication of the number of stems harvested (i.e. without considering poaching), they do not reflect the stem sizes harvested or show the species composition of the harvests. Yet these are critical variables in the management of selectively used uneven aged forests like MTFR. Before the ban was instituted, the permit system at MTFR differed markedly from that of other similar indigenous forests in KwaZulu-Natal and Southern Cape. For instance, while unrestricted one-year long-permits were freely offered at MTFR, other indigenous forests reserves like Hlatikulu (KwaZulu-Natal) sold theirs with shorter harvest durations (one month period) and with strict restrictions placed on the sizes of stems cut.

The free issue of permits in Eastern Cape was a loss of potential forest revenue that could have been collected for the provincial government and put back into forest management. In comparison with Hlatikulu and other reserves, the one year permit duration was too long and difficult to manage. Moll (1977) has shown that with unrestricted periods of harvesting, harvesters tend to leave felled trees lying on the forest floor for long periods and this results in great losses through stems rotting. Where permits are restricted to short harvest periods, losses of trees from uncollected rotting logs is significantly reduced (Muir 1990). For example, when the KwaZulu-Natal Department of Natural conservation (KDNC) shortened their permit duration to one month, the amount of wood losses at Hlatikulu reserves was significantly reduced (Muir 1990). If permits are to be reintroduced at MTFR their duration should be shortened. As previous harvesting activities at MTFR were mostly confined to the first six months of the year (Figure 4.1), the period should at the very least be reduced from one year to six months. To maintain the size class composition of the harvest, there should be a restriction on the sizes of stems harvested depending on availability. This is important in order to control carvers who selectively harvest the middle sized straight stems. Perhaps one way of reducing selective harvesting is increasing incentives for non-straight trees by charging higher fees for the straight stemmed trees.

The trading of sticks and other craft work also needs control by introducing craft work trading permits. Through these system forest guards would ensured that:

1. Local carvers and traders without trading permits are not authorised to sell along the roadsides or to middlemen. However those with permits would be allowed to undertake any form of trade and they would be required to display it besides their products

2. Likewise, all middlemen would require permits before buying craft work from the carvers and these permits would need to be constantly checked by forest department officials

In effect all dealers of craft work, be they a tree harvester, carver, middleman or curio shop trader would all need permits to deal with any wood products.

Despite the benefits of controlling forest resources through permits, introduction of a new permit system is not likely to be willingly embraced. Firstly, the locals have got used to "free" wood and may dislike and oppose the new fees charges. The benefits to community forestry derived from the permit revenue ploughed back into forest management is long term and some locals, interested in quicker returns, may perceive this as financially unrewarding. Secondly, not all of the carvers can afford permits and some are likely to be driven from their only source of livelihood. Perhaps the biggest problem to be faced by the reintroduction of permits is their implementation. More forest clerks, in the form of enumerators, will need to be deployed at various districts and forest substations (rather than being based at the provincial headquarters) to control permit issuing and monitor the resources. However, caution has to be taken because increasing the personnel may increase unnecessary bureaucracy. The way forward would be a well trained sizeable and productive staff. Alongside this, more forest guards would also be needed to enforce the new regulations. This will require a well coordinated planning section for Eastern Cape Forest Department.

5.4.3 Forest Inventory System

Although *M. grandis* is heavily harvested and commercialised, its growth rate, rotational age and optimum harvest age are yet to be documented. The rotational age is not known and it is

estimated to be between 40 and 60 years depending on the site (R. Ngqukutu, 1996, pers. comm.). Since trees are selectively screened for straightness, stem form characteristics in relation to the growing sites need to be determined. The response of coppices and their regrowth should to be monitored under different harvesting regimes. It is recommended that **permanent sample plots (PSP)** be established at MTFR and periodic assessments be done on growth characteristics and seedlings recruitment rates. The importance of PSP is underscored in the well managed Tsitsikama/Southern Cape forests where since 1984 a total of 820 PSP have been established in a forest area of 1315 hectares (Seydack 1991). About 84 PSP (or three per forest block) need to be established for the 28 forest compartments/patches at MTFR.

Equally important is determining the availability of the resource and suitable harvesting regimes. Resource availability is mainly dependent on the number of useable stems per unit hectare and the total hectarage of the resource is affected by settlement patterns, topography and accessibility into forests (Chapter 3). Knowing resource availability of an edge species like *M. grandis* is important since it appears abundant along the forest margins yet within the forest its distribution is limited. This marginal predominance may lead one to overestimate the availability of the tree. As resource use constantly changes with time, it needs to be monitored at least once a year. For slow growing species like *M. grandis, P. obliquum* and *M. caffra* this is best done through biennial assessment in specific permanent sample plots.

