User Attitudes to Conservation and Management Options for the Ongoye Forest Reserve, KwaZulu-Natal, South Africa

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PREFACE

The work presented in this thesis is the original work of the author. It has not been presented or submitted anywhere else for any form of degree to any institution. Where use has been made of the work of other authors, such work has been duly acknowledged in the thesis.

This study was conducted in the period from January 2004 to December 2005 through the Forest Research Unit in the School of Biological and Conservation Sciences of the University of KwaZulu-Natal, under the supervision of Professor Mike Lawes.

This thesis has been written as papers to be presented for publication, except for chapter 1 and 5, introduction and conclusion chapters respectively. Chapters (excluding 1 and 5) were written in accordance with the forest ecology and management format.

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ABSTRACT

Indigenous forest resources are valuable to communities situated around them as they provide many different resources for their livelihoods. South Africa has only 0.5% of indigenous forest cover and most forests are surrounded by local communities who depend on them for resources. At Ongoye the forest was widely (91% of households) used for fuelwood. Community members denied harvesting the forest for either building or fencing poles, claiming they bought *Eucalyptus* poles from suppliers in the community. However, the harvesting intensities of pole size stems confirm that the user community does harvest timber from the forest. There is a high demand for fuelwood and pole-size stems are harvested not only for building but are cut and left to dry for later use as fuelwood. Although the harvesting intensity was greater than users were prepared to admit to, harvesting levels are thought to be sustainable. Local communities did not trade in products extracted from the forest. The use of resources was only for subsistence purposes, and therefore, forest resources were only valuable to users with respect to providing support to local livelihoods.

Ensuring the protection and conservation of forest resources is critical for the survival of the user communities that are dependent upon them. Most local communities are not knowledgeable about managing forest resources adjacent to them, and the management of forest resources at Ongoye is currently in the hands of the state and also the influence of the *Inkosi* (local tribal chief). As part of the process of democratization post 1994, the government is devolving the management of natural resources to local communities. Several models of management institutions have been proposed and tested including community forest management (CFM), state forest management (SFM), and participatory forest management (PFM). Current trends are towards participatory management institutions. Using questionnaires, I determined that users preferred PFM over both SFM and CFM. However, the local community was in favour of more state involvement in the PFM than expected. Given a choice between CFM and SFM, the user community was more favourably disposed toward SFM. This was because they viewed CFM as vulnerable to resulting in open access to resources without any control.

The devolution of powers to local communities can create problems in local governance. For most areas surrounding forest resources, traditional authorities are the important 'governing' leaders. In South Africa, events post 1994 have created tensions between democratically elected and hereditary governance institutions. On the one hand democratic institutions are supposed to be created at the local level, and on the other the constitution recognizes the existence of hereditary institutions. There is a power struggle over who the legitimate authority at the local level is between democratically elected councilors and chiefs. At Ongoye, the local chief was very powerful and had strong views on the ownership and control of Ongoye. He had a positive influence on maintaining current low to moderate levels of use of forest resources. However, because there are several dangers associated with concentrating power over management of natural resources in one individual, I recommend that a participatory natural resources management institution be developed that acknowledges the important role of the *Inkosi*,

but also tempers his influence, so that continuity of management principles is maintained should traditional leadership changes hands.

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I'm grateful to *Inkosi* Mzimela who, through his traditional council gave me the permission to administer the questionnaire with the community. In particular I appreciate the assistance offered to me by the secretary to the local traditional council Ms. Matric Mzimela whose invaluable help assisted in identifying two fieldwork assistants, Sbo Mzimela and Xolani Mayise.

This study would have not been possible had it not been of the generous financial support from the National Research Foundation (Indigenous Knowledge Systems) of South Africa, the Sappi-WWF TreeRoutes Partnership, and the Mazda Wildlife Fund for logistical support.

I'm indebted to my two Mothers, Mrs Matshidiso Phadima and Mrs Mmoelo Molatudi for my up bring and for all my achievements in life, and this one in particular. My two Uncles, Mohohlo Molatudi and Teboho Sejake who have been an inspiration in my life and a challenge for me to stay focused and work hard.

Last but not least, I dedicate this to my SASCO community in the Pietermaritzburg campus who have been with me from my first year of study in the University through to the final year of my degree.

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CHAPTER 1

Introduction

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INTRODUCTION

Forest use, value and importance in South Africa

In South Africa, forests are valuable assets to communities as they provide products and services vital for sustaining rural livelihoods. Forests and forest resources are often an important socioeconomic safety-net for large numbers of rural poor (Lawes *et al.* 2004). Although forest resources are extremely important to rural livelihoods in South Africa, indigenous forests cover only 0.5% (Owen & van der Zel 2000) of the total land surface area, and consequently the harvesting pressure on forests is considerable (Lawes *et al.* 2004). The needs of rural communities and the harvesting of forest resources are thus often in conflict with conservation objectives. Managing indigenous forest reserves in South Africa is thus a significant challenge.

Conserving indigenous forests is important for both socio-economic and environmental reasons (Low & Rebelo 1996; DWAF [TNFF] 2002). From a socio-economic point of view, the contribution of forests products and services to food security and the basic well being of rural households is particularly significant among poor households in communal areas (Nhira *et al.* 1998). As sources for both subsistence and marketed products, forests provide crafting material, medicine, fuel for heating and cooking, fencing and building material. The role of forests as a safety-net for villagers in times of financial hardship is clear.

Indigenous forests also provide the main source of cooking energy for communities who live around them (Badola 1998; Hendry 1998; Nomtshongwana 1999; Gibson *et al.* 2000; Obiri & Lawes 2002; Bauer 2003). On average, fuel wood consumption by communities living near forests areas is approximately 4500 kg per household per annum, which converts to a cost to households of approximately R450,00 per annum (Lawes *et al.* 2004). Forests also provide timber for a variety of handcrafts and household items, such as sticks, carvings, grinding mortars, spoons, pipes and bowls (Lawes *et al.* 2004). These wooden products are either sold at urban markets or tourist areas or used within the household (Nomtshongwana 1999). Forests are also sources

of many non-timber forest products (NTFPs). For example, traditional medicines obtained from forest play a vital role in the health-care of rural communities in South Africa (Vermeulen 1996; Grundy *et al.* 2002; Nomtshongwana 1999; Badola 1998; Hendry 1998; Lawes *et al.* 2004; Mander 1998) with the monthly collection of materials for traditional healers being valued at R300.00 - R400.00 per household [averaged at 6 people] (Mander 1998). In KwaZulu-Natal alone, more than 4000 tonnes of medicinal plant material traded in a year had an estimated value of R60 million in 1998, which was equivalent in value to about one third of the annual maize harvest in the province (Mander 1998).

Forests and forest reserves are also used for grazing livestock and gathering thatching grass to sell or use in households (Hendry 1998). Forests can also be a source of bush-meat, fish (forest streams), fruits, nuts and berries, mushrooms and roots that provide protein, vitamins, carbohydrates and fats (Heermans & Otto 1999) and they also provide mud for building (Wynter 1993). In addition to the above tangible benefits, forests are also important spiritual components of traditional Zulu life, as well as harboring considerable potential economic value which could be released should eco-tourism ventures be developed.

From an environmental point of view, indigenous forests are often located on watershed, providing clean water to downstream communities (Nomtshongwana 1999). Apart from maintaining water quality, forests serve as wind breaks, reduce soil erosion and the loss of soil fertility, promotes ecotourism, and contribute to air quality and carbon sequestration (Horn 2000) – these are all values that are not easily measured but are considerable in terms of environmental health. In addition, indigenous forests are also important for biodiversity conservation reasons as they are the most species rich per unit area habitat in South Africa (Lawes *et al.* 2004). The Ongoye forest, in particular, is a biodiversity hotspot and contains rare and often locally endemic species, such as the *Paraxerus palliatus* (Ongoye Red Squirrel) (Moll 1992) and *Stactolaema olivacea* (Woodwards' Barbet) (Kramer 2004).

The above are compelling reasons for managing indigenous forest. However, there are several management systems that could be adopted. At issue is the need to conserve the limited forest resources and secure regeneration, while negotiating with

surrounding communities to develop acceptable and livelihood sensitive ways of achieving conservation goals. Reconciling conservation goals with community desires requires collaboration between all stakeholders (government, communities, and other interested parties). With the latter (need for collaboration between stakeholders) in mind the Department of Water Affairs and Forestry (DWAF) has through the directorate: Indigenous Forest Management adopted and endorsed programme framework draft for the implementation of participatory forest management (DWAF, D:IFM 2000). This study investigated the challenges confronting forest management and conservation in South Africa, using the situation at the Ongoye Forest as a case study.

History of the Ongoye forest reserve and the surrounding Zulu people

The extraction of resources from Ongoye forest dates back to the era of the great Zulu kings. During the late nineteenth century, King Cetshwayo gave large tracts of land to John Dunn (his European advisor). Dunn's extraction of forest resources was his main source of living (Walker 1961). The late 19th century era ushered in new changes. Initially, the protection of forest resources had been a priority in Zulu tradition, with hunting being reserved for the king, and extraction of timber within Zulu controlled areas being restricted to a moderate level. This situation changed in the 1890s as the demand for mine props increased (Hendry 1998) and the Ngoye Forest Company was granted sole rights by the Natal Government to work the forest. It is estimated that as a result of this demand, by 1919 when this company ceased operation, 900 000 cubic feet of timber, mostly pole-sized stems for mine props, was removed (Anon 1983).

In KwaZulu-Natal, community-based forest management planning is socially complicated. There is often a strong traditional adherence to *iZinkosi* and *iZinduna* (traditional leadership) necessitating consultation with these traditional structures in developing partnerships with local communities. The Ongoye forest is located in a ward with a particularly powerful traditional leader, *Inkosi* Mzimela, who is also chairman of the National House of Traditional Leaders. He is known to have strong views regarding the ownership and use of Ongoye forest (Hendry 1998; Lewis *et al.* 1999). The question of who owns the Ongoye forest (i.e., government or Inkosi) has

not been resolved, presenting the management of the Ongoye forest with a difficult future problem to overcome.

Challenges facing forest management institutions in South Africa

Recent forest management plans (i.e. State Forest Management & Participatory Forest Management) promote the sustainable use of natural resources by communities surrounding such resources (Sah & Heinen 2001; Oribi & Lawes 2002; Bauer 2003). These management plans have been introduced to conserve forest biodiversity and resources and ensure the availability of resources to future users. Often times, the conservation of forest biodiversity and resources to ensure future use requires a reduction in resource use. Numerous studies reveal that local communities are seldom willing to reduce their use of forest resources solely to conserve them (Newmark *et al.* 1993; Badola 1998; Infield & Namara 2001; Robertson & Lawes 2005) and furthermore, where communities participate in forest resource management this does not always result in a significant reduction in resource use (Weber 1987; Holmes 2003). In most cases the pivotal issue about which the success of forest management swings is the right of access to resources by users (Grundy & Michell 2004; Robertson & Lawes 2005). Unlike historical users who protected forest resources (Sikhitha 1999; Walters 2004) contemporary communities tend to exploit resources in a manner inconsistent with the conservation and the sustainable use of forest resources (Badola 1998; Grundy et al. 2002). However, another argument for dissimilarities in the exploitation of resources between historical users and contemporary users is that historical users probably did not actively manage resources.

Local 'custodians' of forests seldom reinvest in nature or exercise self-restraint in the use of scarce communal resources, even when conservation plans provide immediate and tangible benefits (Alvard 1993; Milner-Gulland *et al.* 2003). Overexploitation is more often than not a result of the lack of direct benefit to the community from conservation (Badola 1998; Gibson *et al.* 2000; Infield & Namara 2001; Sah & Heinen 2001; Obiri & Lawes 2002). In this thesis this trend will be investigated by establishing the links between conservation attitudes and the use of resources, and also the extent to which communities are dependent on forest resources for their

livelihoods. Therefore, to conserve natural resources, the attitudes of local people towards conservation must be established, taking into account their needs and aspirations (Fiallo & Jacobson 1995).

Local authorities, in particular traditional authorities, are important institutions within the community. They hold the potential to positively or negatively influence the management of forest resources (Shackleton *et al.* 2002; Grundy & Michell 2004; Obiri & Lawes 2002). Their degree of influence depends on the strength of their authority. In Zambia and Lesotho, chiefs asserted uneven power (unfair and biased) as chairpersons of sub-district natural resource management (NRM) structures and diverted some community-based natural resource management benefits to strengthen their own power base (Shackleton *et al.* 2002). Prior to 1994, some traditional leaders were perceived as puppets of the apartheid state and therefore governing against the people's will (Grundy *et al.* 2002). The post 1994 democratic era ushered in a system where Transitional Rural Councils paved a way for local government authorities. But in many areas, and in rural Ongoye, traditional leaders still effectively hold sway over many aspects of community life. It is therefore critically important to consult the local authorities, particularly traditional leaders to get their support for the sustainable use of forest resources.

Problem Statement

The reality of the small area of indigenous forest cover in South Africa, and its socio-economic importance to rural communities, has not stopped the destructive and unsustainable use of forests by communities and industry alike. The major concern is the long-term consequences of overexploitation and fragmentation of these limited indigenous forests to biodiversity and rural livelihoods. The lack of clear management structures to protect forest, as well as the rights of access of rural communities to forest-based goods and services, has exacerbated damage to, and the loss of, forest in the region. Yet another problem is the lack of and/or under-development of potential income-generating forest-based ventures. In deed, the issue of whether forests can provide income-generating ventures to users deserves careful investigation. National policies and the government Act (National Forest Act 1998) recognize tension between conservation and management objectives. In acknowledging this tension, the

government has suggested a compromise, which they hope will reduce the pressure on forests. They have suggested that developing a licensing agreement (National Forests Act 1998, sections 22-28) with local communities may be a way forward. These changes may include licensing for the establishment and management of plantations, the felling of trees and removal of timber; the cutting, disturbance, damage or destruction of any other forest produce (NFA 1998, section 23 (1) (a) (b) (c)). However the translation of government policy into programs is yet to be experienced by the communities. This problem makes for an important case to investigate. Furthermore,

- There is a need to legitimize the provision of livelihood needs from the Ongoye forest. This study examines these livelihood needs.
- Although studies have been conducted on local people's attitudes toward conserving forest resources (Infield 1988; Nomtshongwana 1999; Fiallo & Jacobson 1995; Newmark *et al.* 1993; Robertson & Lawes 2005; Obiri & Lawes 2002; Appiah 2001) every situation is unique, and there are different combinations of driving forces behind the use and management practices for each forest. By examining the situation at the Ongoye forest I confirm what issues are specifically, as opposed to generally, applicable to community-based forest management.
- From an environmental point of view, the Ongoye forest needs to be conserved more than most forests to ensure the survival of endemic species and the unique forest type.
- It is critically important for both traditional authorities and Ezemvelo Kwazulu-Natal Wildlife to cooperate to manage the forest. It is hoped that this study will provide the basis for useful management plans that will enable these two institutions to work together.
- There is a need to identify user requirements and prerequisites for successful inclusion of the local communities in decision-making and the management of the forest.
- As much as it is essential to involve local communities, the process of involving them needs to be carefully considered and the community themselves consulted on the extent to which they wish to be involved in

management. This study will investigate community perceptions and desire to be involved in forest management.

Objectives of the study

The objectives of this research are to investigate:

(1) villager understanding and support for conservation practices and conservation as a concept;
(2) attitudes of the local community toward ownership, access, value of the resource base to livelihoods, and the management of the forest;
(3) the role and influence of local authorities in managing, accessing and using the forest;
(4) user needs, desires and preferences and the extent to which forest resources fulfill these;
(5) the community's knowledge of conservation and management systems and their preferred system in both cases;
(6) villager understanding of new forest policies and how these affect them; and
(7) identify prerequisites for community participation in new management strategies

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CHAPTER 2

User perceptions of conservation and management options at the Ongoye Forest Reserve

SUMMARY

Recent forest management policies in South Africa promote the sustainable use of natural resources in collaboration with communities surrounding forest resources. To date, studies reveal that local communities are seldom willing to reduce use of forest resources solely for conservation purposes, and furthermore, where communities demonstrate an understanding of the importance of conserving resources, this does not always result in significant reduction in resource exploitation. This study investigates a local user community's understanding and perceptions of various forest management options for conserving and sustaining resources in the Ongoye Forest Reserve. A questionnaire survey of 103 households (16.8%) was used to examine local user opinions. The local community was unaware of new participatory forest management options, as well as recent government policies to include user communities in a forest management system by devolving responsibility to users for many forest management functions. Nevertheless, of the three main management systems currently applied in South Africa, users chose participatory forest management (PFM - 77%) over community (CFM - 17%) and state forest management (SFM - 6%). User choice of PFM (participation with the state) was motivated by the benefits, in terms of management skills, that arise from cooperating with the state, and the fear that without state involvement, both the management and condition of resources would inevitably deteriorate. The concept of conserving resources was generally supported by users (85%) although considered an idealistic goal. For example, users were strongly of the opinion that it was inappropriate to limit legal resource use (i.e., no permit required) to the collection of only dead wood from the forest. There was an obvious conflict of interest between state mediated conservation goals and the desires and needs of the user community. The user community was concerned that the strict implementation of current conservation goals would significantly reduce their

ability to maintain livelihoods. Thus, while communities may recognise PFM, and the devolution of responsibility for managing a forest, as empowering and sustainable, they nevertheless identify few if any tangible incentives for full participation in conservation and management of forest resources. Conservation goals must be sensitive to local users needs. There is a need for income-generating alternatives to forest resources to offset the harvesting pressure exerted on them. Active participation of local communities in identifying alternatives to forest resources is required to ensure ownership of these alternatives and the process of obtaining them. Finally, this study suggests that PFM is likely to succeed if implemented at Ongoye Forest Reserve.

KEYWORDS: Participatory forest management; forest policy; conservation attitudes; community forest management; state forest management; user perceptions; sustainable livelihoods; biodiversity conservation.

INTRODUCTION

Sustainable forest management strategies have been the preoccupation of many studies of forest management in the past two decades (Infield 1988; Kvist *et al.* 1995; Fiallo & Jackson 1995; Noss 1997; Appiah 2001; Robertson & Lawes 2005). The preparation of new forest policies and management institutions in South Africa began in 1995, when the state opted to withdraw from the ownership and management of production forests under its control, and assumed a smaller but vital role as a regulator rather than a participant in the forestry industry (Mayers *et al.* 2001). Essentially, the state's new role (post-1994) was to ensure that forestry responded to the commitment by government to meeting the basic needs of rural people and helped to alleviate poverty within the context of promoting sustainable development (Mayers *et al.* 2001). New management regimes founded on community-based natural resources management systems (CBNRM) accompanied the latter changes by the state. Under CBNRM communities were encouraged to take an active role in the management of indigenous forests (DWAF: PFM-IFM 2003) in which they would partly or entirely determine the rules of access,

control and use of the forest. Initially, these principles were defined as community forestry management (CFM) by the state.

In South Africa Community Forest Management (CFM) currently refers to the community centered and controlled approach to managing forest. All other interventions, be they through the appointment of a manager or the involvement of the government or any other agent, are at the sole discretion of the community (National Forest Act 1998). CFM stems from the government's desire since 1994 to devolve forest management powers to communities, stakeholder groups and individuals. A second strategy was to only partly devolve management authority to communities through community participation with the state and other stakeholders in forest management. Under this, so called, Participatory Forest Management (PFM), each stakeholder has an equal stake in the process and seeks to reduce (but not eliminate) state control. PFM aimed to integrate planning, research, and decision making into a comprehensive system with the combined participation of the state and the local communities (Slocombe 1993; Hobley 1996; Neil 2000; Wily 2001; Bass 2001). It is currently the key process chosen to drive the management of South African indigenous forests (National Forests Act 1998). The strategy challenges the view that forest users are necessarily destructive of the environment while the state is merely the custodian thereof (Grundy & Michell 2004). The state had previously held both the ownership and management rights of forests through State forest management (SFM) processes. SFM is characterized by a centralized, authoritarian structure. It is a top down approach to management and decision making often excluded local people and other stakeholders (Horn 2002) and was predominantly rooted in the principles of protectionism as opposed to conservation. A typical example of this system was the approach used by the Department of Water Affairs and Forestry (through SAFCOL) during the period before 1994.

Recent studies have demonstrated that regardless of state initiatives to devolve management powers to communities, users may not support community forest management *per se* in South Africa (Sikhitha 1999; Obiri & Lawes 2002; Robertson & Lawes 2005). In fact, joint or participatory forest management is widely preferred over

strictly community based management institutions (Sikhitha 1999; Appiah 2001; Grundy *et al.* 2002; Grundy & Michell 2004; Robertson & Lawes 2005). One of the main reasons participatory forest management systems may be preferred over community forest management is the difficulty communities experience in controlling overexploitation of forest resources on their own (Grundy *et al.* 2002). As a result communities may regard the state as better placed to manage resources than the local community (Obiri & Lawes 2002; Robertson & Lawes 2005). Furthermore, the failure by the state to adequately transfer rights of access and property rights to forest users makes the implementation of community management difficult (Robertson & Lawes 2005). The net result of the latter is that forests are neither adequately managed by the state or the communities, thereby exposing forests to overexploitation by communities. Weak state involvement can have dire consequences. For example, in Indonesia, widespread abuses of the laws and other administrative regulations on forests by certain companies and individuals were covertly supported by local government and military officials, causing loss of faith in the capacity of the state to manage forests (McCathy 2000). In India, the presence of state forest staff was insufficient to prevent illegal use of forest resources. Civil disobedience and the sociopolitical culture of communities, made it impossible for the Indian forestry department to enforce property rights (Saxena 2001). In addition, in Africa, post-nationalist suspicion about the motives for colonial protectionism of forests has done much to undermine the implementation of participatory forest management institutions (Anderson & Grove 1987). Furthermore, post-colonial African governments have often naively introduced euro-centric policies, which while appropriate for first-world situations are inappropriate for local conditions (Anderson & Grove 1987). As a general rule, these early attempts at forest management have lacked the support of local communities.

Participatory Forest Management, also referred to as Joint forest management (JFM) or shared management, recognizes user communities as those who are mostly dependent on forest resources, and seeks to secure their co-operation in the usage and management of forest resources (Wily 2001). In PFM, the special role of local forest resources in the economic life of the rural poor is recognized (Kumar 2002) and responsibility for

managing these forest resources is distributed among stakeholders. Given the general lack of support for community forest management over state management (Horn 2002; Obiri & Lawes 2002; Robertson & Lawes 2005), participatory forest management is set to become the most popular of the three management strategies and is increasingly regarded as the way forward in South Africa (Sikhitha 1999; Gibson *et al.* 2000; Horn 2000; Mjwara *et al.* 2000; Adams & Hulme 2001; Appiah 2001; Horn 2002).

South Africa's National Forest Act of 1998 promotes the principles of sustainable forest management. The Department of Water Affairs and Forestry (DWAF) has made a clear commitment to PFM by developing a national strategy (strategic plan [SP]) under the Directorate – Indigenous Forest Management. The plan seeks to conserve biodiversity and contribute to the economic, social and spiritual upliftment of South Africa's people, with a special emphasis on poor rural communities (DWAF [SP-2001-2005] 2000). The strategic plan includes the identification of strategic partners, education and awareness, development of community public and private partnership and strengthening (empowering) local community structures (DWAF 2002 & 2003). Because of the lack of local support for forest management systems other than PFM, and the government's support for PFM, which is in line with the global trend, understanding PFM and the challenges of implementing PFM has become critically important for meaningful support to be given to the future of forest management in South Africa.

However, to date, there have been few successful PFM projects in South Africa (Obiri & Lawes 2002; Grundy *et al.* 2002; Robertson & Lawes 2005). The only successful achievements of PFM in South Africa are related to the processes of establishing structures for the implementation of PFM: (1) establishment of PFM structures at state department level; (2) the development and implementation of resource management agreements; and (3) improved linkages between forest development and local economic development (Horn 2003). In almost all pilot PFM schemes in South Africa the long-term conservation goals have been marginalized by the immediate need for focus on social issues, particularly short-term direct economic benefit (Horn 2000; 2002; 2003), land restitution (Grundy *et al.* 2002) and the related transfer of rights and authority to users (Robertson & Lawes 2005). For example, at Dwesa-Cwebe Forest Reserve, negotiations

between the state and user communities over five years, largely over land and property rights, yielded little real progress in terms of the implementation of PFM (Grundy *et al.* 2002).

Compounding the South African situation is local communities' interpretation of democratic rights. With the change to democracy in 1994 came heightened expectations over social upliftment through job creation and the open use of previously denied forest resources (Horn 2000; Grundy & Michell 2004). Expectations of an immediate economic boom were not realized and there were few short-term tangible benefits to communities (Grundy & Michell 2004). In some cases forest resources were overexploited in the belief that this was a democratic right (Grundy *et al.* 2002; Twine 2004). However, even where communities have received tangible benefits from PFM, the global trend suggests that this does not encourage communities to reinvest in nature or curb their use of scarce resources (Alvard 1993; Milner-Gulland *et al.* 2003). In addition, current approaches to natural forest management are directly derived from a broader national policy, and as a result compromise the complex local implementation of participatory forest management (Horn 2000; 2002), which often requires a case-by-case approach (Clarke & Grundy 2004). Each local forest management initiative presents a unique situation that requires careful analysis and planning (Horn 2000; Clarke & Grundy 2004).

Finally, in South Africa, the issue of institutional capacity to coordinate the proper and effective implementation of participatory forest management remains a challenge (O'Riordan *et al.* 2000; Horn 2000). Participatory initiatives have to date proved to be most successful in situations where: (1) the goals of the process are clear and derived through participation and all stakeholders have positive attitudes toward both conservation and management of the forest (Grumbine 1994; Jacobsen 1995; Bauer 2003; Christensen 2004; Appiah 2001; Robertson & Lawes 2005); (2) users have a high dependency on forests (Gibson *et al.* 2000); (3) there is strong traditional leadership (Obiri & Lawes 2002; Obiri & Lawes 2004); and either (4) natural resources are sufficient and attract economic benefits; or (5) there is a perception of forest scarcity or outside threat (Poffenberger & Singh 1998; Sarin 1998; Twine 2004).

This study identifies the management option (among three management systems) preferred by communities adjacent to the Ongoye forest, and discusses the appropriateness of such a choice in the context of the social challenges presented by the needs of the rural community and evolving policy development in South Africa. The willingness of users to participate in the management of forests, resulting from recent management regimes introduced by government, and in particular participatory forest management, is examined. Stakeholders (including Ezemvelo KwaZulu-Natal Wildlife [EKZNW], community, local authority) are identified and their relations with regard to interaction and decision-making about forest management are also investigated. The primary objectives of the study are to determine: (1) villager understanding and support for conservation practices and conservation as a concept; (2) the community's knowledge of conservation and forest management systems and their preferred system in both cases; and (3) identify socio-economic prerequisites for community participation in new management strategies.

METHODS

Study site and the stakeholders

The Ongoye forest is located in KwaZulu-Natal province (28^0 48'-28^0 53'S, 31^0 38'- 31^0 46'E) in the uMlalazi Municipality, about 10km northwest of Mtunzini and 24km east of Eshowe at 300-500m a.s.l (see figure 1). The forest covers a low massif comprising syenitic granite basement forming the Ongoye range of hills. The forest receives less annual rainfall (800-1100mm) than the coastal town of Mtunzini (1400-1700mm). Maximum temperatures (37^0C) occur during January and February with minimum temperatures (~8^0C) occurring in May, June and July (Schulze 1997). The prevailing winds are southwesterly and northeasterly. Land breezes occur during the winter months (Lewis *et al.* 1999).

The forest is classified as a coastal scarp forest (Pooley 2003; Lawes *et al.* 2004). Ongoye Forest Reserve (3906 ha) comprises 2830 ha of indigenous high forest covering low hills,

with granite outcrops and open grassy glades. It is home to rare and endemic animal species such as *Paraxerus palliates* (red squirrel), *Stactolaema olivacea* (Woodward's barbet), *Phyllastrephus flavostriatus* (yellow-streaked bulbul) and *Papilio nireus* (green butterfly). It was also home to the giant *Encephalartis woodii* (Wood's Cycad), extinct in the wild since the early 1900s. Unusual trees found here are *Millettia sutherlandii*, *Chionanthus peglerae*, *Alchornea hirtella, Atalaya natalensis*, *Garcinia gerrardii*, *Syzygium gerrardii* and *Ficus bizanae* (Pooley 2003).

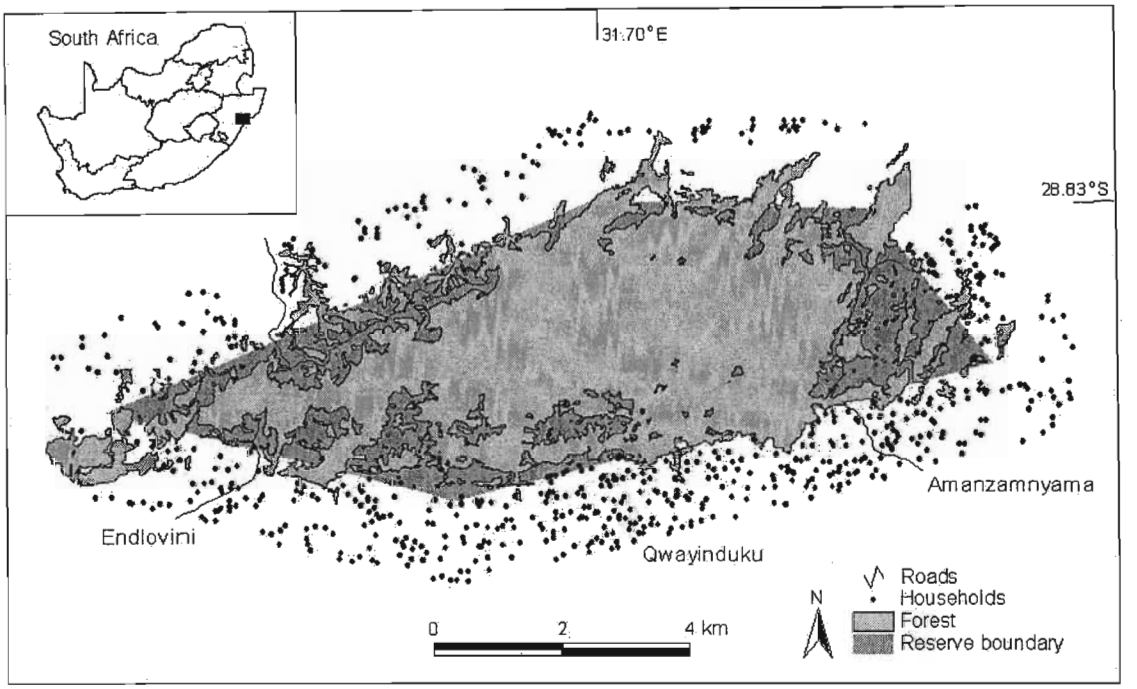


Figure 2.1. Map of the study area (Ongoye Forest) in relation to South Africa

In this study the user community was defined as the Zulu people living within a 2 km distance of the forest. The area of study included 5 settlements including Qwayinduku, Manyameni, Endlovini, Noshungu, Gugushe, and Amanzamnyama, with a combined population of approximately 616 households and 8455 individuals. Average household size was 11.88 ± 10.0 individuals (mean ± 1 SD; n = 103 households). Because of the size and close proximity of these settlements to one another, they were grouped into three discrete areas for the purposes of analysis, with Manyameni, Noshungu and Gugushe falling under Endlovini, and Amanzamnyama and Qwayinduku standing alone. All these

settlements fall under a single tribal authority (*Inkosi* [chief] Mzimela) in a single ward (Ward 26, uMlalazi municipality). Population density in the uMlalazi municipality and particularly in areas surrounding the forest averages of 60 persons km^{-2}. High population growth rates, which were 4.2% from 1980-1991, and unemployment (70% in 1995) have given rise to an economically depressed and poor population. More recently (1999 to 2001) unemployment rate in uMlalazi municipality has been determined at 40.8% and the population has declined by 12.47% (Statistics South Africa 2003).Future ecotourism development of the Ongoye Forest Reserve has a potentially important role to play in addressing local economic development (Lewis *et al.* 1999).

In KwaZulu-Natal, community-based forest management planning is socially complicated. There is often a strong traditional adherence to *iZinkosi* and *iZinduna* (traditional leadership) necessitating consultation with these traditional structures in developing partnerships with local communities. The Ongoye forest is located in a ward with a particularly powerful traditional leader, *Inkosi* Mzimela, who is also chairman of the National House of Traditional Leaders. He is known to have strong views regarding the ownership and use of Ongoye forest (Hendry 1998; Lewis *et al.* 1999). The question of who owns the Ongoye forest (i.e. the state or *Inkosi*) has not been resolved, presenting the management of the Ongoye forest with a difficult future problem to overcome.

Questionnaire and survey design

The study was conducted in the months between April and November 2004. Before conducting the survey the local authority (*Inkosi* Mzimela) was approached for permission to do so. The questionnaire design was based on the structure of other studies conducted on user conservation and management attitudes (including particularly those of Henry 1998; Nomtshongwana 1999; Obiri & Lawes 2002; Robertson & Lawes 2005). The following themes were central to the structure of the questionnaire:

- the demography of the user community, including respondent's age, gender, level of education, period of stay in the area, distance from the forest, income sources, and household size;

- user perceptions of the environmental impact of forest use, and socio-economic prerequisites for their participation in forest management;
- stakeholder (EKZNW, users, local authority) interaction and their respective objectives and perceptions of the management of Ongoye forest;
- user perception and preference of forest ownership, access and law enforcement, and forest management systems;
- the nature and extent of forest use by outsiders; and
- user's willingness to accept alternatives to forest products and use, and alternative management options.

The structure of the questionnaire was such that most questions were closed questions, requiring the respondent to judge opinions according to a symmetric five point Likert scale i.e. 1 = strongly agree to 5 = strongly disagree, with a central neutral point (Likert 1974). Other questions were based on a binomial, yes or no, or multinomial response, for example, descriptions of which forest products were used, or were continuous variables such as the respondents' age, replacement value of a forest product or the discrete value such as number of livestock owned.

Individuals from 103 households (16% of households) were interviewed (71 at Endlovini, 16 at Amanzamnyama, and 16 at Qwayinduku). Each questionnaire took 50 minutes to administer and all questionnaires were conducted by the same interviewer (LJP) with the assistance of an interpreter. The questionnaire survey was conducted in an informal atmosphere and addressed to all members of the household, but focussed on the answers provided by a key informant among those present. This was usually that individual most willing to engage in dialogue with us and often was a senior household member. However, senior members of the household were not always present and the age and gender of the key informant were recorded to check for any bias later. If members of a household discussed the answer to a question, we allowed the key informant to represent the consensus view rather than drawing our own conclusions from the discussion.
Usually the household head or their representative was interviewed. Sometimes the family insisted on having younger members represent the household. The latter decision

was motivated by the assumption that questions from a 'young university student' (interviewer) would be difficult and required a more knowledgeable or better-educated younger respondent.

Before administering the questionnaire on management options, the three management systems or options were discussed with household members. In this way user experience of one or other management system did not constrain or overshadow their meaningful comparative evaluation of the systems. Prior discussions were also necessary in each and every household to establish a consistent base point of understanding about the reasons for the interview.

Statistical Analysis

The perceptions and attitudes of respondents to each question on forest management and conservation were determined using the most commonly-selected response (i.e., the modal class) from a frequency distribution of responses on the Likert scale. Differences in opinion or choice were for the most part tested using the Chi-square goodness-of-fit statistic. Data were analyzed using the Statistical Package for the Social Sciences (SPSS 2002) Version 11.0 (ter Braak & Šmilauer 2002).

The data were initially explored using correspondence analysis (CA). All binary questions, as well as those based on the Likert scale, were included in one of two data matrices relating to management perceptions or conservation attitudes, respectively. These data matrices were balanced by including the reciprocal value for all questions in additional columns (Greenacre 1993). Demographic data (e.g., age, gender, household size), as well as socio-economic data (income per month, number of income-generating activities per individual, education) and the distance of the household from the forest, were ranked on a scale of 1 to 5 and included in the data matrices. The relative importance of questions or variables was judged against the position of respondents in the ordination attribute plot using the biplot rule (Lepš & Šmilauer 2003). Variables with a large value for weight X variance and a high percentage fit for the first two axes were

regarded as having influence, and only these were plotted as a biplot (arrows) on sample scores (ter Braak & Šmilauer 2002).

Logistic regression was used to examine the putative influence of demographic and socio-economic variables on conservation attitudes. Three binomial questions about attitudes towards conservation and management options were used as the dependent variable in separate regressions. The three questions were (1) should the forest be conserved to prevent overuse by the community, (2) is PFM the best management system for achieving conservation goals, and (3) is conservation of forest resources important for securing rural livelihoods. In addition, I used multinomial logistic regression to further determine whether demographic and socio-economic variables explained management attitudes. The dependent variable in this analysis was a multinomial question (i.e., not based on the Likert scale) about the choice of preferred management system (SFM, CFM, PFM, open access, other).

RESULTS

User demography and socio-economic status

There was no significant difference in gender distribution of respondents ($\chi^2 = 3.505$, $df = 1$, $p = 0.061$). Among the key respondents, 40.8% were male, 59.2% were female and the mean age was 36.9 years. The mean household size was 11.4 persons and varied significantly from household to household 11.88 ± 10.0 individuals (mean ± 1 SD, $t = 11.941$, $p < 0.0001$). About 76% (n=79) of households had been resident in the area for >30 years. Only 16.5% of households had been resident near the Ongoye forest for less than 30 years. With over half (51.5%) the community unemployed, almost all (83.5%) households were dependent on government grants, supplemented by their small vegetable gardens. An equal number (83.5%) of households grew crops for subsistence purposes. Most of the key respondents (91.2%; n=94) lived within 2 km of the forest, and on average respondents' households were 0.5 km from the forest. A quarter of the respondents (25%; n=26) had not received any formal education, and almost the same number (24.2%; n=25) had only a primary school education. A third (32%; n=33) of

respondents had completed grade 10 (Standard 8) at secondary school, and only (16.5%; n=17) had matriculated. Only two respondents had post-matric qualifications. The community did not have access to electricity and most households were dependent on fuel wood for energy.

Management Opinions

For most respondents (68.9%) the management of the forest meant securing the community's access to forest resources. Furthermore, a significant number of respondents (79.6%, $\chi^2 = 121.320$, $df = 4$, $p < 0.0001$) thought that the management of forest resources should be about establishing equitable benefits from harvesting. However, half of the respondents (52.4%) felt that management restricted their access to resources. Most respondents (82.5%) recognized that management is a tool for sustaining future yields from forest resources, but this view was based in the belief that management is about ensuring benefits for future users (86.4%). Both *Inkosi* and the EKZNW (76%) were acknowledged as the current managers of the forest. Respondents held the view that under current management, rules were nearly always (77%) enforced under this dual system.

More respondents than expected by chance preferred PFM (74%; $\chi^2 = 207.37$, $df = 4$, $p < 0.0001$) from among the forest management options (PFM, CFM [18%], SFM [6%], open access [0%], & others [0%]). In addition, they rejected the suggestion that the forest should not be managed at all and that there should be open and unrestricted access for everyone (71%). These data indicate that, regardless that forest management restricts villagers from using the forest, users nevertheless acknowledge the need to manage the forest to the benefit of future generations. However, respondents indicated a strong desire to have more say in management (91.5%) and were willing to consider alternative methods of forest management (96%).