5.4.4 Staffing Needs

The forestry personnel in Umzimvubu District in general is severely understaffed. Forest guards are the most affected, for instance, in the entire district only four forests guards patrol an area of over 10 000 hectares. Yet the recommendation is for a minimum of two guards for every 500 hectares (Hall 1983). If this recommendation were to be implemented, MTFR alone would require four guards while the district would need at least 40. There are no data collectors and yet establishing a forest inventory is an important goal. Although there are general workers, most are not conversant with basic forest procedures such as licensing and harvesting. There is a need to impart the basics of forest management to forest workers especially the guards and field workers. This is further discussed this in the next section (5.4.5).

Not only is staff development needed but also the operational facilities that will enable it to work efficiently. Currently in Umzimvubu District there is no vehicle or telephone links between the various substations. Surveys and patrols are very difficult to undertake as the forest staff depend on lifts to reach their working areas. Under such disincentive conditions, the staff are not motivated and many forests go uninspected for long periods.

5.4.5 Forest Extension System

The lack of a forest extension system is perhaps the biggest weakness of the Eastern Cape Forest Department. A few previous attempts were made at socio-forestry with little regard to backing it up with extension work (M. Jonker, 1996, pers. comm.). The major challenge now is to change the Forest Department from a policing role to one of extension with extension targets on the number of farmers reached and trees planted. To achieve this it will have to give attendance to the following:

1. Undertake intensive staff training on extension especially on information dissemination and rural community training. Extension skills are important since forest officers would be required to give advise on growing of indigenous trees and the establishment of cheap tree nurseries using village resources.

2. Spread the concept of community forestry and extension to policy makers such as senior government officials, forest managers, rural development officers and other public office bearers at the local grassroots level. Most of the current forest managers and their junior staff have never dealt with community forestry as it was not in the policies of the previous governments in the Transkei.

3. Inform the rural public on the benefits of community forestry. These will include emphasizing the advantages of joint marketing of their products, better value for their craft work and being able to have a say in the control of forest resources.

4. The principles of sustainable use of natural resources should be disseminated to schools starting from the primary stage up to the adult education level. In this regard, visits by

students to parks, indigenous forest demonstration plots, and nature reserves ought to be encouraged.

In the local schools surrounding MTFR, this factor has been ignored as very little environmental education is included in the schools' curriculum (T. Bouwer, 1996, pers. comm.[19]). Students from villages surrounding MTFR should be encouraged to visit indigenous forest patches like the Ntsonga Forest where names and uses of trees have been identified and marked out by the Wildlife Society of South Africa. This is important as it gives the locals a sense of heritage and the incentive to invest in their cultural heritage.

For locals to actively participate in community forestry, they will need to be motivated into the programme. An important initial phase is to assist them to articulate and communicate their needs, problems and solutions as visualised by themselves. This will assure them that programmes are relevant to their needs and that the community will benefit from them. This would also give the community a sense of responsibility, ensuring success of what would be 'their' programme and carried out with the technical assistance of the government. At MTFR some of the problems that the locals have mentioned are shown on Figure 4.3 and their visualised solutions discussed under section 4.4.1. Further solutions for MTFR should include two main considerations:

1. Promote the idea of using alternative species to *M. grandis* . Although other species such as umThunzi (*M. caffra*) and umThathi (*P. obliquum*) are sometimes used, this should be discouraged as they are also limited in quantities and are slow growing species. Instead, emphasis should be diverted to using others species like old eucalyptus and pine trees which can produce good carving wood (T. Kaissling, 1996, pers. comm.[20]). Alongside alternative species, carvers should be informed and encouraged to participate in art exhibitions held in many art centres throughout South Africa.

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[19]Mrs. Tesa Bouwer, Manageress Umgazi River Bungalows, P.O.Box 75 Port St. Johns

[20]Mr. Telo Kaissling, Wood Sculptor, P.O.Box 38 Port St. Johns 4830.

2. Extension officers should encourage tree planting especially *M. grandis* seedlings which, being leguminous, enrich the soil through nitrogen fixation. Most locals are unaware that this species can positively intercrop with their food crops in a mixed row system of farming. Together with its shelter and wind belt benefits, *M. grandis* is a **Multi-Purpose Tree (MPT)** that can be easily propagated through seeds and cuttings and has tremendous agroforestry potential that has yet to be exploited.