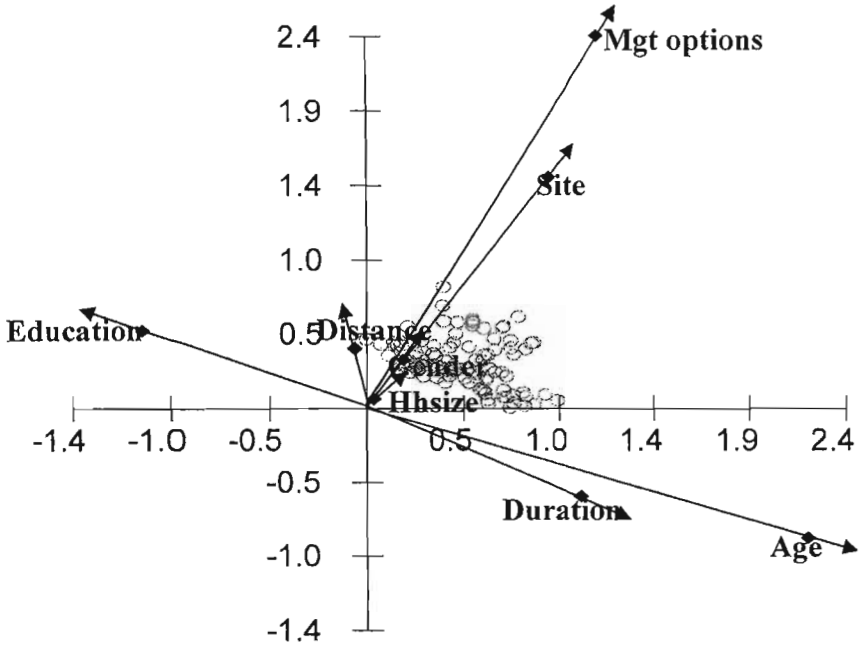
Correspondence analysis revealed that age, education, period of stay (duration), gender of respondents, and distance from the forest were not important in the choice of

management option by respondents, but that settlement site was (Fig. 2.2a). Multinomial logistic regression confirmed the general importance of settlement site of the respondent in choice of management option (Table 2.1), although the final model fit was not significant (Likelihood ratio = 108.11, $\chi^2 = 30.72$, $df = 20$, $p = 0.059$). Overall PFM was popular in all the three sites (Endlovini, Amanzamnyama, and Qwayinduku). Site 2 (Amanzamnyama) villagers did not even give consideration to other management options, and in site 3 (Qwayinduku) PFM was preferred over CFM.

Table 2.1. Multinomial logistic regression of relationships between socioeconomic variables and people's choice of management options (PFM, CFM, SFM). Age = Age of respondents to questionnaire; Household size = the number of people staying in the same household; Duration of stay = the period that a respondent stayed in the community; Distance from forest = Distance from the household to the closest point of the forest; Settlement = the site at which questionnaire was administered (among the three sites); Gender = gender character of the respondent; Education = the education level of respondents (with categories from 1 = no schooling to 4 = post matric qualification).

Effect	-2 Log Likelihood of Reduced Model	Chi-Square	*df*	*p*
Intercept	108.111	.000	0	.
Age of respondent	108.309	.198	2	.906
Household Size	108.864	.753	2	.686
Duration of Stay	109.929	1.818	2	.403
Distance from forest	108.898	.787	2	.675
Settlement	119.931	11.820	4	.019
Gender	113.327	5.216	2	.074
Education	113.264	5.153	6	.524

(a)


Mgt options
Site
Education
Distance
Gender
Hhsize
Duration
Age
2.4
1.9
1.4
1.0
0.5
-0.5
-1.0
-1.4
-1.4
-1.0
-0.5
0.5
1.0
1.4
1.9
2.4

(b)

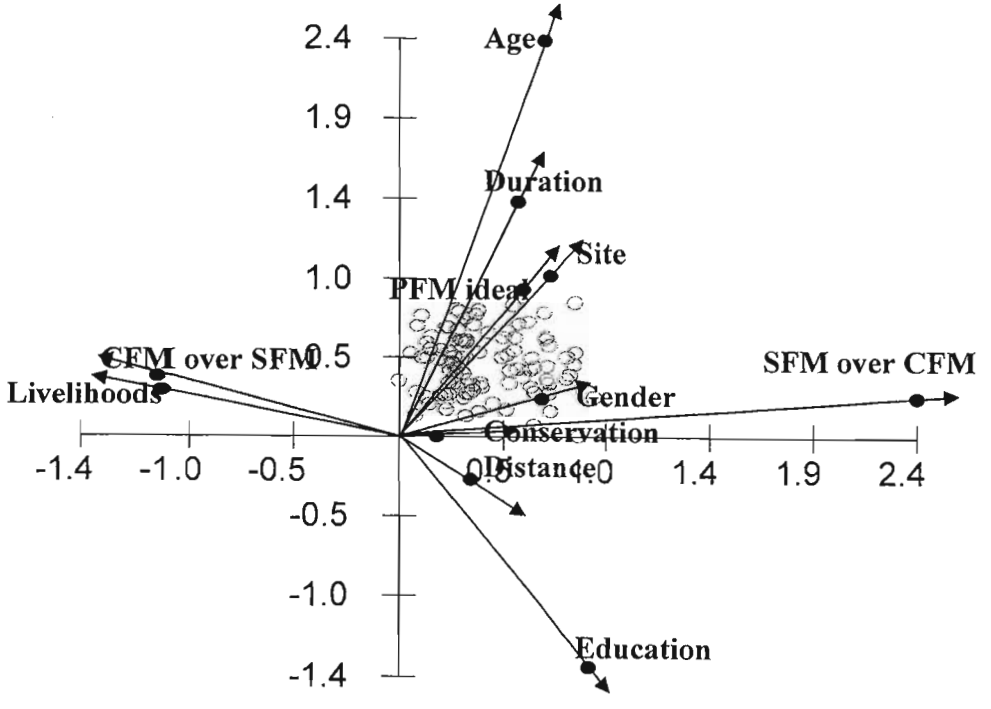

Age
Duration
Site
PFM ideal
CFM over SFM
Livelihoods
SFM over CFM
Gender
Conservation
Distance
Education
2.4
1.9
1.4
1.0
0.5
-0.5
-1.0
-1.4
-1.4
-1.0
-0.5
0.5
1.0
1.4
1.9
2.4

Figure 2.2 *(page 31.)* Correspondence analysis for (a) management variables (eigenvalues: Axis 1 = 0.054, Axis 2 = 0.031; cumulative % variance = 58.3%). and (b) conservation variables (eigenvalues: Axis 1 = 0.054, Axis 2 = 0.037; cumulative % variance = 40.5%). Mgt options = Management options (PFM, SFM, CFM, Open access, others); Site = settlement site where interview was conducted (3 site = Endlovini, Amanzamnyama, Qwayinduku); Education = education level of respondents (from no schooling to respondents with post matric qualifications); Distance = households distance from forest; Gender = gender of respondents; Hhsize = the size of households; Duration = the period respondents stayed in the village; Age = age of respondents; PFM ideal = PFM is the best management system for achieving conservation goals; Conservation = should the forest be conserved to prevent overuse by the community; Livelihoods = Conservation of forest resources is important for securing rural livelihoods; SFM over CFM = forest can be better managed with SFM than CFM; CFM over SFM = forest can be better managed with CFM than SFM.

Through prior discussions with respondents before administering questionnaires, it was established that all members of the community were familiar with CFM. The user community was also familiar with SFM, having experienced the system through the presence of EKZNW, the state conservation and management agency. Because the Chief (*Inkosi*) exerted much influence, through his tribal council, on the management of the forest, users could not say with certainty that the forest was under SFM. Equally so, the fact that the tribal council had immense influence over the management of the forest was not interpreted as CFM because the community was not regularly consulted on the management of the forest. A term "control" was interpreted or understood different from the phrase "management". The difference was that by management, villagers referred to day to day care taking which deals with access and conservation, while control meant the monitoring and law enforcement at the level of traditional/*Inkosi's* council). Hence as much as 50% of the respondents thought that EKZNW and the state controlled the forest, 21% were of the view that because of the tribal council's involvement the forest was under the Chief's control. However because of the confusion, 17% did not know who between the state (including EKZNW) and the Chief was in control of the forest. The rest (12%) of the respondents' view varied among those who thought the control of the forest either resided with the Chief and EKZNW or the state in consultation with the Chief. It was clear that PFM concepts were relatively new to users.

In addition, significantly more respondents than expected by chance (82%, n = 84, χ^2 = 41. 02, df = 1, $p < 0.0001$) were prepared to participate in a licensing agreement with the state for access to forest resources. Respondents showed willingness (67%) to contribute money (if available) or time to the management of the forest. All the above responses strengthen the case for the user community's desire to participate in the management of the forest. Many respondents (58.3%) did not recall any attempt by the state to involve them in the management of the forest. Most of those who claimed to be aware of an agreement between the community and government (84%) were not aware of the details of the contract and where they were, the contracts were difficult to understand. However, many respondents (62%; n = 64) indicated that the essential precondition for participation in forest management was the identification of tangible benefits from participation.

The community was uncertain about who owned the forest, with 40% suggesting that it probably belonged to the state, 23% indicating that they did not know, 18% speculating that it belonged to *Inkosi*, and the rest (19%) suspecting that it belonged to either EKZNW, the community, or God. On who should own the forest, an even number of respondents indicated that it should either be owned by the *Inkosi* (27%), state (24%), or the community (19%) with its own committee independent of the tribal council. Some (17%) respondents did not know (did not have an opinion) who should be the owner, while 4% thought that it should be jointly owned by the Community and the Chief. The rest (9%) of the respondents thought that it should be either owned by the community with the state (3%), God (3%), or the rest (4%) inclusive of all the stakeholders. Regardless of the general perception that there was no negative environmental impact as a result of use (70.9%), respondents were nevertheless strongly in support of the need to protect the forest (85.4%).

Most respondents (75%) thought that if the local community were to manage Ongoye without assistance from the state (EKZNW), permits would be granted for live wood harvesting (91.3%). They further acknowledged that there would be worse control of use (81.6%) of the forest, which they regarded as undesirable. In fact few respondents reluctantly admitted to using the forest, these use were however against the law (poaching). Villagers' viewed EKZNW's management strategy as primarily protecting

the forest against overuse (61.2%). In addition, respondents reported that EKZNW's presence in the forest did dissuade most users (83.5%) from collecting forest resources and had thus far ensured that most users (71%) had reduced their levels of use slightly. As much as the presence of EKZNW dissuaded use, most users (93%) indicated that they had become reliant on the forest only as a source of fuel wood, and that they would stop collecting fuel wood if they had electricity. A significant (67%) number of respondents indicated that they had no contact with the EKZNW Zone officer. Contact between EKZNW and the community was through the invitation of Zone officers to the regular (weekly) tribal council meetings. Furthermore, slightly more than half (57%) of respondents indicated they did not wish to have contact with the Zone officer. Regardless of users' lack of interest in communicating with the Zone officer, most (71%) described their relations with EKZNW as 'good'. This might have been because most forest guards were from the neighbouring settlements. These findings suggest that although respondents were not happy with the presence of forest guards in protecting forest against use, they were generally tolerant of the existing relationship between EKZNW and themselves.

Conservation attitudes

The open-ended question 'what does conservation mean?' was posed to users. Responses fell into five broad categories: (1) minimal or restricted use of resources, (2) sustainable use (use such that a resource lasts forever or regenerates), (3) no wastage of resources, (4) protection (protection of the forest from any sort of use), and (5) did not know or had no opinion. From this coding, most (72.8%) households understood conservation to be the restricted use of a resource. Only 11.7% of respondents' thought that the concept referred to sustainable use, with 10.7% indicating that the concept meant protection against use. In response to a directed question most users (77.7%) suggested that conservation is about the management of forest resources in a way that secures the livelihood of the community.

More respondents than expected by chance (82%, n = 84, $\chi^2 = 247.24$, $df = 4$, $p < 0.0001$) were positively disposed toward the notion of conservation being primarily concerned with the sustainable existence of the forest. A significant percentage (77.7%) of respondents agreed that access should be allowed to the forest only through a permit system. In addition the community (92.2%) was supportive of the view that conservation should secure stocks of resources into the future for everyone to use in a sustainable way. Half (53.4%) of all respondents would not use the indigenous forest less if there were woodlot nearby. Furthermore, respondents strongly rejected (82.5%) the view that only dead wood should be harvested. These results display significant support for conservation among users provided it is not to the detriment of their livelihoods, particularly because woodlots area outside Ongoye lacks many resources that are only derived from the indigenous forest.

Correspondence analysis showed that the level of education, age and gender of respondents, duration of stay in the community and the site (distance in proximity from *Inkosi*'s main homestead) all had influence on respondents' general attitudes to conservation (Fig. 2.2b). In addition, and using the biplot rule (Lepš & Šmilauer 2003) education and age appeared most influential in the choice of management institution for conservation purposes. Axis 1 and Axis 2 of the DCA accounted for 40.52% of variation in demography and socio-economic variables from 103 households in response to questions about conservation (Axis 1 = 0.054; Axis 2 = 0.037) (Figure 2.2).

Binary logistic regression revealed however that only site and distance were the two most important factors influencing conservation attitudes. In all the sites, except at Qwayinduku, PFM was regarded the best management system for achieving conservation goals (Wald statistic = 11.101, $p < 0.001$), while at Amanzamnyama PFM was the only management system considered for achieving the conservation objectives. In Qwayinduku, villagers where not in favour of PFM as the best management system for achieving conservation objectives. On whether the forest should be conserved to prevent overuse by the community, distance was the only important variable that influenced attitudes (Wald statistic = 8.081, $p < 0.004$). Villagers who lived far away from the forest disagreed that it was critical to implement conservation practice while those who lived

nearer to the forest thought that the practice of conservation was critical for sustainable existence of the forest. The final model fit was also significant (likelihood ratio = 74.747, χ^2 = 23.742, df = 10, $p < 0.008$). Lastly, on whether conservation of forest resources is important for securing rural livelihoods, distance was again the only important variable. People who lived closer to the forest thought that conservation of the forest resources was important for securing rural livelihoods, while those who lived far from the forest disagreed with the statement (Wald statistic = 7.013, $p < 0.008$) although the final model fit was not significant (likelihood ratio = 115.860, χ^2 = 17.452, df = 10, $p < 0.065$). In addition, 87.4% of respondents reported that there were no notable harvesting gaps in the forest. More than half of the respondents (65%) were convinced that the rate of resource use over the next five years by the community would not significantly deplete the resource base or alter harvesting practices. Hence most users (71.8%) did not see any need to reduce the use of resources from the Ongoye forest so that their children could use it.

In response to the question on who was better placed to conserve forest resources, the local community (through CFM) or the state authority (through SFM), a significant number of respondents (63%) were of the view that forest would be better conserved if managed by the state authority than by local communities. However most respondents (81%) indicated more support than expected by chance for PFM (χ^2 = 183.94, df = 4, $p <$ 0.0001) as the best management option to ensure forest conservation. These findings, particularly the support for PFM, give recognition and impetus to the need for synergy between management institutions (use) and conservation agencies to ensure the conservation of forest resources. Together these findings demonstrate strong support among users (80%) for PFM as the management system that would best ensure state involvement to the benefit of the community.

DISCUSSION

Users gave overwhelming support to PFM over other forms of forest management including CFM, SFM, and open access. The present management style of Ongoye was

regarded by users as severely limiting livelihood options from the forest and significantly affecting users need to secure access to forest resources. Users further demonstrated their unhappiness over the present management system (under *Inkosi* and EKZNW) by indicating a desire for a new management committee to replace the local traditional council. There was an overwhelming desire by users to partake in the management of the forest. In addition, the concept of conservation was supported by users only in so far as it ensured the survival of those resources that directly benefit users. Villagers claimed that they wanted to avoid depletion of forest resources to a level where their children and grandchildren would be unable to easily obtain traditional medicines and other products from the forest.

Management options and perceptions

Hardin (1968) argued in his widely cited paper on the 'tragedy of the commons', that in a situation where a community/villagers are to share common resources, there will always be a tendency to overexploit the shared resources with little regard to their sustainable existence. Recent studies of forest management strategies in South Africa (Sikhitha 1999; Obiri & Lawes 2002; Robertson & Lawes 2005; this study), have demonstrated little support for exclusive community forest management (CFM) of common resources. In this study, the lack of support for CFM (and also confirmation of Hardin's argument) was related to the concern among users that in the event that the state (EKZNW) left the community to manage the forest, resources would be overexploited and eventually depleted. The latter outcome would be contrary to the community's desire that management should be a tool for sustaining yields of resources for today's users, but also ensuring that future generations benefit too. In addition, resource depletion would have dire consequences for users' as forest resources are important for maintaining rural livelihoods. For example, in the absence of electricity, the forest is the main energy source in the form of fuel wood.

However, as much as users suggested that it was not appropriate for the forest to be managed solely by villagers, they did not support sole management of the forest by the

state (SFM). Similar to studies in Natal and the Eastern Cape in South Africa and Katavi National Park in Western Tanzania, users' main concern with sole state management (SFM) was that extending the present strict application of rules by the state (EKZNW) would severely restrict access (Infield 1988; Holmes 2003; Robertson & Lawes 2005), and like the Turkwel River situation in Kenya, villagers' perceived right to forest resources would be seriously compromised (Stave *et al.* 2001). In many local cases, however, the state is unable to enforce its property rights and this weakens the case for exclusive state forest management (Robertson & Lawes 2005). And in many instances in Africa (Waza National Park in Northern Cameroon, Lake Mburo National Park in Uganda, Gwira-banso in Ghana, and Tukwel River in Kenya) the presence of forest guards/rangers (SFM) did not stop poaching (Bauer 2003; Infield & Namara 2001; Appiah 2001; Stave *et al.* 2001). These perceptions find support in other studies (Shackleton *et al.* 2002; Obiri & Lawes 2002) conducted in South Africa, and it is likely that devolution of responsibility for forest management to communities in South Africa has not been successful so far because of a lack of capacity by the state to either enforce state property rights or transfer rights of access and ownership of forests to users (Lawes *et al.* 2004). Given, inherent problems with both state and community forest management systems (SFM and CFM), it is not surprising that PFM is emerging as the most favorable system for the management of the Ongoye forest and other forests in the region.

In studies conducted in Niger, Mali, Senegal, Burkina Faso, Benin, Chad (Heermans & Otto 1999), Uganda, Kenya, Northern Cameroon, Ghana and Western Tanzania (Appiah 2001; Stave *et al.* 2001; Infield & Namara 2001; Bauer 2003; Holmes 2003) support for PFM has been contingent on local communities benefiting from participation in forest management. These benefits are difficult to realise across a broad user community. Thus, the implementation of PFM programmes are bolstered, but also paradoxically threatened, by the economic incentives offered to communities and may fail if sufficient revenue is not realised from what is to be conserved (Robertson & Lawes 2005). In addition, the success of participatory management institutions is dependent on low transaction costs to users in relation to the benefits they receive (Ostrom 1990). These conditions and requirements aside, in almost all pilot PFM schemes in South Africa, the long-term

conservation goals have been marginalized by the immediate need to concentrate on socio-economic issues, particularly the short-term direct economic benefit (Horn 2000; 2002; 2003). Establishing strong PFM structures at Ongoye forest will be a challenging task as users' needs and desires follow the patterns described above.

The Ongoye forest is rich in flora and fauna that could increase its revenue generating potential, particularly ecotourism ventures, and reinforce economic incentives to the surrounding communities to conserve the forest. The depressed socio-economic state of the user community makes participation in any income-generating activity attractive at this time. However, the latter short-term gain will have to be off-set against the long-term benefits for sustainable forest management. Not withstanding the global trend that even with tangible benefits from PFM, communities seldom reinvest in nature or curb the use of resources (Alvard 1993; Milner-Gulland *et al.* 2003), the local economic opportunities, as well as the dependence by the community on the forest for maintaining livelihoods (at Ongoye), bode well for the participation of the community in forest management.

In studies on participatory forest management in Africa (e.g., Gwira-Banso, Ghana and Toui-Kilibo, Benin), the one common thread attached to successful participatory initiatives was that they often had strong traditional leadership that guaranteed the community's participation and some degree of accountability for their actions (Appiah 2001; Heermans & Otto 1999). Unlike in other local case studies (e.g., Mt Thesiger forests, Obiri & Lawes 2002; iGxalingenwa forest, Robertson & Lawes 2005) the conservation of the Ongoye forest conservation is underpinned by strong traditional (traditional leadership) and cultural practice. While, post-nationalist suspicion about the motives for colonial protectionism of forests has done much to discredit modern practices of conserving natural resources (Anderson & Grove 1987), the conservation of the Ongoye forest dates back to the early days of King Shaka and Mpande, when the forest was preserved as a royal hunting ground (Walker 1961). To this day, the Ongoye forest is still guarded by the *Inkosi*, and the community's commitment to protecting the forest is independently rooted in the cultural and traditional practice of the Zulu nation.