5.5 Conclusion

Land, its ownership and use has always been a driving force in shaping the socio-economic and political trend of South Africa. Past conservation policies have put little consideration on socio-cultural aspects, tenurial rights and political factors and this has led to perennial management problems in many indigenous forests. Examples include MTFR and other Pondoland forests which have been poorly managed in comparison to similar forests in the Southern Cape and KwaZulu-Natal. The major problems have a been poor institutional capacity in the Forest Department (understaffed and lowly trained personnel with limited facilities) lack of a forest inventory system and disincentive working conditions. To uplift the current low status, management plans that are ideal to MTFR and Pondoland forests need to be devised. These include the development of simple forest harvesting models that can be used as first hand guides to foresters, strengthening personnel and operational facilities of the Forest Department and establishing a tenure system that is ideal to this region. In deciding between co-management, communal management and privatisation, careful consideration is needed as there are specific strengths and weaknesses associated with each tenure system. Together with this is the need to monitor wood resource availability by introducing permits that will check the flow of forest products from local harvesters/carvers to the big traders in the cities. This will, however, require strict monitory as there is a likelihood of previous illegal trading being driven underground. Forest extension, which in the past has been ignored, is also identified as one factor that could enhance sustainable development as it can be used as a medium for channelling the benefits of both community forestry and agroforestry into Pondoland.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

The most overriding concern and central question in this thesis has been that of sustainable management of wood resources in Pondoland and its effect on the local socio-economic status. It is appropriate therefore to conclude the thesis by reviewing the concept of sustainable development and the conflict between socio-economic development and environmental conservation.

Prior to the 1980s, it was thought that the economic growth was limited by the capacity of the environmental to handle degradative agents or externalities associated with production. Currently the environmental debate has shifted to managing the natural resources in which economic development and environmental improvement compliment one another and this view underscores the concept of sustainable management. There is now a realisation by national governments and international institutions that it is impossible to separate economic development issues from environmental issues: many forms of development erode the environmental resources upon which development must be based and environment degradation can undermine economic development.

The need for reconciling issues of environment and development is well depicted in the Eastern Cape province of South Africa. In Umzimvubu district, where this study was done, forestry potential has been undermined by a subsistence economy, extreme poverty, poaching and most local socio-economic needs are drawn from the forests. These forests provide raw materials for hut construction, basketry, weaving and craft work industry. The high dependance and exploitation of *M. grandis* forests has lead to one major question; are the forests sustainably managed to uphold the current craft work industry without, in the long run, affecting the forest structure and composition?

In answering this, a starting point is (1) quantifying the existing amounts of *M. grandis* resources in the forests, (2) ascertaining their distribution profile and (3) determining their exploitation rates. This was done by sampling in 30MX14M rectangular plots and along line transects and the results indicated that:

1. *Milletia grandis* is a forest margin species that grows to about 50-60 metres into the forests from the edge. However, most of the trees were found to grow within 15m from the forest edge and their densities decrease into the forest.

2. The most demanded and exploited trees are those with a stem diameter ranging between 20-25 cm. These have been harvested at a density of four trees per hectare. Considering that only five trees of the same diameter exist per hectare, this is indeed a high extraction rate which must be lowered.

3. *Milletia grandis* forests show an inverse 'J' shape type of distribution whereby there are many seedlings and saplings as compared to trees. These forests are coarse grained indicating that their regeneration occurs over a large scale and thus large tracts of land are necessary for sustainability to be maintained. Forest grain information is important in managing resources in reserves like MTFR as it assists forest managers in making harvesting decisions. For instance, fine grained forests which normally have high numbers of forest species can be exploited, if well managed, without negative long term effects.

4. The study showed that the wood resources in the various forest compartments / patches are not under different levels of exploitations (i.e. highly exploited forests, partially exploited forests or unexploited forests), but rather, they are all under similar external pressure of exploitation. Thus in drawing management strategies, forest managers should not view the various forest compartments differently but instead consider them as one continuous forest block requiring the same management plan.

The current high exploitation rates of forest resources has lead the Eastern Cape Forest Department into placing a temporal harvesting ban on *M. grandis*. Despite this ban, tree poaching remains high in the reserve. The ban has subsequently led to (1) more demand for carving wood, (2) increased illegal craft-work trading, (3) poor marketing, (4) low profits and thus further wasteful exploitation of the forests to meet local economic needs.

Within the study area of Caguba location, neighbouring MTFR, the number of carvers were approximated to be 100 with another 200-300 people estimated to be directly employed in the carving industry. Social survey results indicated that monthly yields and profits per carver depend on the type of markets the carvers trade in. Net profits per carver varied from R400-R560 in the rural markets and R700-R960 in the urban markets. Carving activities are limited to 10 months of the year and the annual income per carver dealing with urban markets was estimated to be R11000. If the crafts were to be sold in the lucrative markets like Johannesburg, the estimated sales would surpass R3.6 million per annum. Yet these estimates were only for one location in Pondoland and considered under the current wasteful methods of harvesting with poor marketing strategies.

The prevailing poor indigenous forest management in Pondoland can be linked to the past conservation policies that put little consideration to local social cultural aspects, tenurial rights and political factors. In addressing these issues the current Eastern Cape Forest Department faces two major challenges, (1) to manage the existing forest resources so as to meet the required economic, social, environment and conservational needs and (2) to expand the current resources through afforestation and reforestation programmes.

Solutions to problems at MTFR, and Pondoland coastal forests in general, will not only involve ecological factors but social, political and market forces as well. In seeking answers, various recommendations have been suggested:

1. Establishing land tenure system that will encourage local communities into collaborative management. Three land tenure options were reviewed (1) co-management (2) community forest management and (3) privatisation.

   Co-management allows both resources users and formally trained managers to jointly control the forest resources with the former benefiting from factors like employment opportunities in the reserves. Although it has succeeded in many parts of the developing world, similar success in Pondoland will depend on whether the interests of the conservationists and local communities converge.

Community Forest Management (CFM) is perhaps the way forward for resource management in MTFR and Pondoland. This is supported by the social survey results which indicated that Headmen forests (which are communally managed) were less vulnerable to exploitation and had more positive sustainability factors as compared to the state forests. The biggest advantage with (CFM) is that it opens up opportunities for better negotiation and communication between craft workers, helps to remove distrust and this makes them better custodians of their resources. However, for CFM to fully succeed, caution should be taken to ensure that structures are put in place to prevent powers slipping into the hands of the chief or a few elders. This can be ensured by establishing a resource control committee with a broad representation of the village.

Although the South Africa government advocates **privatisation** of some state land into local ownership, this has remained a problem as locals lack sufficient funds. The Settlement / Land Acquisition Grant and Settlement Planning Grant, established by the government, are appropriate avenues of facilitating local ownership of land. However, it was suggested that instead of each local buying small unproductive fragments of land for themselves, it would be perhaps better that they buy shares into rural based development companies with interests in resources like ecotourism or horticultural farming. Similarly they could group their efforts into partnerships amongst themselves and link up to other bigger investment companies.

2. The weaknesses of the current permit system were exposed and it is recommended that a craft work trading permit be introduced. This, which should be co-managed with the local authorities, would control the trading of sticks as tree cutters and carvers without permits would not be authorised to sell on the roadsides or to the middlemen. A similar permit should be also introduced for the middlemen and traders who would need to produce it before buying craft products from the locals or selling in the big cities.

3. A forest inventory system needs to be established with at least one permanent sample plot (PSP) in every forest compartment or patch. Through periodic assessments, these PSP

would provide data on growth characteristics, recruitment rates and resource quantities which are important information for forest managers.

4. There is need for developing a harvesting criterion that would assist managers decide when and under what conditions to harvest a particular forest. A provisional tree decision model is suggested, however, it would need further studies before implementation. Also reviewed was the options of harvesting being either entirely under the control of Forest Department (who would then sell logs to carvers from a central yard) or allowing carvers to cut trees themselves. The former is recommended as it removes the problems associated with permit issuing and their monitoring.

5. The current personnel requirements within the Forest Department need to be addressed especially staff shortage and the poor working incentives. It was noted that there were only four forest guards in the whole district yet at least 40 are required.

6. Introducing a forest extension programme is perhaps the most important input required as it would strengthen the current weak links and distrust between the Forest Department and the local communities and thus enhance afforestation. Through extension services it is envisaged that (1) the concept of community forest will widely spread to policy makers from the grassroots level to the senior most government officials, (2) locals will learn the benefits of community forests and be exposed to other alternative craft work species, (3) the potential of *M. grandis* as a multi-purpose agroforestry tree (rather than just for craftwork) will be gained by the local farmers and (4) the principles of sustainable natural resource use will be better disseminated in schools from the primary stage to the adult education levels. However, if this is to be achieved, the forest workers themselves will need to be first trained on extension skills.