The sociopolitical circumstances of the Ongoye community, particularly with regard to the power of the local authority, are such that it is almost impossible for a member of the community to disobey the *Inkosi* who was widely seen to be working together with EKZNW in managing the forest. If someone was caught harvesting in the forest without the required permit, everyone knew that the consequence of such a transgression meant that they were to appear before the local traditional court, which was often presided to by the *Inkosi*. Thus, in many respects the state's (EKZNW) role in preventing overexploitation and live wood harvesting was made easier by the reverence the community members had for the *Inkosi*. In this context, and because most EKZNW guards were from neighbouring settlements, and in justifying (to villagers) the strict implementation of rules, EKZNW forest guards could claim that they were implementing rules supported by the *Inkosi*. Consequently, the relationship between forest guards, forest zone officer and the community was generally regarded as good. Like in Lake Mburo National Park, in Uganda (Infield & Namara 2001) villagers were of the view that guards were only doing their duty in order to feed their families, and therefore they could not be held responsible for denying villagers access to the forest.

Perhaps because of the power wielded by the *Inkosi* over forest users, most users (71%) indicated a desire that a participatory forest management system be accompanied by a new committee structure to replace the existing local traditional council in managing forest resources on their behalf. Essentially, users preferred that the forest management committee was largely independent of the traditional council. This may be because while the user community respects the current rule of the *Inkosi*, they do so more out of fear than out of having derived a mutually agreeable solution through consultation. The latter finding reinforces the complex nature of developing and implementing forest management systems for the Ongoye forest. While there is no doubt that the *Inkosi* and traditional leadership have aided in the management of the forest, the ongoing role of traditional leaders in the process of forest management will have to be carefully investigated and reviewed (see Chapter 4).

Conservation perceptions

In general, users regarded forest conservation arguments and activities as a means of restricting their use of the forest. This definition differs from the modern definition of conservation where users are not necessarily alienated from the resources, but are involved through participatory or inclusive initiatives in deciding on the conservation of resources (Infield & Adams 1999). Similar to most studies in Africa (South Africa, Infield 1988; Cameroon, Bauer 2003 & Tanzania, Newmark *et al.* 1993) and elsewhere in the world (Indonesia, Walpole & Goodwin 2001; India, Maharana *et al.* 2000 & Lower Himalayas, Badola 1998) the concept of conservation was supported by users. Users reasons for supporting the conservation of the Ongoye forest varied considerably from user to user. Most users supported conservation on condition that it would not impede their access to resources, which was regarded as critical for sustaining livelihoods. Other members of the community supported conservation as long as they directly benefited from some sustainable form of use. The benefit would reportedly arise from tourism projects at Ongoye.

Ecotourism has provided a powerful means of motivating for forest conservation in other regions of the world. For example, in a study conducted in Indonesia, 93.7% of forest users supported conservation for tourism purposes (Walpole & Goodwin 2001). At Ongoye users did not consider the present levels of use detrimental to the forest. Most users felt the forest was subjected to only slight to moderate levels of exploitation. The latter view has been supported by studies of the harvesting pressure on pole-sized stems at Ongoye (Boudreau *et al.* 2005). For local users, it was critical to ensure that a balance is maintained between conservation objectives and livelihood needs. These findings differ from those given by villagers surrounding Dzanga-Ndoki National Park and Dzanga-Special reserve - Central African Republic, where communities were not concerned about overexploiting resources as their strategy was to move to other new places where resources were not so depleted as they believe that they do not (and no one on earth) owns any land (Noss 1997). In this regard, the importance of forest resources to sustaining local livelihoods as opposed to conserving biodiversity was equally recognised

by users at Ongoye as it is in other places (Bauer 2003; Walpole & Goodwin 2001; Maharana *et al.* 2000). Users further preferred PFM over (SFM and CFM) for the balance between conservation and management of resource use that it potentially brings. Traditionally, in SFM livelihood needs have not been given priority in competition with conservation objectives and in CFM the community recognized that they might be inconsiderate of conservation objectives. Nevertheless, while PFM offers a suitable compromise, it is important to recognize that conservation goals under PFM are motivated by a desire by users to sustain the use of forest resources rather than protect biodiversity *per se*.

CONCLUSIONS

The Ongoye situation has the necessary basis, in terms of user respect for local authority, adherence to local laws (permit system) regulating harvesting and conservation attitudes among the user community, for the successful implementation of a participatory forest management system. Given the villagers' dissatisfaction with the present management under the powerful *Inkosi* and EKZNW, perhaps the only practical route to combining all the concerns and desires of the diverse stakeholders in one management system is through a participatory structure between the state and the user community.

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CHAPTER 3

Resource use and the value and importance of forest resources to the livelihoods of users surrounding the Ongoye forest

SUMMARY

Forests and forest resources are very important assets that provide the backbone of products and services critical for the sustainability of many rural communities' livelihoods in South Africa. Indigenous forests are rich in timber and non-timber products and services, such as fuelwood, traditional medicine, building, fencing, and carving material, spiritual sanctuary, edible fruits, and for livestock grazing among others. Although forest resources are extremely important to rural livelihoods in South Africa, indigenous forests cover only 0.5% of the total land surface area, and consequently the harvesting pressure on forests is considerable. Here I investigate usage patterns and plant resource preferences of communities around the Ongoye forest. I also examine for what purpose plant species are used, who (outsiders, women, men, youth) uses them, and the value of these resources to households in terms of their contribution to local livelihoods. A questionnaire survey of 103 households (16.8%) was used to examine local usage patterns, user preference and opinions on resource value and the demographics of users. Patterns of use of tree species obtained from questionnaires are compared with ecological transect data of species removal from the forest. I recorded 65 species used at Ongoye. There were about 10 most used species and *Englerophytum natalense* and *Garcinia gerrardii* were the two most preferred tree species. Fuelwood was the main resource harvested from the forest, with almost everyone (91%) collecting wood in the forest. Logistic regression showed that women were more likely to collect than men. In addition households closer to the forest were more inclined to collect. The second most used resource was building poles (65%), followed by medicinal products (44.7%) and fencing poles (39.8%). Pole-sized stems were most harvested, as they are easily portable. These were used for building and fuelwood. Correlation between the questionnaire results and ecological study (Boudreau *et al.* 2005) confirmed that current levels of use appear to be sustainable. The only discrepancy was with regard to the results of the ecological data and users responses to whether users harvest poles or not. The ecological study showed that pole size stems were harvested from the forest even though users claimed the opposite. The forest did not contribute directly to monthly household income, because users were not trading in forest resources but were using the forest

for subsistence. This use contributed substantially toward maintaining household livelihoods at Ongoye. Although not thoroughly reflected in this paper, users collected grass from the forest for thatching their hut structures. Because of the discrepancy between the ecological study and social survey, it is fair to regard as questionable, the utility of questionnaires in a social survey when trying to establish patterns of resource use. Finally, it is very difficult, especially for research studies that do not have a tangible development agenda (direct economic benefit), to conduct effective participatory rural appraisals using gatherings of users.

KEYWORDS: forest use, forest valuation, Non-timber forest Products, Sustainable livelihoods,

INTRODUCTION

In South Africa, forests are a valuable asset to communities as they provide products and services vital for sustaining rural livelihoods. Forests and forest resources are often an important socioeconomic safety-net for large numbers of rural poor (Lawes *et al.* 2004). Although forest resources are extremely important to rural livelihoods in South Africa, indigenous forests cover only 0.5% (Owen & van der Zel 2000) of the total land surface area, and consequently the harvesting pressure on forests is considerable (Lawes *et al.* 2004). The needs of rural communities and the harvesting of forest resources are thus often in conflict with conservation objectives. Managing indigenous forest reserves in South Africa is thus a significant challenge.

The Ongoye forest is a biodiversity hotspot and contains rare and locally endemic species, such as the *Paraxerus palliatus* (Ongoye Red Squirrel) and *Stactolaema olivacea* (Woodwards' Barbet) yellow-streaked bulbul and the green butterfly. It is particularly rich in biodiversity with medicinal plants, and several endemic plant and animal species (Hendry 1998, Pooley 2003). Unusual trees found here are *Millettia sutherlandii*, *Chionanthus peglerae*, *Alchornea hirtella, Atalaya natalensis*, *Garcinia gerrardii*, *Syzygium gerrardii* and the *Ficus bizanae* (Pooley 2003). Harvesting of live wood is illegal, but happens regardless. The top seven most (82%) harvested stems are: *E. natalense* (33%), *G. gerrardii* (19%), *Drypetes gerrardii* (9%), *Tabernaemontana ventricosa* (9%), *Rinorea angustifolia* (4%), *Oxyanthus speciosus* (4%) and *Chrysophyllum viridifolium* (4%) (Boudreau *et al.* 2005).

Although the pole size harvesting intensity of the forest is sustainable under current patterns of use, Boudreau *et al.* (2005) argued that similar patterns of poles size stem harvesting in other smaller areas led to species extinction (Boudreau *et al.* 2005).

Conserving indigenous forests is important for both socio-economic and environmental reasons (Low & Rebelo 1996, DWAF [TNFF] 2002). The contribution of forests products and services to food security and the basic well being of rural households is particularly significant among poor households in communal areas (Nhira *et al.* 1998). As sources for both subsistence and marketed products, forest resources fall into two broad categories: (1) forest timber products and (2) non-timber forest products (NTFP) (Grace *et al.* 2002). As NTFP (material extracts other than timber) for example, traditional medicines obtained from forest play a vital role in the health-care of rural communities in South Africa (Vermeulen 1996, Grundy *et al.* 2002, Nomtshongwana 1999, Badola 1998, Hendry 1998, Lawes *et al.* 2004, Mander 1998) with the monthly collection of materials for traditional healers being valued at R300.00 - R400.00 per household averaged at 6 people (Mander 1998). In KwaZulu-Natal alone, more than 4000 tons of medicinal plant material traded in a year had an estimated value of R60 million in 1998, which was equivalent in value to about one third of the annual maize harvest in the province (Mander 1998).

Furthermore, forests can also be sources of bush-meat, fish, fruits, nuts and berries, mushrooms and roots that provide protein, vitamins, carbohydrates and fats (Heermans & Otto 1999) and they also provide mud for building (Wynter 1993). In addition to the above tangible benefits, forests are also important for the spiritual components of traditional Zulu life, as well as harbouring considerable potential economic value which could be released should eco-tourism ventures be developed at Ongoye. Tourism and recreational use arising from an eco-tourism project could stimulate economic benefits and ecotourism ventures have been under investigation at Ongoye for several years (Lewis et al. 1999). For timber forest products, communities lop timber for firewood, crafting, building and fencing material (Vermeulen 1996). Indigenous forests in particular, provide the main source of cooking energy for communities who live around them (Badola 1998, Hendry 1998, Nomtshongwana 1999, Gibson *et al.* 2000, Obiri & Lawes 2002, Bauer 2003). On average, fuel wood consumption by communities living near forests areas is approximately 4500kg per household per annum, which converts to a cost to households of approximately R450.00 per annum (Lawes *et al.* 2004). Forests also provide timber for a variety of handcrafts and household

items, such as sticks, carvings, grinding mortars, spoons, pipes and bowls (Lawes *et al.* 2004). These wooden products are either sold at urban markets or tourist areas or used within the household (Nomtshongwana 1999).

However in South Africa the role of forests as a safety-net for villagers in times of financial hardship is complicated by the small (0.5% of total land surface) area of indigenous forest cover (DWAF [TNFF] 2002) and the subsequent harvesting pressure put on forest resources by communities. At iGxalingenwa users conceded that use had affected the availability of resources, and resource use was more focused on acquiring daily needs rather than the long-term ecological integrity of the forest (Robertson & Lawes 2005). The management of forest resources is therefore critical in ensuring that community use (motivated by needs) does not compromise the sustainability of the limited resources for future use or to avoid their extinction. The government responded to this challenge by devolving management powers to local communities, through devising different management strategies (Horn 2002, DWAF PFM-IFM 2003). With these strategies (Participatory Forest Management [PFM], Community Forest Management [CFM], State Forest Management [SFM]), communities would partly or entirely determine the rules of access, control and use of the forest (DWAF PFM-IFM 2003). These strategies (PFM, SFM, CFM) bring different challenges, among these, were the influence of traditional leaders on use and management (Obiri & Lawes 2002, Dore 2001) and the related power dynamics, and the tension between user priority to fulfilling livelihoods and conservation objectives. Ongoye forest with its relatively large (2611 ha) surface area cover, has almost all the factors that contributes towards challenges facing the management of forest resources. The presence of a particularly powerful traditional authority, the absence of electricity to communities around the forest, the generally poor social conditions (unemployment & poverty levels) making communities relay on forest for livelihoods, in relation to the biodiversity importance of the forest as articulated above, set the ground for conflicting priorities.

The use of forest resources is widely documented in most of the large body of research on conservation and management of forest resources worldwide (i.e., Anderson & Grove 1987, Slocombe 1993, Vermeulen 1996, Maharana *et al.* 2000, Grundy *et al.* 2002, Walters 2004, Dudley 2004, etc.). In Zimbabwe (Vermeulen 1996) forests were used for both consumptive (i.e., collection of fodder, snails, aquatic plants, livestock grazing) and non-consumptive purpose. Although there is evidence to suggest different and unique use of resources by

different ethnic groupings (i.e., Ashanti people who revered porcupine as a symbol of totem; Lopez & Shanley 2004) and some communities who did not use the forest because there was deadwood nearby (Holmes 2003), there is generally no difference in use of forest for fuel wood (Sah & Heinen 2001). The latter is probably the case at Ongoye, where there was no house with electricity within 3 km of the forest (Statistics South Africa 2003). Resource use was in some instances (i.e., Zaire-Nile Divide) very excessive such that there were already severe shortages of wood products and patterns of use were significantly limiting attempts to use resources in a sustainable manner (Weber 1987). While considerable volumes of medicinal plants are collected from forest in general (Cunningham *et al.* 1988, Nomtshongwana 1999, Grace *et al.* 2002) and probably from Ongoye too, few surveys of the actual amounts have been conducted. Generally the use of forests and its resources is critical for the livelihoods sustenance of most communities living around these resources. This value is made more important because in many cases (i.e., iGxalingenwa - South Africa; Mafungabusi - Zimbabwe; Nile divide – Zaire) and probably in Ongoye, communities were dependent on the forest (Weber 1987, Vermeulen 1995, Robertson & Lawes 2005). This paper investigates various socioeconomic values of these resources e.g., replacement value of fuel wood, value of resources, user willingness to pay, to determine the relative importance of the forest to the community.

The primary aims of this study are; to investigate user needs, desires and preferences and the extent to which forest resources fulfill these. At Ongoye, where there is a large amount of forest (2830 ha) and the relatively low human population density living near the reserve (616 households within 1.5 km of the reserve, 12 persons per household, 149 persons km^{-2}, 2.8 persons ha^{-1} of forest), users would presumably put the forest under less stress. However the weaknesses and strengths (at Ongoye) of the local authority have the potential to drive harvesting patterns either way, since strong traditional leadership with no regard for conservation goals can lead to excessive harvesting, while equally strong leadership with regard for conservation practice could benefit the conservation of forest resources. Furthermore this study investigates the effect of community subsistence harvesting of wood and non-wood products on the forest. The motivation here being the fact that the local authority (*Inkosi*) is known to have strong opinions on the usage of Ongoye, and as a result live wood harvesting is illegal. The findings would make indications on whether communities adhere to *Inkosi's* rule. Finally, I test the correlation of user perception to resources and use, with the actual transacts conducted at Ongoye by Boudreau *et al.* (2005).

METHODS

Site study and the stakeholders

The Ongoye forest is located in KwaZulu-Natal province (28^0 48'-28^0 53'S, 31^0 38'- 31^0 46'E) in the uMlalazi Municipality, about 10 km northwest of Mtunzini and 24km east of Eshowe at 300-500 m a.s.l. The forest covers a low massif comprising syenitic granite basement forming the Ongoye range of hills. The dominant tree species are *Drypetes gerrardii, Englerophytum natalense, Millettia sutherlandii, Rinorea angustifolia, Rothmania globosa, Harpephyllum caffrum* and *Garcinia gerrardii*. The mean number of understorey and canopy trees per ha is 718 and 246 respectively and the mean canopy tree species richness per 0.0625 ha plot is 9 (Krűger & Lawes 1997). The forest was logged for saw-timber from the 1890's and intensively from 1909 to 1919 by the 'Ngoye Forest Company' owned by Johnson and Carmont. No further legal extraction of large timber trees occurred after 1924. Since then it has been the perception of the conservation management institutions responsible for the Ongoye Forest Reserve that timber has been exploited by the local community to 'an alarming extent' (Anon 1983). Current harvest intensity of pole-sized stems is estimated at an average 978 m^3 ha^{-1} yr^{-1}(Boudreau *et al.* 2005).

User community was defined as Zulu people living within a 2 km distance of the forest. The area of study included 5 settlements including Qwayinduku, Manyameni, Endlovini, Noshungu, Gugushe, and Amanzamnyama, with a combined population of approximately 700 households and 8455 individuals. Average household size was 11.88 ± 10.0 individuals (mean ± 1 S.D.; n = 103 households). Because of the size and close proximity of these settlements to one another, they were grouped into three discrete areas for the purposes of analysis, with Manyameni, Noshungu and Gugushe falling under Endlovini, and Amanzamnyama and Qwayinduku standing alone. All these settlements fall under a single tribal authority (*Inkosi* [chief] Mzimela) in a single ward (Ward 26, uMlalazi municipality). Population density in the uMlalazi municipality and particularly in areas surrounding the forest averages 60 persons km^{-2}. High population growth rates, which were 4.2% from 1980-1991, and unemployment (70% in 1995) have given rise to an economically depressed and poor population. More recently (1999 to 2001) unemployment rates in uMlalazi municipality have been set at 40.8% and the population has declined by 12.47% (Statistics South Africa 2003).

Forest stakeholders were made up of *Inkosi* Mzimela as the Chief of the community, his tribal council, the Ezemvelo KwaZulu-Natal wildlife (EKZNW), and community members. *Inkosi* Mzimela is the chairperson of the National House of Traditional Leaders and is most represented in the community by his tribal council, made up of Izinduna (Headmen) and other council members appointed by him and representing the community members. EKZNW is represented in the community by the forest security guards.

Harvest intensity

Harvest intensity of pole-size trees was estimated from vegetation surveys. Detailed methods are reported in Boudreau *et al.* (2005). Only the essential details are given here. The density and size-class distribution of the seven most commonly used understorey tree species were sampled along twenty-two 300 m long transects. These species were favoured by harvesters because they yield portable pole-size stems (5 cm < DBH < 15 cm) suitable for multiple functions. I incorporated the findings of the surveys into this study to indicate: (1) harvesting pressure on timber products; (2) what species are harvested as opposed to reported as harvested by users; (3) the social correlates of use (household size and distance from the forest); and (4) the likelihood that current harvesting rates will be sustainable. Only pole-sized stems were evaluated and other resources, such as medicinal plants, deadwood, and vines harvested from the forest, were not evaluated.

Questionnaire interviews

The study was conducted in the months April through to November 2004. Before conducting the survey the local authority (*Inkosi* Mzimela) was approached for permission to do so. Individuals from 103 households (16% of households) were interviewed (71 at Endlovini, 16 at Amanzamnyama, and 16 at Qwayinduku). Each questionnaire took 50 minutes to administer and all questionnaires were conducted by the same interviewer (LJP) with the assistance of an interpreter. The questionnaire survey was conducted in an informal atmosphere and addressed to all members of the household, but focused on the answers provided by a key informant among those present. This was usually that individual most willing to engage in dialogue with us and often was a senior household member. However, senior members of the household were not always present and the age and gender of the key informant were recorded to check for any bias later. If members of a household discussed the

answer to a question, we allowed the key informant to represent the consensus view rather than drawing our own conclusions from the discussion.

The questionnaire design was based on the structure of other studies conducted on user attitudes to forest resources (particularly those of Hendry 1998, Nomtshongwana 1999, Robertson & Lawes 2005). Most questions were closed questions, requiring the respondent to judge opinions according to a symmetric five point Likert scale i.e., 1 = strongly agree to 5 = strongly disagree, with a central neutral point (Likert 1974) or a binomial, yes or no. Other questions were based on multinomial responses, for example, costs and descriptions of which forest products were used, or were continuous variables such as the respondents' age, replacement value of a forest product or the number of livestock owned.