Even though forest conservation issues are not perceived uniformly in South Africa, conservation of the Eastern Cape coastal Pondoland Forests will be of keen interest to South Africans in view of their unique natural heritage and huge future tourist potentials. There is room for innovative progressive management of these forests and the feasibility of managing them on a productive

basis deserves consideration. Although some of the management problems facing the current forest managers are beyond their control, they should not deter from drawing the attention of other professionals. Indeed, a multidisplinary approach is the best way forward to solutions as these problems transverse through the broad spectrum of socio-economic and ecological issues.

If sustainable development is to be realised in Pondoland it is inevitable that both sustainable management of wood resources in the coastal forests and the craft work trade succeed. Regulated harvesting is a must and this should be supported by alternative economic activities that will engage the locals and reduce the exploitation pressure exerted on the forests. Therefore, establishment of other economic activities in this region remains a vital long term goal for sustainable development and this **must** be a national responsibility and priority.

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PERSONAL COMMUNICATION

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APPENDIX I

Structured questionnaire to carvers and local craft work traders

1. Is the umSimbithi wood of importance to you? ☐Yes ☐No

If yes why i) For craftwork☐ ii) Kraalwood☐ iii) Fuelwood☐ iv) Others☐

2. What types of carvings do you deal with?

i) Ornamental craft ☐

ii) Utilitarian craft

-knobkerries ☐

-walking sticks ☐

iii) Both (i and ii) ☐

b) Why do you prefer this choice? .....

3. What are your total monthly / annual costs?

i) Transport.....ii) Labour.....iii) Licenses.....iv) Purchases.....

4. What are your monthly buying (harvesting) costs of umSimbithi wood?.....

5. What are the general prices of your various items?.....

6. What is your monthly income from selling umSimbithi craft works? .....

7. What percentage of your monthly income is drawn from trading with umSimbithi tree?

i) Less than 25% ☐ ii) 25-50%☐ iii) 50-75%☐ iv) More than 75%☐

8. How do you consider your dependance on umSimbithi craft work trade, in the last five years, as having varied?

a) Drastic increase (i.e. double, tripled?) ☐

b) No increase (constant) ☐

c) Gradual decline ☐

d) Drastically declined ☐

e)Other considerations ☐

Give reasons .....

9) How much of umSimbithi wood do you use in a month? .....

i)..... trees ii).....logs iii).....branches

b) Does this amount meet your demands? Yes☐ No☐

c) If not, what do you think is the problem?

i) Few wood supplies ☐

ii) License limitations ☐

iii) Marketing ☐

iv) Rotten Stem cores ☐

v) Expensive logs ☐

vi) Other reasons ☐

10. How do you think the availability of umSimbithi wood in forests and markets has changed in the last five (or ten) years?

a) Drastic increase (i.e. double, tripled?) ☐

b) No increase (constant) ☐

c) Gradual decline ☐

d) Drastically declined ☐

Give reasons .....

11. Does the present method of issuing tree harvesting licenses present any problem to your procurement of wood?

i)Yes☐ ii)No ☐

If yes, give reasons

i) Licenses are expensive☐ ii) Issuing process is slow☐ iii) Offices are far☐

iv) others☐

12. Has your carving technique changed over the years? Yes☐ No☐

If yes, how?.....

13. What do you do with the waste that is produced from the carving?

i) Firewood☐ ii) Make small curios☐ iii) Throw away☐ iv) Other uses☐

14) Are there any alternative wood tree species you are using or may use in future?

i) umNonono☐ ii) umThathi☐ iii) Others☐ Specify☐

15. Have you ever considered growing a few umSimbithi trees in your garden for future utilisation?

i)Yes☐ ii) No☐

Give reasons .....

16. Would you be interested in the results of this study?.....

APPENDIX II

Protected (Reserved) tree species in the Pondoland forests that have significance to carvers and craft wood trade.

Botanic Name	Xhosa Name	English Name
Milletia grandis	umSimbithi	umsimbeet
Milletia sutherlandii	umQunye	Giant umSimbeet
Ptaeroxylum obliquum	umThathi	Sneezewood
Mimusops caffra	umThunzi	Shore milkwood
Mimusops obovata	umThunzi	Red milkwood
Strychnos henningsii	umNonono	Natal Teak