The questionnaire was structured around sections dealing with the following:

- The demography of the user community. For each household I determined the respondent's age, gender, period of stay in the area, level of education, income sources, household size, and distance from the forest.
- The use of forest products. This section included questions about who used the forest (age, gender, household). What forest products were collected? How much time per week did a household spend collecting forest products and how frequently did a household visit the forest in days per week. I established the mass of a head load (kg) carried per trip from the forest. In addition I examine user preference for plant species for various categories of use - building, medicinal extracts, fencing, craftwork, and food.
- User's willingness to accept alternatives to forest products.
- The nature and extent of forest use by outsiders.
- The monetary value of used item to collectors and households (using willingness to pay to determine replacement value) and by deduction the value of important forest products to sustaining rural livelihoods.

Participatory Rural Appraisal (PRA) of forest product use and value

Participatory Rural Appraisal is a methodology which helps to identify community problems and to plan solutions with the active participation of community members (Selener *et al.* 1999). PRA aims to achieve interactive participation with stakeholders although this is very

difficult, especially for research projects that do not have a tangible development agenda (North 1990, Nemarundwe & Richards 2002). PRA methods were conducted only with the Endlovini community. At both Amanzamnyama and Qwayinduku sites, several attempts to bring the community together for PRA exercises failed, as a result of continuous community postponement of such meetings. On three occasions the local authority was consulted but planned meetings were cancelled because of urgent funerals, the community had decided on other programs on the day of the meeting, or people did not have the time to attend. Similarly at Endlovini, the community was not especially interested in PRA exercises. All the attempts to meet the community were met with various excuses. Consequently, it was decided to approach an already established group of people living near to and who used the forest. This group comprised villagers (young adult to middle aged; male and female) who were constructing a local church. The group gave us only 30 minutes in which to conduct two exercises aimed at establishing the relative value and importance of forest resources in relation to each other, and to rank user preferences for the seven most harvested tree species from the forest. We used the matrix-ranking method (Bulwer Participants 1993) to conduct the PRA but could not finish the mapping required. The matrix-ranking is usually done on a two-dimensional matrix, with the items listed on one axis and the characteristics of the items listed on the other axis (Selener *et al.* 1999). In general, household questionnaires were regarded as more reliable sources of information on these topics and were favored in the analyses.

The importance of forest products to sustaining local livelihoods

A primary aim of this study was to establish the importance of forest products to sustaining the livelihoods of local people. Accordingly, I investigated the economic status of households as best I could, bearing in mind the reluctance of households to divulge personal details, especially monthly income. I tried to establish how much financial capital a household had; the amount of land owned by a household (and indeed, whether they owned the land or not); what the farming activities were; the level of education in a household; how vulnerable and resilient households were to changes in the local economy; and the importance of natural resources to livelihoods security i.e., to what extent are forest resources truly a livelihoods safety-net?; what household activities were essential for maintaining livelihoods; and finally, how many of these activities were supported by forest resources.

Statistical analysis

All binary questions, as well as those based on the Likert scale, were included in data matrices relating to frequency of use. These data matrices were balanced by including the reciprocal value for all questions in additional columns (Greenacre 1993). Demographic data (e.g., age, gender, household size), as well as socio-economic data (number of income-generating activities per individual, education) and the distance of the household from the forest, were ranked on a scale of 1 to 5 and included in the data matrices. Because community members were not in a position to provide information of income per month, Statistics South Africa (2003) figures were used.

Binomial Logistic regression was used to examine the putative influence of demographic and socio-economic variables on resource use. Six binomial questions about whether respondents used forest resources or not, were used as the basis for the dependent variable in separate regressions. The Six questions were; do you use the forest for (1) fuelwood, (2) Building poles and (3) Fencing poles, (4) Medicine, (5) Craft wood, and (6) source of food. Logistic regression was further used to determine which social correlates (household size, education, mean age of occupants, gender of respondents, proximity to the forest, duration of stay in the community) were more important for deciding which items were most used. In addition the frequency table (Chi-squared statistics) that shows what proportion of the 103 households collected each of these items were used. To determine the monetary value of forest products, contingent valuation methods (willingness to pay) were used to elicit information from the respondents. Therefore the price value that was attached to resources was based on what local users were prepared to pay each other for products or resources collected or harvested from the forest (Godoy *et al.* 1993). This value was consolidated and compared against annual income for households and unemployment statistics, to measure the value of resources to rural livelihoods. Furthermore comparisons were made between the observed frequency of use of timber species obtained from vegetation surveys and use of these species claimed in interviews (including PRA).

RESULTS

User demography and socio-economic status

There was no significant difference in gender distribution of respondents ($\chi^2 = 3.505$, $df = 1$, $p = 0.061$). Among the key respondents, 40.8% were male, 59.2% were female and the mean age was 36.9 years. In the Ongoye context, a household was any homestead within 2 km of the forest and on average, respondents' households were 0.5 km from the forest. The mean household size was 11.9 persons and varied significantly from household to household (11.9 ± 10.0 individuals; mean ± 1 S.D., $t = 11.941$, $p < 0.0001$). About 76% (n = 79) of households had been resident in the area for >30 years. Only 14% of households had been resident near the Ongoye forest for less than 30 years.

With over half (51.5%) the community unemployed, almost all (83.5%) households were dependent on government grants, supplemented by their small vegetable gardens. An equal number (83.5%) of households grew crops for subsistence purposes. Annual household income for ward 26 (the ward including the forest) of Umlalazi municipality in 2001 was R16 677 (Statistics South Africa 2003). This is probably an inflated estimate as it includes all households in the ward, and not just those from the user community living immediately around the forest.

A quarter of the respondents (25%; n = 26) had not received any formal education, and almost the same number (24.2%; n = 25) had only a primary school education. A third (32%; n = 33) of respondents had completed grade 10 (Standard 8) at secondary school, and only (16.5%; n = 17) had matriculated. Only two respondents had post-matric qualifications. The community did not have access to electricity and, in fact, all the interviewed households were dependent on the forest for fuelwood.

General patterns of resource use

Forest products were collected from the forest for a variety of purposes (Table 3.1). Almost all households (91.3%) collected fuelwood, most (65%) collected building materials, and almost half (44.7%) collected medicinal plant products and poles for fencing purposes

(39.8%) (Table 3.1). Few households collected forest products to use in craftwork or as food, or grazed their cattle in the forest.

Table 3.1. Forest products used by households from the Ongoye forest.

Use	No. households (n = 103)	%
Fuel	94	91.3
Building	67	65.0
Medicine	46	44.7
Fencing	41	39.8
Craftwork	8	7.8
Food	5	4.9
Grazing	4	3.9

Fuelwood collection

Fuelwood was the most collected forest resource (Table 3.1). There were no preferred fuelwood species and almost all households (83%) claimed they collected any dry wood they found. Users did not buy fuelwood. Fuelwood was collected as deadwood from the forest floor in headload bundles, each individual carrying a single headload. Seven head loads were weighed. Headloads (5) weighed approximately 20kg and as much as 30kg in a few (2) instances. Taking into consideration the mean headload mass (25.3kg) determined by Obiri (2002), I therefore used 25kg in my calculations. Each household collected a headload 3.77 ± 2.86 (mean ± 1 S.D., n = 85 households) times a week. Collecting pressure was unevenly spread over the seasons with most households (91%) collecting fuelwood in winter and 61% of households collecting in the other three seasons too. Assuming an average headload weight of 25kg and collection in all 52 weeks of the year, each household collected approximately 4901kg of deadwood per annum. No households admitted to cutting live trees for fuelwood, although this practice is known to occur, where the cut tree is left to dry or the crown branches of trees cut for poles are later collected for fuel.

Binomial logistic regression confirmed that households closer to the forest were more inclined to collect fuelwood from the forest (Wald statistic 7.141, $p < 0.008$). Location of the user community, household size, the general level of education, and the duration that a household had been in that location, all had no effect on patterns of wood collection. However, fuelwood was more likely to be collected by women than men (Wald statistic 3.29, $p < 0.07$).

Building materials

Most households (65%; n = 67) harvested building materials from the forest, although they also claimed that they mostly used poles cut from *Eucalyptus* spp. woodlots in the near vicinity. Household response to questions about collecting timber from the forest was complicated by the fact that harvesting of live stems is illegal. Thus to avoid implicating themselves households generally denied using timber from the forest when the question was explicitly put to them. When pressed on the issue, households generally claimed that the only live wood taken was "aMathandela", meaning thin branches. However, from the ecological survey (Boudreau *et al.* 2005) it was clear that mainly pole-size stems (2 cm < dbh < 15 cm) were collected.

Because respondents were reluctant to admit to removing live wood from the forest I could not obtain data from the questionnaires on rates of removal of stems for comparison to the ecological survey data. I estimated pole use by the average household indirectly. On average 18.9 ± 8.69 (mean ± 1 S.D.) poles are used in constructing a typical dwelling (circular hut). Only 10 of the 103 (9.7%) households interviewed over eight months were engaged in building. In all instances a single hut was being built. In one hut, the poles used were clearly a mixture of *Garcinia gerrardii* and *Englerophytum natalense* stems. Building was infrequent and as huts lasted several years, they were mainly built when a new individual joined the household. It is impossible to say exactly how often building occurred for any one household so I have used an estimate of 9.7% of households in any year (derived from the above) in calculations of annual demand for building timber. This is likely a conservative estimate of the number of households who build in a year, but at least defines the lower limit, with the upper limit probably no more than double this figure. From 1996 orthophotos, 616 households were counted within 1.5 km of the reserve (Boudreau *et al.* 2005). Thus the community wide demand for building poles was approximately 9.7% * 616 households * 18.9 poles per structure = 1129 poles per annum. Given that harvest intensities of pole-sized stems were on average 264 ± 30 stems ha^{-1} (Boudreau *et al.* 2005) this demand value is a gross underestimate and indicates that either many more poles were collected for fencing (see next section) or the social survey of building resource use has large margins of error (because users are reluctant to admit to harvesting live wood). Users indicated also that they did not cut large

tree stems for building materials but used smaller poles and saplings to build the frame for the mud walls of huts.

Although unwilling to admit to harvesting poles from the forest, respondents were nevertheless willing to say what species were best for building purposes. A few species were highly preferred and the most preferred species, *Garcinia gerrardi* and *Englerophytum natalense*, were also detected as frequently used in the ecological surveys (Table 3.2). These are understorey species that grow slowly, have particularly hard wood and are resistant to rot and insects (Boudreau *et al.* 2005). On the other hand, some species that were frequently recorded in the ecological surveys were not especially noted by respondents (e.g., *Drypetes gerrardii*, *Rinorea angustifolia & Oxyanthus speciosus*). Similarly, some species that were particularly noted by potential users for their strength and use in building (e.g., *Cassinopsis ilicifolia*) were of very low use-rank in the ecological survey.

Table 3.2. Species preferred for building purposes.

Species used	Zulu name	No. households
Garcinia gerrardii	iSibinda	23
Englerophytum natalense	Umthongwane	21
Cassinopsis ilicifolia	iKhumalo	13
	Any	11
Nectaropetalum zuluense	Xwelebe	7
Chrysophyllum viridifolium	umGwinya/ umEmezi	5
Trichilia emetica	Umkhuhlu	3
	Nokhahlu	3
Bowkeria verticillata	iSiphampathi	2
Eucalyptus spp.	Ugumtrini (Gumtree)	2
Albizia adianthifolia	Usolo/ umGadawenkau	2
	Manonga	2
Strychnos henningsii	umQalothi	1
Rinorea angustifolia	iThwakela/ imPicamaguma	1
Diospyros lycioides	uMqandane	1
Rapanea melanophoeos	uMaphipha	1
Zanthoxylum capense	UmNungumabele	1
Canthium inerme	umVuthwamene	1
Bridelia micrantha	mHlahle	1
Mimusops caffra	aMasethole	1
Antidesma venosum	iSibangamlotha/ umhlalanyoni	1
Ochna arborea	Umbovane	1
Euclea racemosa	iDungamuzi	1
	Mendo/u	1
	Sbangamlotha	1
	isiKhumbasempisi	1
	Uphahla	1
	Mazwende	1
	uQhekhe	1
	Usolemamba	1

Distance of the household from the forest, household size, the general level of education, and the duration that a household had been in that location all had no effect on patterns of wood collection for building materials. However, building was more likely in the Amanzamnyama community (Wald statistic 4.88, $p < 0.03$) at the time of this study.

Fencing materials

Respondents distinguished fencing materials from other types of building materials collected from the forest. Only 39% (n = 41) of households admitted to collecting fence posts comprising smaller stems (<15 cm dbh) over the last 3 years. Respondents were evasive about

the exact quantities of pole-size stems they collected. Their reluctance to discuss the harvesting of many items from the forest, including medicinal plants, and fencing and building materials, is understandable as harvesting of any live plants from the forest is illegal. They claimed to be using woodlots outside the forest or buying fencing poles from a supplier of *Eucalyptus* poles. Households with cattle were more likely to have fenced enclosures that required fence posts. I counted the numbers of fence posts used by a sub-sample of 21 households. These traditional fences were made from vertically arranged small stems, held in place by horizontal railings or small stems poles, or wire, with a large post (± 10 cm dbh) every 0-3 m. A few of these sorts of fences used several hundred poles (2 - 10 cm dbh) with no space in between stems.

On average, 76.9 ± 81.6 (mean ± 1 S.D., n = 21, median = 50) poles were used by households to build a fence every three years. In other words, approximately 25.6 poles were removed by a household from the forest per annum. Demand for fencing poles by the user community was calculated as follows: (20% households with fences) x (616 households in the user community) x (approximately 77 stems per fence) x (each household collects 0.33 times per annum), which equaled 3154 poles per annum used by the community around the Ongoye forest. This equates to 0.2% of the standing stock (1939699 stems) in the forest (Boudreau *et al.* 2005). Clearly some of these variables are crude estimates, however, a doubling of the households collecting fencing poles and a doubling of the number of stems used per household yielded an annual demand for fences posts of only 0.61% of the standing crop in the forest (Figure 3.1).

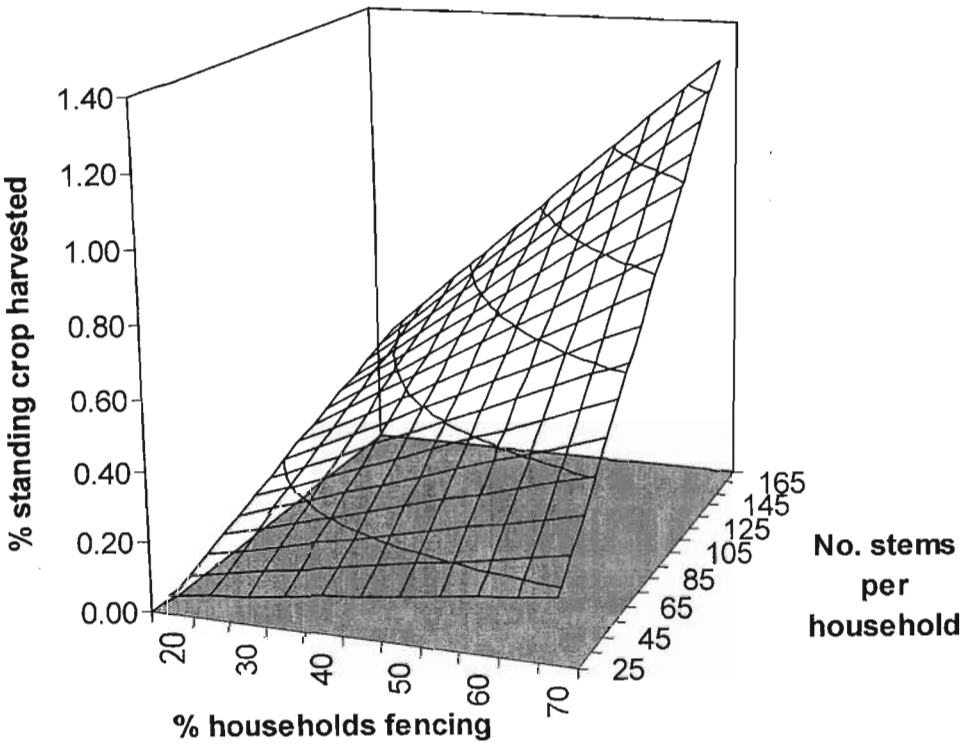

Figure 3.1. Illustrating the percent of the standing stock of fence poles harvested from the forest per annum as a function of the percentage of households requiring fencing poles and the number of stems used for fencing per household. Note that a very small proportion of the standing stock is apparently harvested by users each year. These estimates are in contrast to the estimates of use of poles from the ecological survey (approx. 3-4% of standing stock per annum).

Of course these calculations of static demand do not factor in the growth or ingrowth rates of stems (ingrowth = replacement of stems in the pole-size class). Nevertheless, they do illustrate that at worst a relatively small fraction of the standing crop is potentially used by the local community each year. It should be noted at this point that these estimates provided by the users are considerably less than the estimates derived from the ecological survey (approx. 3-4% of standing stock per annum).

Twenty–two species of trees were preferred for fencing posts (Table 3.3) by 24% of households, while 17% of households claimed they harvested any species of suitable size (the remaining 59% of households did not collect fence posts from the forest).

Table 3.3. List of species used for fence posts.

Scientific name	Zulu name	No. households
Any species		18
Garcinia gerrardii	iSibinda	4
Chrysophyllum viridifolium	umGwinya/umEmezi	3
Nectaropetalum zuluense	Xweleba	3
	Umdoni	3
Englerophytum natalense	Umthongwane	2
Eucalyptus spp.	Ugumtrini (Gum tree)	2
Cassinopsis ilicifolia	iKhumalo	2
Strychnos henningsii	mQalothe	2
Trichilia emetica/dregeana	Umkhuhlu	2
Rinorea angustifolia	IThwakela/imPicamaguma	2
	amaHlahle	1
Drypetes gerrardii	UmHlwakela/isikhumaphuphu	1
	Ingi	1
	Mbozane	1
	Nokhahlo	1
	Nqeghe	1
Antidesma venosum	Sbangalothe	1
Macaranga capensis	Umfongofongo	1
Bridelia micrantha	Umhlahle	1
	Umqathi	1
	Umsimbithi	1

Binomial logistic regression confirmed that households closer to the forest were more inclined to collect fence posts from the forest (Wald statistic 4.987, $p < 0.026$). In addition large households tended to depend more on the forest than smaller households (Wald statistic 3.910, $p < 0.05$). Location of the user community, the general level of education, and the duration that a household had been in that location, all had no effect on patterns of wood collection.

Medicinal plant collection

Medicinal plants were the third most important resource (44.7% of households) collected from the forest (Table 3.4). These plant products were collected throughout the year from several species, but because of the difficulty of implementing an already long questionnaire I did not ask for full lists of species used. Instead, I asked respondents to name the important medicinal plant species that they used most frequently (I did not ask which plant part was

collected or for what purpose). Many respondents (21%) were reluctant to do so, and 34% of households claimed they did not collect medicinal plants. Those households that did collect medicinal plants named 28 species (Table 3.4). The general reticence among respondents to discuss the collection and use of *muti* made it impossible to gather detailed information on the patterns of use of traditional medicines in this survey.

Table 3.4. Medicinal plant species listed by households. Species names are in Zulu or the scientific name is given where known.

Zulu Name	Scientific Name	No. of households
Trichilia emetica/dregeana	Umkhuhlu	10
Macaranga capensis	uMfongamfongo	6
Albizia adianthifolia	Usolo	6
	Bophuphu	5
Syzygium cordatum	Umdoni	4
Ekebergia capensis	aMathunziwentaba/mNyamathe	3
Englerophytum natalense	umThongwane	2
Kiggelaria africana	isiHlulamanya	1
	Madlozana	1
	Mathungwa	1
	Ngodo	1
Chrysophyllum viridifolium	uMemezi	1
Annona senegalensis	uMhlalajuba	1
	Gonothi	1
	Qibi	1
	Magoco	1
Garcinia gerrardii	IsiBinda	1
	Umbola	1
Prunus africana	iNyazankomo	1
Myrica serrata	Ulethi/iLethi	1
Zanthoxylum capense	umNungumabele	1
Tricalysia capensis	inDulwane	1
Ficus ingens	uMgoswane	1
Drypetes gerrardii	UmHlwakela/isikhumaphuphu	1
	Umgadiza	1
Bridelia micrantha	Umhlahle	1
	Sqegisomkhofu	1

None of the households acted as collectors for local traditional medical practitioners. Consequently, medicinal plants were infrequently collected by the households surveyed (on

average, less than once a month) and in small quantities (depending on item, one or two samples – 2-3 g of processed product), depending on need.

From those who admitted to using medicinal plants (44.6%) from the forest, not all households collected medicinal plants themselves. Generally, traditional medicines were rated more effective than western medical products by 45% of households, as working equally well (were neutral) by 39% of households, and 16% of households thought that western medicine was more effective than traditional *muti*. Thus, although many households did not collect *muti* from the forest, most used these traditional medicines and the pressure on these forest resources is probably higher than implied by this analysis, because there was no clinic in the area. Of the households that admitted to using traditional medicine, 59.5% collected *muti* from the forest, and 17% were dependent on traditional healers, and the rest were either getting *muti* else where or they did not use *muti* at all.

Craftwork materials

Most community members (90.3%; n = 93) did not collect materials for craftwork from the forest. However, they indicated that they knew of people who collected forest wood for craftwork. Only 9.7% collected craftwood from the forest. The households that admitted to using the forest for craft wood listed eight preferred species (Table 3.5).

Table 3.5. List of species preferred by users for Craftwork

Zulu Name	Sci. Name	No. of households
Trichilia emetica	uMkhuhlu	6
Albizia adianthifolia	uSolo	4
Chrysophyllum viridifolium	umGwinya/umEmezi	3
Annona senegalensis	uMhlalajuba	1
Englerophytum natalense	uMthongwane	1
Voacangathouarsii/Rauvolfia caffra	uMhlambamanzi	1
Syzygium cordatum	uMdoni	1
	magwinya	1

Total of 9.7% (n=10) used forest for craftwork.

Foods from the forest

Foods derived from the forest were not of any substantial value to households. Most respondents (84.5%) did not collect foods from the forest. Only 15.5% of households

admitted collecting food from the forest. These were cases of opportunistic harvesting of fruits by people who were collecting other items, such as fuelwood, from the forest. These people preferred *Canthium inerme/Plectroniella armata* [uMvuthwameni] to other species (Table 3.6) because the fruits of the tree were said to be sweet. However, it is suspected that there may have been other kinds of foods collected from the forest such as bushmeat. But because the harvesting of bushmeat was illegal and restricted by the powerful chief, whom users feared, people may have been reluctant to admit to using bush meat.

Table 3.6. Species used for food.

Scientific Name	Zulu name	No. of households
Canthium inerme/Plectroniella armata	umVuthwamini	4
Trichilia dregeana	uMkhuhlu	4
Syzygium cordatum	uMdoni	3
Englerophytum natalense	uMthongwane	3
Chrysophyllum viridifolium	umGwinya/umEmezi	3
Vangueria infausta	Amaveyo	2
	lamula	2
Mimusops caffra	aMasethole	2
	Magwenya	1
Harpephyllum caffrum	aMagwava	1
	Abone	1
Annona senegalensis	uMhlalajuba	1
	Grannadilla	1
	mafiyolo	1

Use of forest for grazing livestock

The use of the forest to graze livestock was confirmed by only 6.8% (n = 7) of the households. 48.5% (cattle and goats/sheep) of households owned livestock. Other households grazed their livestock (including goats) in the grasslands immediately surrounding the homestead. Most users (83.5%) indicated that the authorities (Inkosi or EKZNW) did not require permits to graze or herd animals in the forest.

The ten most used tree species

The dominant use of forest resources was for fuelwood (91% of households). This statistic is not reflected on the table below because there was generally no species choice made of dry wood collected. The second most important use of the forest was for building purposes (65%), followed by medicinal purpose, fencing, curio work and foods. *Garcinia gerrardii* was the most preferred species (n = 23). *Englerophytum natalense* was the second most important

species to households. The third most important species was *Trichilia emetica/dregeana* with most users preferring this species for medicinal purposes more than any other species. *Cassinopsis ilicifolia*, a species that did not appear to be intensely harvested according to the ecological survey, was the fourth most important species used primarily in building.

Table 3.7. The ten most used species at Ongoye forest. The numbers in the cells refer to the number of households who reported using the species.

Species	Building	Fencing	Medicinal	Curio	Food
Garcinia gerrardii	23	7	1	0	0
Englerophytum natalense	21	3	2	1	5
Trichilia emetica/dregeana	3	2	10	7	5
Cassinopsis ilicifolia	13	2	0	0	0
Albizia adianthifolia	2	0	6	6	0
Syzygium cordatum	0	4	4	1	3
Macaranga capensis	0	3	8	0	0
Chrysophyllum viridifolium	3	3	0	2	3
Tabernaemontana ventricosa	1	1	1	0	0
Rinorea augustifolia	1	0	0	0	0

Comparing reported trends in pole-harvesting against data from the ecological survey

From field surveys of trees harvested from the forest it was clear that mostly pole-size trees (5 cm < dbh < 15 cm) were taken. Overall, 11.6% (n = 853) of pole size stems appeared to have been collected over a 3 year period, representing a harvest intensity of 264 ± 30 stems ha^{-1} over that period. Seven understorey species accounted for 82% of the pole-size trees collected: *Englerophytum natalense, Tabernaemontana ventricosa, Rinorea angustifolia, Garcinia gerrardii, Alchornea hirtella, Oxyanthus speciosus* and *Drypetes gerrardii* (Table 3.7). The remaining harvested stems (18%) were distributed across 26 species. Few pole-size stems from large canopy species (n = 537, 8.2 %) were recorded and among these canopy species, *Chyrsophyllum viridifolium* was the only species collected as poles in quantity by local harvesters (Table 3.7).

Of the seven most used understorey species recorded in the ecological survey, *Garcinia gerrardi, Englerophytum natalense, Chrysophyllum viridifolium, Trichilia emetica/dregeana, Tabernaemontana ventricosa, and Rinorea augustifolia* were also confirmed by users as in the top 10 most preferred species (see *table* 3.7). Contrary to the ecological survey, *Rinorea angustifolia, Drypetes gerrardii* and *Tabernaemontana ventricosa* were the least used species in the questionnaire interview survey. *Alchornea hirtella* was not even mentioned in the social survey. Furthermore, while *Cassinopsis ilicifolia* and *Nectaropetalum zuluense* were not detected as being under any harvesting pressure (or way below the 2% use threshold) in the ecological survey, they were recorded in the social survey as very strong and useful and therefore preferred for building.

Table 3.8. The most abundant understorey species recorded in the ecological surveys of the Ongoye Forest and their intensity of use.

Species	Stems ha-1	% of all stems	Harvested stems ha-1	% of harvested stems
Englerophytum natalense	475	13.4	70	33.3
Tabernaemontana ventricosa	423	11.9	18	8.5
Garcinia gerrardii	325	9.2	40	19.2
Rinorea angustifolia	292	8.2	9	4.4
Alchornea hirtella	237	6.7	4	1.8
Oxyanthus speciosus	164	4.6	8	3.8
Drypetes gerrardii	129	3.6	18	8.7
Tricalysia sonderiana	121	3.4	5	2.3
Psychotria capensis	115	3.2	1	0.6
Elaeodendron croceum	111	3.1	4	1.8
Tricalysia capensis	108	3.0	3	1.5
Cola natalensis	108	3.0	5	2.3
Oricia bachmannii	94	2.6	0	0.1
**Chrysophyllum viridifolium*	31	1.0	8	4.0

* Only trees that account for at least 2% of the pole-size tree population are shown except for *C. viridifolium*, which is shown because of its high use by local people

No instance of canopy tree logging was recorded from the 22 transects. Cutting height was between 0 and 30 cm above the ground for most species except *G. gerrardii* for which stumps were often up to 1m high.

Discrepancies were evident in the comparisons of the use and importance of (recorded) species to households from the ecological survey (Table 3.8) and questionnaire interviews.

The ecological survey showed that *Englerophytum natalense* was the most used species in the forest (33.3%), while for building material and fencing poles, *Garcinia gerrardii* was more important (34%, building; 17%, fencing poles) than *Englerophytum natalense* in the social survey. Other species (i.e. *Cassinopsis ilicifolia*) were not detected in the ecological survey while they were relatively important (19.4%, building; 5%, fencing poles) to households. Similarly, *Nectaropetalum zuluense* (Xweleba) was also important (10.4%, building; 73.3%, fencing poles) in the questionnaire but was not recorded in the ecological survey.

Table 3.9. Comparisons between ecological survey and households responds on building and fencing use

Ecological Study		Building Material		Fencing Poles	
Species	**% use**	**No. of households**	**% importance**	**No. of households**	**% importance**
Englerophytum natalense	33.3	21	31	3	7.3
Garcinia gerrardii	19.2	23	34	7	17
Drypetes gerrardii	8.7	1	1.4	1	2.4
Tabernaemontana ventricosa	8.5	1	1.4	1	2.4
Rinorea angustifolia	4.4	1	1.4	0	0
Chrysophyllum viridifolium	4	3	4.5	3	7.3
Oxianthus speciosus	3.8	0	0	0	0
Cola natalensis	2.3	0	0	0	0
Tricalysia sonderiana	2.3	0	0	0	0
Alchornea hirtella	1.8	0	0	0	0
Cassine papillosa	1.8	0	0	0	0
Millettia sutherlandii	1.6	0	0	0	0
Tricalysia capensis	1.5	0	0	0	0

For building, % importance is based on 67 (65%) of users
For fencing poles, % importance is based on 41 (40%) of users
171 species in the ecological survey, could not be identified

There is a discrepancy in the large number of poles used recorded from the ecological survey and the small amount claimed to be used by households. The ecological survey suggests 3-4% of the standing stock of poles is harvested each year (Boudreau *et al.* 2005), while users are

estimated to use only 0.2-0.6% of pole-size stems per annum. Considering the percentage (27%) of users who suggested that there were outsiders using the forest, it is possible that some of the inconsistencies above (between ecological and social survey) could be explained by the use of the forest by outsiders, which could be happening with the ignorance of most (73%) community members. It is also possible that pole size stems are cut for fuelwood, and even other uses (such as building, fencing and carving), even though users say they do not harvest pole-sized stems for these purposes. In that sense, users under reported their use of forest resources.

User perceptions of harvesting pressure and impacts of resource use on the forest

Users were asked how difficult it was to find the top seven species from the ecological study (*Chrysophyllum viridifolium, Englerophytum natalense, Rinorea augustifolia, Garcinia gerrardii, Tabernaemontana ventricosa, Oxyanthus speciosus, and Drypetes gerrardii*). For *Chrysophyllum viridifolium,* 84% of villagers reported that it was easy to find in the forest. *Englerophytum natalense, Garcinia gerrardii, and Rinorea augustifolia,* were all regarded as easy to find and readily available by 65%, 61% and 54% of households, respectively. Less than half of the respondents regarded the remaining species as easy to find. Most villagers (70%, $\chi^2 = 76.738$, $df = 2$, $p < 0.0001$) were of the view that harvesting had not negatively affected the forest's structure and claimed there were no big gaps as a result of harvesting. More respondents than expected by chance (88%, $\chi^2 = 60.592$, $df = 2$, $p < 0.0001$) indicated that if harvesting was to be banned, they would be unlikely to obey the ban, even if the order came from the tribal committee, EKZNW, or was justified with good reasons (87%). A significant number of respondents (66%) indicated that being gainfully employed would not stop them using the forest. There was general consensus (83.5%) that EKZNW activities had been effective in persuading users to reduce their use of forest products. Most respondents (71%) said they had reduced their use of forest products directly as a consequence of EKZNW policy. This influence did not however have negative effects on the community's relationship with the EKZNW security guards.

Use of the forest by outsiders

Most respondents (73%) suggested that there were no persons from outside the community who were using the forest. From the few villagers (27%) who reported that there was outsider

use of the forest, 11.6% indicated that they probably came once a month and 5.8% felt it was as infrequent as once a year. A significant number (60%) of those who indicated that there were outside users, reported that these outsiders were primarily taking building poles. The community was evenly divided on whether outsiders should be allowed to harvest from the forest (51%), but most respondents (63%) felt that outsiders were not negatively impacting on either local users' access to the forest or the amount of resources available to locals.

Valuation of forest resources

The value of a forest product to a household was judged by what a household was willing to pay for that product. Households were asked to indicate what they would be willing to pay for a headload of deadwood, and per building and fencing pole. To obtain users' "willingness to pay" values for products that were harvested from the forest, they were asked to attach a monetary value to a bundle of collected wood, or fencing and building poles. To elicit true (unbiased) values, questions were asked separately to ensure that users did not compare the values of products and were thus less subjective in assigning a value to a product.

Fuelwood

Most households (92%) supplemented fuelwood with paraffin. It took on average, two hours to prepare one meal of the day using paraffin, although most users did not use paraffin for cooking *per se*, but used it for preparing less time consuming items such as hot drinks. A litre (*l*) was sold at R6.30 ± R2.00 in local outlets (prices were not regulated). An average household used 7.18 ± 5.43*l* of paraffin a month, at a total monthly cost of R37.43 ± R24.56, (mean ± 1 S.D., n = 33). The average annual household paraffin consumption was 86.16*l*. In addition, just over half (51%) the villagers cooked twice a day, 21% prepared food three times in a day, and 27% cooked only once a day, all using fuel wood to prepare food. Paraffin was bought towards the end of the month when most households received their government grants.

On average a household gathered fuelwood 3.77 ± 2.86 (mean ± 1 S.D., n = 85) times a week, which amounted to a total of 94.25kg (25kg * 3.77) of fuelwood a week per household. This figure totaled an average of 4901kg per annum for a household or 3 019tonnes for the whole community (616 households) per annum.

For a fuelwood headload collected in the forest the average selling price was R14.39 and the average buying price was R12.99 (Table 3.10). It took on average 2.42 ± 1.52 (mean ± 1 S.D., n = 85) hours a day for a household to collect fuelwood. Since the average cost of a bundle of deadwood/fuelwood was R12.99 a bundle (Table 3.10), the annual fuelwood consumption for each household was valued at R2 546.56 which translates to R1 568 680.96 per annum for the use of fuelwood for the community. This figure (R2 546.56) is 15% of the estimated average household income (R16 677 per annum; Statistics South Africa 2003) and makes a substantial contribution toward maintaining rural livelihoods. These findings reveal the extent to which the community valued fuelwood by comparison to the alternative product (paraffin). The results also show that the community was highly dependent on the forest for fuelwood.

Table 3.10. Calculated costs (rands) of buying, labour, selling and collecting from the forest

	Selling price	Buying price	Your labour cost	Collector's labour cost
		Fuelwood (deadwood)		
Mean	14.39	12.99	14.31	13.04
1 S.D.	12.56	7.57	12.37	7.56
n	94	94	94	94
		Building poles		
Mean	11.07	11.07	10.71	10.67
1 S.D.	14.28	17.14	16.82	16.59
n	15	14	14	14
		Fencing poles		
Mean	7.32.	7.15	7.35	7.13
1 S.D.	7.88	7.37	7.72	7.72
n	95	95	83	83

In valuing fuelwood, respondents preferred to sell fuelwood collected from the forest at a higher price (R14.39) than they were prepared to pay (R12.99) for it themselves. The small difference between buying and selling price (R1.40) for fuelwood is difficult to explain. Especially as most respondents (91%) did not realize the importance of adding labour costs to the selling price and the difference cannot be explained as an attempt to value labour costs. Their values on imputed values for their own labour costs and that of a collector if they were to pay (Table 3.10) were not necessarily in conscious derivation of labour costs. But these imputed values do provide a rough calculation of how much users could afford if they were in the position of the other person. As a result, for imputed labour costs, the difference between collector's labour cost and own labour cost was R1.27. Considering the difference between

the selling and buying price (R1.40), and the difference between collector's and own value (R1.27), the true value of a bundle of fuelwood was (14.39 – 1.34 [average of 1.27; 1.40]) approximately R13.05 (Table 3.10).

Building

For fencing and building poles users based pricing on *Eucalyptus* spp. collected from woodlots, although previous questions and the ecological surveys show that a considerable proportion of the building poles are collected from the forest. An average of 18.9 poles was used to build one roofing frame for a hut. Not all huts used small poles or laths to reinforce the walls. But for those who did (I counted ten), an average of 15.5 ± 6.84 poles (n = 10, mean ± 1 S.D.) were used to reinforce the walls of their huts. One hut was built every 3 years on the average homestead. Given an average cost of each building pole (R11.07, see Table 3.10) and the average number of poles needed (18.9) to build a roof over a hut, it cost approximately R 209.22 for a household to build a hut roof. This value can be divided by three to obtain a potential annual cost of roofing poles to a household. I did not ask respondents to value the cost of small wall building poles. However, supposing the cost of these wall poles was half (R5.54) the cost of each building pole, then the cost of building a wall for a hut was (5.54 * 15.5/3) R85.87. Thus the total cost to a household of building poles required to build a hut was R 295.09 (R 98.36 per annum) and R 181775.44 to the whole community. This figure is a considerable underestimate of the actual value of building poles to a household as the total number of poles used are known to be underestimated by the households. But, even if three times as many poles were used, incurring three times the value, the estimated value of building poles to a household would still only be 2% of annual household income.

Fencing

If on average 76.9 ± 81.6 (mean ± 1 S.D., n = 21, median = 50) poles were used by households to build a fence every three years, in other words, approximately 25.6 poles per annum per household. The monetary value of fencing a household per annum was therefore (R7.15 * 25.6) R183.04, which translated to R112752.64 for the entire community per annum.

Medicinal Material

On a 5 point scale of 'critically important' to 'not important at all', with a neutral mid-point, medicinal extracts harvested from the forest were rated by households as generally important. More than half of the respondents (81%) regarded medicinal material harvested from the forest as 'important' to their lives. Of all respondents only 3.9% said the medicinal material was not important in their lives, 4.8% were ambivalent and 9.7% did not have any opinion as this question was not relevant to them. This reliance on medicinal material from the forest may have been also the result of the absence of a well functioning clinic in the community. Only three respondents indicated that traditional medicine harvested from the forest was important in contributing directly towards sustaining their livelihoods, as they were selling it to communities. These three users were not traditional healers but traded within the community and claimed to have knowledge of the use of traditional medicines for specific diseases.

Labour Costs

If users were not in the forest harvesting or collecting fuel wood, building and fencing poles and medicinal products, most (79.6%) respondents suggested they would spend their time doing home chores including cleaning, working in the garden and cutting grass (especially women) for thatching and making traditional floor mats. The average amount of time spent on these activities was 5.27 ± 2.33 hours (mean ± 1 S.D., n = 103) a day. Respondents were asked how much they would charge to do the above chores for someone else, and how much where they willing to pay someone to collect items for them. In both instances, prices varied but on average were similar. For these hours (5.27 h) a day, respondents charged R36.06 ± R64.31 a day to do these activities for another person, but were only prepared to pay another an average of R31.93 ± R57.32 a day for their labour. Given that these chores were conducted during the time that could have been used harvesting, and although 2.42 hours were spent in a day collecting from the forests, the average daily cost of collection from the forest to a household is R36.06 per day. This does assume that there is little division of labour among members of the household, which is unlikely, but does allow me to estimate the 'at worst' scenario for costs of labour. Furthermore, these labour charges appear, to some extent, to be incorporated into the selling and buying prices listed in Table 3.10. Thus, in general a household would expect to sell an item, such as a fuelwood headload, for more than they

expected to buy them from someone else. Users appeared to be unaware of the costs of labour and did not incorporate these into pricing levies, although little or no selling-on of forest products occurred in reality. Most (98%) households did not use any form of transport to collect or harvest from the forest and transport costs are not represented here.

Cultural & Spiritual Value

Most households (78%) did not value the forest for cultural or religious reasons and thus valued the forest mostly for the products it provided to support livelihoods (i.e., Fuelwood).

General Value to Livelihoods

I have already demonstrated that the value of fuelwood consumed represents 15% of the average annual household income. Annual household paraffin consumption (86.16*l*), which was valued at R449.16 per annum per household, currently, represents 2.8% of the annual household income. This cost would likely double, if not triple, if paraffin were used to replace fuelwood for preparing food. Thus, there is no doubt that fuelwood from the forest alone makes a substantial contribution toward maintaining household livelihoods at Ongoye. Together the annual value of fuelwood (R2 546.56), alternative fuel source (paraffin - R449.16), building poles including wall building poles (R69.74 + R28.62 = R98.36), and fencing poles (R183.04) amounted to R3 277.12, represented 19.7% of the annual household income. This proportion is likely to be greater for many households as the estimate of average household income is derived from statistics for Ward 26 as a whole, and 51% of the interviewed households had no employed members and most households (83.6%) received government grants and pensions. For the latter households the value of just these few categories of forest products, which excludes essential services such as water supply and medical services, is more like 50-60% of annual income. These findings show compellingly that forest products were critical in securing the livelihoods of the community. Finally Ongoye forest harbors considerable potential economic value which could be released should eco-tourism ventures be developed at Ongoye.

DISCUSSION

Several studies point to the importance of forest resources to the livelihoods of communities surrounding such resources (Lewis & Alpert 1997, Shackleton *et al.* 1999, Sah & Heinen 2001, Stave *et al.* 2001, Lawes *et al.* 2004, Cunningham 2004, Choge 2004, Robertson & Lawes 2005). This study showed the extent to which the Ongoye community was dependent on the forest. An overwhelming percentage of respondents (91.3%) used the forest as a source of fuelwood, probably because the best alternative fuel, paraffin, was not within financial reach of most of the community. Variation in patterns of use of forest resources are broadly determined by distance of a household from the forest, with those closer to the forest using more resources. Although respondents generally denied harvesting the forest, comparison of an ecological study (Boudreau *et al.* 2005) and my social survey showed that the community was using the forest to a greater extent than they were prepared to admit. This calls into question the utility of questionnaires where estimates of resource use are required. Furthermore, the findings suggest that the importance of the forest to communities is not related to esoteric cultural or religious factors and is driven solely by the need to maintain and sustain livelihoods. Consequently, the success of management institutions and the conservation of the forest will depend very much on strategies that appeal to the maintenance of day-to-day aspects of rural livelihoods and not to security of resource use in the too distant future. The latter conclusion is consistent with findings from other forest user communities in South Africa (Robertson & Lawes 2005).

In a study conducted at the Afromontane forests of KwaYili and iGxalingenwa forests, fuelwood comprised the bulk of wood used by the villagers, and harvesting continued throughout the year (Nomtshongwana 1999). At KwaYili and iGxalingenwa most people (91.5%) used the forest for fuelwood. Even though Ongoye forest is located on the coastal plain and the climate is warmer than these Afromontane forests, which receive occasional snowfalls in winter, dependence on fuelwood from the forest was just as high at Ongoye. However, unlike villagers adjacent to the KwaYili and iGxalingenwa forests (Nomtshongwana 1999) users at Ongoye were at pains to indicate that they were not harvesting live-stems from the forest for fuelwood, but that they only collected deadwood from the forest floor, even though this was obviously not true from the findings of my study. This qualification on the part of Ongoye users arises because the provincial conservation agency (EKZNW) has a presence in the reserve and only permits the use of deadwood. That

users are knowingly using live wood for fuel indicates that harvesting demand for fuelwood currently exceeds supply and this issue will become an important ecological and management concern in the near future.

In South Africa 51% of domestic energy use consists of fuelwood gathered from forests, woodlands and exotic plantations, and accounts for between 0.27 and 1.12 tonnes per capita per annum (Nomtshongwana 1999, Lawes *et al.* 2004). The annual household fuelwood consumption (kg) for South Africa varied from 3484 to 7500kg (Table 3.11). On average annual fuelwood consumption (kg) for each household at Ongoye was estimated at 4901kg. In the study area fuelwood use was unevenly spread over the year, with more intensive use occurring during winter (May, June and July) period when minimum temperatures reached as low as ~8^0C. Similar amounts of fuelwood were used by households annually (3948kg) from another coastal scarp forest at Mt Thesiger in the Eastern Cape (Obiri 2002). However, fuelwood bundles weighed mean 25.3 ± 1.5kg (ξ ± 1 S.D., n = 44) in Obiri's (2002) study. I weighed 7 head loads at Ongoye. Five of those, weighed approximately 20kg and the other two weighed 30kg. And using 25kg as an average mass, the annual tonnage at Ongoye was 3.019 tonnes per annum for the whole community. Therefore in general, the annual tonnage (4.9) of fuelwood used by a household at Ongoye is within the range used by other forest or woodland based communities (kwaJobe, Mseleni, KwaYili, Mt. Thesiger; see Table 3.11) in South Africa. An important conclusion of this study is that users cannot get all their fuelwood requirements from deadwood and do cut live stems for future use as fuelwood. I also suspect that much of the discrepancy between ecological and social surveys in the number of stems used derives from considerable use of pole-sized stems for fuelwood.

Table 3.11. Comparisons of user densities per ha of forest among studies in South Africa

Name of forest	Population size	Forest area (ha)	Users per ha
iGxalingenwa	7318	2800	2.61
Dukuduku Indigenous Forest	20000	6500	3.08
Ongoye	1000	616	1.62

However, in comparison with other studies, trends at Ongoye did not differ significantly from those of studies in South Africa. There were no specific population figures for Ongoye. The available population data was for Ward 26 of Mlalazi municipality (8455 individuals), which extended beyond the boundaries of my study. For purposes of arriving at a workable value for contrasting and comparing population data with other studies, I calculated the population data for Ongoye as 7318 individuals. Since the average household size (11.88) from 103 household respondents represented 16.7% of the 616 households, I multiplied the number of households (616) that potentially used the forest by the average household size (11.88) to get the most reliable value (approx. 7318). Therefore in comparisons with other these studies (i.e. Picard 2003, at Dukuduku Indigenous Forest – 6500ha to approx. 20000 individuals; Robertson & Lawes 2004, iGxalingenwa – 616ha to 1000 individuals) and given current off-take rates of 264 ± 30 small stems ha^{-1} over three 3 years (Boudreau et al. 2005), it appears Ongoye is not under any immediate threat from overexploitation.

Table 3.12. Household valuation of fuelwood for communities living around forest resources

Region	Reference	Quantity consumed/ household/ annum (kg)
KwaJobe	Shackleton et al. (1999)	3 484
Mseleni	Beukman et al. (1998)	5 511
KwaYili	Nomtshongwana (1999)	4 866
Sihangwane	Lewis & Mander (2000)	4 000
Mt Thesiger	Obiri (2002)	3 948
Amatola Basin	Bembridge & Tarlton (1988, 1990)	6 404 & 7 500
Ongoye forest	This Study	4 901

Forests provide favoured hardwoods for a variety of handcrafts and household items (Lawes *et al.* 2004), and products carved from forest woods often make an important contribution towards the livelihoods of communities adjacent to them (Choge 2004). In Kenya for instance, income from woodcarving supports 60 000-80 000 carvers, who in turn, support approximately 400 000 dependents (Choge 2004). Wood crafting was also an alternative source of income in Zimbabwe during the serious droughts of the 1980s and 1990s (Standa-Gunda 2004). Although there is a documented use of forests in southern Africa for a variety of handcrafts and household items such as sticks, bracelets, carvings, spoons, bowls, (Nomtshongwana 1999, Obiri & Lawes 1997, Standa-Gunda 2004, Shackleton & Shackleton 2004, Lawes *et al.* 2004) only 7.85% of respondents at Ongoye used the forest to harvest

wood for craftwork or carving. Harvesting from the forest for craft wood was therefore of limited importance to local livelihoods and appears to have limited impact on the forest's ecology (Boudreau *et al.* 2005).

Given the small percentage (0.5%) cover of indigenous forest in South Africa, tree felling in indigenous forest is generally discouraged (DWAF - 2003). In Kenya, for example, intense harvesting, particularly of slow growing tree species, led to severe reductions of most natural tree populations (Choge 2004). The second most (65%) used resource at Ongoye forest was material harvested for building purposes. The ecological survey revealed the vulnerability of the 7 most harvested species from the forest (Boudreau *et al.* 2005). However, users denied harvesting building poles from the forest at the intensity recorded in the ecological survey. The ecological study suggests 3-4% of the standing stock of poles were recently harvested (Boudreau *et al.* 2005) while users' reported using about 0.2-0.6% of available pole-size stems per annum. Large numbers of posts are needed by households and their removal from the forest often causes disturbance to, and major effects, on forest ecology (Ruffo 1989). However, at Ongoye, building and fencing rarely occurred, furthermore adherence to the rules (laid down by both the *Inkosi* & EKZNW), together with a reverence for the local authority, make for a situation where the poles from the forest are used in a sustainable manner for now (Boudreau *et al.* 2005). However while building and fencing posts are important to local users, as indicated by the percent of households (65% and 39.8% respectively) who claim to use them, the harvesting of poles for fuelwood will need careful monitoring. The difference between the ecological and social surveys in the numbers of poles used cannot be explained by any other factor than their use for fuelwood.

While collection of fuelwood and medicinal products is recognised as causing significant threats to forest habitats in many parts of South Africa (Shackleton 1993, DWAF 1993, Mander 1998, Shackleton & Shackleton 2004), users claimed not to be harvesting medicine from the Ongoye forest, but rather that they used medicine gathered from the forest by a few 'professional' gatherers who knew which species were important. This is not to say that these few gatherers do not affect the size of the standing stock of medicinal plants, but only that I did not detect evidence of excessive gathering of medicinal plants. Unfortunately, the dire status of medicinal plants is often recognised only when that species is near to extinction from a local forest. Nevertheless, I found that nearly half of the households review (44.6%) used traditional medicinal products. Of the top seven species used for medicinal purposes; *Trichilia*

ametica/dregeana, Macaranga capensis, *Albizia adianthifolia,* Bophuphu (Zulu name in absence of Scientific), *Syzygium cordatum, Englerophytum natalense, Ekebergia capensis,* all except *Englerophytum natalense* were not reflected in the ecological survey of pole use (Boudreau *et al.* 2005) at Ongoye. The status of medicinal plants at Ongoye remains uncertain but it is clear that medicinal tree species are, for the most part, not favoured for other purposes.

Harvesters of medicinal products from trees usually remove the tree bark and concoct it with other species. Obiri & Lawes (2002) argue that medicinal tree use and fuelwood use in local forests are related since excessive debarking causes trees to die standing. The dead wood resulting from these tree deaths contributes to the dead wood material commonly used as fuelwood. As has been indicated previously, large quantities of dead wood were collected from the forest, more than for any other category of tree use and it is possible that, given that 81% of households valued medicinal products from the forest, the effects of medicinal harvesting are more far-reaching at Ongoye than the questionnaire and ecological surveys would suggest.

Forests have been used in many instances as sources of food. In the Eastern Cape (White 2004) and in Zimbabwe (Vermeulen 1996, Standa-Gunda 2004) forests were used for both consumptive (e.g., hunting for meat, fruits, snails, honey, fungi) and non-consumptive purposes (e.g., collection of fodder, livestock grazing). In other parts of Africa, forests have provided crucial resources including fruits and protein in the form of bush meat (Redford *et al.* 1995, Cunningham 2004). These foods make a significant contribution toward local livelihoods in other coastal scarp forests in the Eastern Cape (White 2004), and in general are most important where no other social security is provided by the state (Cunningham 2004). However, most respondents (84.5%) at Ongoye did not collect foods from the forest. Foods from the forest at Ongoye were mostly collected opportunistically (especially by children) when collecting other items, such as fuelwood. Although the local Inkosi conducts an annual hunt at Ongoye forest (Walker 1961), the local community is effectively banned from hunting themselves. Respondents denied using the forest for neither any kind of hunting nor their knowledge of any exclusive hunting by *Inkosi*, probably for fear of reprisals. By comparison to other protected forests, such as the Hluhluwe forests (those in the reserve) antelope numbers at Ongoye are very low. In fact, densities of game animals, at Ongoye are low by comparison with other 'community forests' too, such as Nkandla, although the occupants of

homesteads close to the Ongoye forest boundary did complain about bushpig activities in their crops. It is my impression that forest mammals favoured as bushmeat at Ongoye are heavily hunted or at least were heavily hunted in the past and game is kept at low densities by continual hunting pressure. During the ecological surveys hunters using firearms were encountered in the forest (S Boudreau pers. comm). While most people depended on their homestead gardens to supplement their diet, my discussion above points to evidence that some foods, particularly bushmeat, are being collected from the forest. Unlike on other African countries, such as Nigeria (Cola nuts – Adebisi 2004), and Cameroon (Kernels of *Ricinodendron heudelotii* – Ngono & Ndoye 2004) there was no trade in forest foods from Ongoye on local markets although it is likely that forest foods do contribute in a small way toward maintaining local livelihoods.

Forest Value

The value of forest products to local livelihoods and user communities can be high (Weber 1987, Lewis & Alpert 1997, Sah & Heinen 2001, Stave *et al.* 2001), particularly with regard to securing the livelihoods of communities around such resources (Robertson & Lawes 2005). The economic value of some forest species has threatened their survival in the forest (Chamberlain *et al.* 1998, Fearnside 1999, Grace *et al.* 2002). Very good local examples of species threatened in this way are *Warburgia salutaris* and *Ocotea bullata,* which have become extinct outside of protected areas in KwaZulu-Natal (Cunningham *et al.* 1998, see Lawes *et al.* 2004) for review. Other values to the forest are cultural, religious and social values, which are even less visible and therefore unaccounted for at macro-policy level (Lawes *et al.* 2004). In South Africa, rural communities traded medicinal products worth US$143 million per annum (Mander 1998), and trade in handcraft products is well documented (Cunningham *et al.* 1988, Cawe & Ntloko 1997, Hendry 1998, Nomtshongwana 1999). These trade practises contribute significantly towards rural livelihoods. However, at Ongoye, and similar to a study by Cavendish (1999), users were not engaged in any form of trade in forest products. The use of forest products from Ongoye was essentially to provide direct support to local livelihoods and there was no case to make for forest resources providing any means of income for users.

Clarke & Grundy (2004) describe local livelihoods as typically comprising households that do not survive on crop production or wages alone, but on a complex mix of different activities,

many of which depend on the resources available to them, and are closely tied into the social networks of which they are part). Users were mainly dependent on government grants for their income, and small vegetable garden plots of crops for subsistence. Thus, forest products from Ongoye are important to the maintenance of local livelihoods and it is possible that forest products provide a vital 'safety-net' for the survival of most Ongoye households. For example, the annual fuelwood consumption for each household was valued at R2 546.56 or 15% of the estimated average household income (Statistics South Africa 2003) per annum. If users were to pay for these resources, the cost would impact negatively on their livelihoods, particularly considering high (51.5%) unemployment rates at Ongoye. In comparisons between this study and other studies (Shackleton *et al.* 1999, Beukman *et al.* 1998, Nomtshongwana 1999, Obiri 2002, Lewis & Mander 2000, Bembridge & Tarlton 1988, 1990), including the ecological survey (Boudreau *et al.* 2005) the findings suggest that the forest is excessively used by local people, but not over-exploited. This is also because the overall percentage harvest intensity was only 3 to 4% while users admitted to harvesting a rate of 0.2-0.6% per annum.

In the new South Africa, the county's natural forests are viewed as sources of livelihood for local people (Grundy *et al.* 2002). Because Ongoye community claimed that they never traded any of the products (or by-products i.e. through carving) sourced from the forest (and therefore no replacement value), I could not assess the value of the products in terms of their monitory value to the community. The forest was mainly used for subsistence purpose. These findings are similar to that of Nomtshongwana (1999) with regard to the absence of trade for carved material and people using them for subsistence purposes only. The current use of indigenous forest at Ongoye appears to be primarily related to fuelwood, and much of this comes from dead wood. Robertson and Lawes (2005) conceded that it was important to manage biomes as they were vital to sustainability of rural livelihoods, but also because often dead wood on the ground result from earlier harvesting. Considering other definitions of sustainable livelihoods; for example, "people's capacities to generate and maintain their means of living, enhance their well-being and that of future generations (Ellis 2000, Shackleton et al. 2000); it can be argued that reliance on the forest for fuelwood and other resources greatly enhanced the well-being of the Ongoye community and made a substantial contribution toward maintaining their livelihoods. Because without the forest as a source of fuelwood, and given their socio-economic conditions (including unemployment rates, education level) it would be fair to conclude that the community was not going to be able to

sustain their livelihoods. Therefore the value of resources was high to the local community's livelihood. At iGxalingenwa, Nomtshongwana (1999) made similar findings with the local communities not trading.

CONCLUSIONS

Users are highly dependent on the forest for fuelwood. However, the present use of tree species and wood products from the Ongoye forest appears to be sustainable at current levels (Boudreau *et al.* 2005). There is a discrepancy between the ecological and social surveys in the numbers of poles used and the responses received from users on whether they (users) harvest live wood for fuelwood or not. It therefore is fair to conclude that;

- There was widespread illegal harvesting of live wood for fuelwood, because the discrepancy above can only be explained by the use of live wood for fuel.
- There is insufficient natural deadwood for the policy of allowing the collection of deadwood for fuel to be sustained.
- The utility of questionnaires in a social survey when trying to establish patterns of resource use is questionable, particularly when activities being investigated are illegal.
- It is difficult, and often challenging to conduct PRA in studies that do not have tangible and immediate economic benefit for communities.

Users did not trade in forest products to any great degree and most products contributed directly to maintaining the livelihood of a household. Users valued the forest for the products they obtained from it and not for cultural or religious reasons. Household income is low in the region and forest products account for at least 15% of that income in the potential costs of building, fencing and fuelwood expenses. Most households preferred to collect fuelwood from the forest rather than use the alternative fuel, paraffin. Where paraffin was used by a household this was often limited to certain types of cooking (boiling water). The latter shows that most households were financially strapped and dependent of the forest for important resources.

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CHAPTER 4

Evaluating the influence of traditional authority on the use and management of forest resources

SUMMARY

Traditional authorities have the capacity to determine whether forest resources in their areas of jurisdiction are properly managed or not. Their influence has affected the use and management of forests in South Africa both positively and negatively. In South Africa where government policy has been to devolve responsibility for the management of natural resources to local communities, traditional authorities (tribal chiefs) are key stakeholders in this process. This study investigates the strength of traditional authority at Ongoye forest, and the influence that this traditional institution has on the use and management of forest resources. At Ongoye the local chief (*Inkosi* Mzimela) is also chairperson of the National House of Traditional Leaders in South Africa and commands wide respect from the community and therefore rules on forest use imposed by him were generally adhered to. The *Inkosi* appeared to be making sensible ecologically sustainable rules about the use of the forest and supported EKZNW conservation policy. A questionnaire survey of 103 households (16%) was used to examine local user opinions. In general, users (64%) thought that the *Inkosi* was more influential in managing forest use than EKZNW. However, respondents (61%) were of the view that the *Inkosi* should not have unilateral power to decide who should use and access forest resources. The latter arises not from disrespect for the *Inkosi* but because the user community would prefer unrestricted access to forest resources. This has potential consequences for forest management institutions in the future, as any weakening of authority in the creation of such an institution will almost certainly be taken advantage of by users and the use of forest resources will increase. The *Inkosi* plays a vital role in helping to maintain forest conservation policy at Ongoye. Because the introduction of new management structures by government, such as community forestry management initiatives where the local community has the majority say in managing the forest, have proven to be divisive,

causing conflicts of interest among stakeholders at the local level, it is suggested that more participatory management structures be sensitive to the role that the *Inkosi* and his council play. This would ensure that responsibilities, powers and jurisdiction issues are condoned by representatives of the community before being implemented, thereby avoiding confusion and conflict over access and tenurial issues involving the forest. Furthermore existing local structures, particularly the local tribal council should be trained and strengthened in basic forest management principles, to increase their legitimacy to users and EKZNW and efficacy in cooperatively managing local resources.

KEYWORDS: traditional leadership, resource use, local stakeholders, indigenous forest, forest management, user attitudes, forest conservation

INTRODUCTION

Most countries in southern Africa including South Africa, Zambia, Lesotho, Tanzania, Zimbabwe and Botswana have initiated processes of governance of natural resources that involve devolving management powers to communities surrounding them (Grundy *et al.* 2002). As part of its land restitution programme, the South African government has promoted the formation of legally recognised land-holding bodies called Communal Property Associations. These democratically elected structures are often headed by influential people in the community, such as local businessmen and local government councillors (Grundy & Michel 2004). However, there are problems with the unsustainable management of natural resources at local level (Virtanen 2000). Besides the fact that users may not support community forest management *per se* in South Africa (Sikhitha 1999, Obiri & Lawes 2002, Robertson & Lawes 2005), the use and management of resources at a local level is often compounded by conflicts and clashes between new management institutions that are introduced by government and existing local institutions, usually traditional local authorities (Ntsebeza 2000). The co-existence of these local authority institutions (traditional leadership/local government/department sponsored committees) that have overlapping jurisdictions causes conflicts (Shackleton *et al.* 2000, Grundy *et al.* 2002, CEAD 1999). The more management institutions at the

local level the more complex management becomes, and the greater the likelihood of overlapping jurisdictions and mandates (Ntsebeza 2000, Campbell & Shackleton 2001). These tensions are also fueled by concerns among communities about access to, and ownership of, forest resources and forested land (Grundy *et al.* 2002, Robertson & Lawes 2005). Traditional leadership, such as tribal or clan chiefs, which in the past would have been responsible for allocation of land within the communities, has often been marginalised in the new initiatives since 1994, a situation that has been socially divisive and has caused conflicts over decision-making power (Grundy *et al.* 2002).

At a local level, traditional authority institutions usually have control over a number of villages that may be grouped into sub-wards and wards. A chief and tribal council, composed of *Inkosi* appointed (occasionally elected) clan members, oversee the area and the tribe, and may report to a king or paramount chief. Headmen (*indunas*), usually appointed by the chief, are responsible for the day-to-day running of villages and report to the tribal council and chief on a regular basis. At the provincial level a 'house of traditional leaders' and a department dealing with, among other issues, traditional affairs, provides support to chiefs (von Maltitz & Shackleton 2004). The institution of traditional leadership and the role of chiefs' cultural activities and customary law is recognized in the South African constitution (TLG-FB 2003). Resources at this level (traditional authorities) are managed through unwritten traditional rules, values and norms (Mukamuri 2000). In the period before democracy in South Africa rural people were mostly led by traditional authority. The chief and his tribal council (TC) were generally responsible for setting and enforcing controls and regulations. TCs were powerful institutions that were respected and obeyed by local people, with absolute authority over their people and resources (Keulder 1998). However, in some areas, traditional authorities (TA) were regarded as puppets of the apartheid state and not widely respected (Mukamuri 2000). In addition, some TAs were not fully accountable, and in a few instances abused their authority. In Zambia and Lesotho for instance, local chiefs diverted some community based natural resource management benefits to building their own power base (Shackleton *et al.* 2000). The unaccountability of local authorities, particularly chiefs and *Indunas*, were in some instances extremely bad for the

environment and the community in general. In one survey conducted in Ghana by Appiah (2001), 73% of interviewed farmers were tenants, migrants who acquired their land bogusly through directly paying drink money to the chief (Appiah 2001).

Traditional Authority Post-1994

Post 1994 the South African government introduced legislation designed to establish local institutions that were accountable. As a result transitional rural councils were created to pave the way for new local government (Ntsebeza 2000). But in many rural areas, Chiefs still held sway in many day-to-day aspects of the lives of local communities. Traditional leadership in local communities surrounding the Thathe forest in Limpopo Province (Sikhitha 1999), Ongoye forest in KwaZulu-Natal (Hendry 1998), the Nkandla forest in KwaZulu-Natal (CEAD 1999), and the Dwesa-Cwebe in Eastern Cape (Grundy *et al.* 2002) were very strong and played a critical role in use of resources. There is also a move in South Africa to strengthen traditional authorities' power, particularly in the ownership and administration of land rights (Ntsebeza 2005). Traditional authorities are also represented through the National House of Traditional Leaders (chaired by *Inkosi* Mzimela) and the powerful Congress of Traditional Leaders in South Africa (Contralesa) under the leadership of Chief Holomisa. These two structures have been in the forefront of pushing for more traditional authority based local governance, giving the chiefs and headmen more decisive powers at the third tier of governance (Ntsebeza 2005). In some instance (Vhatavhatsindi tribe of Thengwe in Limpopo Province) failure to comply with the chief's authority on matters relating to forest management could lead to the offender being ostracized from the community (Eeley *et al.* 2004). In other areas outside South Africa (several of which are in the neighboring Zimbabwe) the respect for local authority derived from a fear of the powers that chiefs had. In Mukarakate (Zimbabwe) for instance, local community members ranked the influence of the chief highly in relation to local institutions (i.e., Ward Councillor, Forestry Commission) that contributed to natural resource management (Mukamuri 2000). However participants to this ranking claimed that the chief was ranked high because of his presence during the ranking exercise (Mukamuri 2000). All these

steps did not, however, deter illegal carvers some of which were outsiders and not as affected by traditional authority and who traveled long distances to come and harvest (CEAD 1999, Sikhitha 1999, Tyynelä & Niskanen 2000). The local community around the Thathe forest was dependent on the forest for a variety of consumptive and non-consumptive uses (Sikhitha 1999). However, TAs still contributed significantly towards reducing use of resources to sustainable levels. The resistance by local communities or outsiders was not due to disrespect for the chiefs but a consequence of ever increasing demand for natural resources to sustain livelihoods. In many communities the demand for natural resources was in excess of the quantities required to sustain the resource base, and even where communities were directly involved in managing natural resources, the community's recognition of the importance of using resources in a sustainable way was never translated into appropriate actions on the ground (Grundy *et al.* 2002). von Maltitz & Shackleton (2004) speculated that the impact of population growth, increasing commercialization of wild resources and the unavoidable need to use natural resources for livelihood activities, have probably affected TAs ability to control resource use. Particularly with regard to reducing use of fuelwood, and where essential resources for the maintenance of livelihoods are concerned, harvesting rules and controls were generally flouted (von Maltitz & Shackleton 2004).

However, the influence of traditional leadership has had a positive effect on the management of resource use in some areas, for example in the Nkandla community in South Africa (CEAD 1999), Chukurume, Tahuona, Kasirori, and Ndoro villages in Zimbabwe (Tyynelä & Niskanen 2000). In further examples, some forests have survived harvesting because they were regarded as sacred places where chiefs and headmen are buried, such as the Thathe forest in Limpopo (Sikhitha 1999) and Dukuza forest in the Drakensburg Mountains (Eeley *et al.* 2004). Other sacred forests, such as Hlatikulu in the Lebombo Mountains and Nkandla in Zululand also had spiritual importance to communities because they were the burial sits of Zulu kings (King Dingaan at Hlatikulu; Moll 1977, and King Cetshwayo at Nkandla; CEAD 1999). Similar traditional influences by chiefs elsewhere in southern Africa (i.e., Malawi and Lesotho) have been cited as one of the strengths of community based natural resource management (Campbell &

Shackleton 2001). All these factors had positive influence in the access and use of forest resources. However, it must be borne in mind that local communities respected these traditional authorities and adhered to traditional norms and values (Keulder 1998). In these situations, traditional authorities are still powerful institutions that have an important role to play in managing and conserving natural resources. The break down in adherence to traditional values and morals can have dire consequences for the management of forests.

Of concern is that there is evidence that traditional leadership is increasingly becoming weak in southern Africa and losing its legitimacy among people (Nomtshongwana 1999, Mukamuri 2000, Obiri & Lawes 2002, Robertson & Lawes 2005) relative to local government and other structures such as Communal Property Associations (Rihoy 1999). Ironically, the move by government to introduce new legislation generally disempowered most respected traditional institutions (traditional leadership), often denying them statutory responsibility over land and resources (Grundy *et al.* 2002). For instance, at villages surroundings Kwayili and iGxalingenwa State Forests, local communities did not regard the *Inkosi* as the custodian of the forests and he was a weak authority figure in relation to the local party political councilor (Nomtshongwana 1999). As a consequence, KwaYili and iGxalingenwa forests have been over-exploited (Nomtshongwana 1999, Robertson & Lawes 2005). In the years immediately following 1994 the political climate resulted in many rural villages, and particularly among youths, being more politically than traditionally inclined (Nomtshongwana 1999). Weak traditional leaders lost ground to party politics to the detriment of local environmental management practices (Obiri & Lawes 2002).

Although the recent devolution of management powers to communities in southern Africa (Obiri & Lawes 2002, Shackleton *et al.* 2000, Robertson & Lawes 2005) has created conflicts and disempowered many traditional leaders (Grundy *et al.* 2002), in rural areas the management of natural woodlands and forests is mainly still in the hands of local traditional authorities such as chiefs and headmen (Zharabe & Mudavanhu 2000, Shackleton *et al.* 2000, Grundy *et al.* 2002). Even though several studies agree that these

local level and traditional institutions are important, there are conflicting views on their effectiveness (Nomtshongwana 1999, Virtanen 2000, Robertson & Lawes 2005), for the following reasons: (1) chiefs can introduce traditional policies that are sometimes in conflict with government policies (CEAD 1999, Virtanen 2000, Grundy & Michell 2004); (2) Amakhosi may ignore/disregard prescribed conservation policy from government if it contradicts a common traditional practice (CEAD 1999); and (3) Amakhosi may abuse their authority for their personal benefit (Appiah 2001, Shackleton *et al.* 2000). At Ongoye the question of who owns the forest (i.e., the *Inkosi* or the state) has not been resolved, presenting the management of the Ongoye forest with a difficult future problem to overcome. This study investigates the power dynamics in the community with regard to control and ownership of the forest; including the power and influence of traditional local authorities over the use and management of Ongoye Forest. In particular I examine whether the influence of the traditional authority has benefited or been detrimental to the conservation of Ongoye forest.

METHODS

Site study and the stakeholders

The Ongoye forest is located in KwaZulu-Natal province (28^0 48'-28^0 53'S, 31^0 38'- 31^0 46'E) in the uMlalazi Municipality, about 10 km northwest of Mtunzini and 24km east of Eshowe at 300-500 m a.s.l. The forest covers a low massif comprising syenitic granite basement forming the Ongoye range of hills. The Ongoye forest is located in a ward with a particularly powerful traditional leader, *Inkosi* Mzimela, who is also chairman of the National House of Traditional Leaders in South Africa. He is known to have strong views regarding the ownership and use of Ongoye forest (Hendry 1998, Lewis *et al.* 1999).

Initially, the protection of forest resources had been a priority in Zulu tradition, with hunting being reserved for the king, and extraction of timber within Zulu controlled areas being restricted to a moderate level (Lewis *et al.* 1999). This situation changed in the 1890s as the demand for mine props increased (Hendry 1998). Ongoye Forest Company

was granted sole rights by the Natal Government to work the forest. The forest was logged under licence to this private company until about 1920. It is estimated that as a result of this logging and demand, by 1919 when this company ceased operation, 900 000 cubic feet of timber, mostly pole-sized stems for mine props, was removed (Anon 1983). After 1920 the forest came under the control of the forestry department until 1978 when it passed to the then KwaZulu Bureau of Natural Resources and finally in 1994 to EKZNW. Thus it has been formally protected since about 1920, although the influence of TA has been considerable during and before this period (when it was a favoured hunt of the Zulu kings). The extraction of resources from Ongoye forest therefore dates back to the era of the great Zulu kings.

Questionnaire and survey design

The questionnaire design and specific questions were based on previous studies by Hendry 1998; Nomtshongwana 1999; Obiri & Lawes 2002; Robertson & Lawes 2005). Most questions were closed questions, requiring the respondent to judge opinions according to a symmetric five point Likert scale i.e. 1 = strongly agree to 5 = strongly disagree, with a central neutral point (Likert 1974). Other questions were based on a binomial, yes or no, or multinomial response, for example, descriptions of who was the most respected person in control of access and use of the forest, or were continuous variables such as the respondents' age were used.

The following themes were central to the structure of the questionnaire:

- the demography of the user community, including respondent's age, gender, level of education, period of stay in the area, distance from the forest, income sources, and household size;
- stakeholder (EKZNW, users, local authority) interaction and their respective objectives and perceptions of the management of Ongoye forest;
- user perception and preference of forest ownership, access and law enforcement, and forest management systems;
- The *Inkosi's* authority over the use of forest resources.

The study was conducted in the months April through to November 2004. Before conducting the survey the local authority (*Inkosi* Mzimela) was approached for permission to do so. Individuals from 103 households (16% of households) were interviewed (71 at Endlovini, 16 at Amanzamnyama, and 16 at Qwayinduku). Each questionnaire took approximately 50 minutes to administer and all questionnaires were conducted by the same interviewer (LJP) with the assistance of an interpreter. The questionnaire survey was conducted in an informal atmosphere and addressed to all members of the household, but focussed on the answers provided by a key informant among those present. This was usually that individual most willing to engage in dialogue with us and often was a senior household member. However, senior members of the household were not always present and the age and gender of the key informant were recorded to check for any bias later. If members of a household discussed the answer to a question, we allowed the key informant to represent the consensus view rather than drawing our own conclusions from the discussion.

Statistical Analysis

The perceptions and attitudes of respondents to questions on the authority of the *Inkosi* and his influence on use and access to forest resources were determined using the most commonly-selected response (i.e., the modal class) from a frequency distribution of responses on the Likert scale (Likert 1974). Differences in opinion or choice were for the most part tested using the Chi-square goodness-of-fit statistic. Data were analyzed using the Statistical Package for the Social Sciences (SPSS 2002) Version 11.0 (ter Braak & Šmilauer 2002).

The data were initially explored using correspondence analysis (CA). Demographic data (e.g., age, gender, household size), as well as socio-economic data (number of income-generating activities per individual, education) and the distance of the household from the forest, were ranked on a scale of 1 to 5 and included in the data matrices. The relative importance of questions or variables was judged against the position of respondents in the ordination attribute plot using the biplot rule (Lepš & Šmilauer 2003). Variables with a

large value for weight X variance and a high percentage fit for the first two axes were regarded as having influence, and only these were plotted as a biplot (arrows) on sample scores (ter Braak & Šmilauer 2002).

Logistic regression was used to examine the putative influence of demographic and socio-economic variables on the power and influence of traditional authority on use and access. The two critical multinomial (four and five options) questions about power and influence of such power were used as dependent variables in separate regressions. The two questions were; (1) The *Inkosi* has the power to decide who has the right to forest resources, and (2) who is the most influential person/institution when it comes to controlling the use of the forest at this time? The first one was a statement where respondents' options were based on a likert scale (1 to 5). In addition, I used multinomial logistic regression to further determine whether demographic and socio-economic variables explained the power and influence of the *Inkosi*.

RESULTS

User demography and socio-economic status

There was no significant difference in gender distribution of respondents ($\chi^2 = 3.505$, $df = 1$, $p = 0.061$). Among the key respondents, 40.8% were male, 59.2% were female and the mean age was 36.9 years. In the Ongoye context, a household was any homestead within 2 km of the forest and on average, respondents' households were 0.5 km from the forest. The mean household size was 11.9 persons and varied significantly from household to household (11.9 ± 10.0 individuals; mean ± 1 SD, $t = 11.941$, $p < 0.0001$). About 76% (n=79) of households had been resident in the area for >30 years. Only 14% of households had been resident near the Ongoye forest for less than 30 years.

With over half (51.5%) the community unemployed, almost all (83.5%) households were dependent on government grants, supplemented by their small vegetable gardens. An equal number (83.5%) of households grew crops for subsistence purposes. Annual

household income for ward 26 (the ward including the forest) of Umlalazi municipality in 2001 was R16 677 (Statistics South Africa: Census 2003). This is probably an inflated estimate as it includes all households in the ward, and not just those from the user community living immediately around the forest.

A quarter of the respondents (25%; n=26) had not received any formal education, and almost the same number (24.2%; n=25) had only a primary school education. A third (32%; n=33) of respondents had completed grade 10 (Standard 8) at secondary school, and only (16.5%; n=17) had matriculated. Only two respondents had post-matric qualifications. The community did not have access to electricity and, in fact, all the interviewed households were dependent on the forest for fuelwood.

Management and Ownership of Ongoye

Although the state through EKZNW owns, and is responsible for managing, the Ongoye forest reserve, 31% of the respondents thought that the *Inkosi* (through his tribal council) was responsible for managing the forest, while 29% were of the view that the forest was under the Community's control. Twenty-two percent (22%) of the respondents' thought that management of the forest resided with the EKZNW, while the rest (16.5%) did not know who was in control of the forest. There were no democratically elected community based or local government institutions responsible for controlling the forest, and no mention was made of such institutions in relation to forest control or management by the community. In addition, every Wednesday the tribal council sat and some of the sittings were dedicated to adjudicating cases of community members who used the forest (i.e., illegal harvesting) without a permit (*Induna* Mhlongo and *Inkosi* Mzimela's administrator, pers comm.). These findings suggest at least 50% of the local community believed that the forest was under the control and management of and the community or the *Inkosi* as a representative of the community. A surprisingly small proportion of respondents were aware that EKZNW actually controlled activities in the forest reserve.

The above trend toward community control of forest resources was supported when respondents were asked who should control forest resources. Many community members were (40%) in favour of the forest being under the *Inkosi's* control, while a significant number (30%) felt that the community (independent of the Inkosi's tribal council) should take control of forest resources. About 20% did not have an opinion, while others (7.8%) felt that EKZNW should have control over forest resources. There was agreement (67%) that, although the local authority ostensibly controlled and managed the forest, the residing committee formed by the local authority did not have capacity to ensure sustainable harvesting of the forest. Users (93%) felt there was a need for training the local committee to effectively manage resource use from Ongoye forest. Multinomial logistic regression revealed that distance ($\chi^2 = 20.881$, $p < 0.0001$) from the forest and education level ($p < 0.025$) of respondents influenced respondents' opinions on who should control forest resources. The least educated respondents indicated that the *Inkosi* should control forest resources. Those who had junior primary school education only felt strongly that resources should be under the control of EKZNW or the community, while users with grade 10 (standard 8) believed that the community independent of the tribal council should have control over the resources. People who stayed within 0.2 kilometres from the forest wanted the community to control the forest, while those who lived further from the forest indicated that the *Inkosi* and EKZNW were better placed to control the use of forest resources.

The community was also uncertain about who owned the forest with 42.7% suggesting that it belonged to the community, 23% indicating that they did not know, and 18% speculating that it belonged to the *Inkosi*. The rest (9.7%) of the respondents suspected that it was either owned by EKZNW, or was 'God's property' (5.8%). The *Inkosi's* view, on the other hand, was that he was part owner of the forest (Hendry 1998). When asked who should own the forest, almost half (46.6%) of the respondents indicated that it should either be owned by the community, or the *Inkosi* (33%). The other 16.5% did not have an opinion on who should own the forest resources, with almost three percent (2.9%) saying that the forest should be owned by no one but God. Only one person said that the forest should be owned by EKZNW. These findings together suggest that

community members are of the view that forest resources should be owned by them. Multinomial logistic regression revealed the importance of duration of stay ($\chi^2 = 11.511$, $p < 0.021$) in the community, and distance ($\chi^2 = 21.764, p < 0.0001$) from the forest as the two most important factors affecting user's responses to questions on ownership. Interestingly, respondents who had stayed in the area for 35 to 45 years felt that forest resources should be owned by EKZNW and not the *Inkosi*, while those who had been in the area for a longer period (46 and over 50 years) felt that both the *Inkosi* and the EKZNW should own the forest. All those who were new in the area (less than 20 years) believed the forest should be owned by the community. The effect of distance on ownership was that people who were closer to the forest (within 0.5km) preferred that the forest be owned by EKZNW together with the community. Their worry was that if only the community owned the forest resources, they will be depleted. It does appear from these findings that new people in the area, who were probably not supporters of the *Inkosi*, thought that resources should be owned by the community. In addition, even though community members wished to own resources, they were concerned about the consequences of community ownership on resource availability. Surprisingly few users either acknowledged that EKZNW controlled or owned the forest or supported control and ownership of the forest by EKZNW. The latter is very worrying for the state's role in managing forest resources at Ongoye and does emphasize the need for greater community participation in, and the creation of, a participatory forestry management institution at Ongoye.

Power and influence of Traditional Authority (TL) at Ongoye

A significant number of users (64%) thought that the *Inkosi* Mzimela (or his tribal council) was the most influential person/institution when it came to controlling access and the use of the forest. Eighteen percent (18.4%) of the respondents thought that together the *Inkosi* and the EKZNW (they are regarded as working together) were most influential in controlling use of the forest. However, most (61%; $\chi^2 = 40.641$, $df = 4$, $p < 0.0001$) respondents were off the opinion that the *Inkosi* should not decide who has access to forest resources (only 30.9% supported the *Inkosi's* powers in this regard and

7.8% were ambivalent). In spite of the community's obvious concern about whether the *Inkosi* should have as much power to influence their use of the forest as he does, half (50.5%; $\chi^2 = 90.519$, $df = 4$, $p < 0.0001$) of all respondents nevertheless reported that the *Inkosi* was the most respected authority controlling the forest, while 33% thought that both the *Inkosi* and EKZNW commanded the same respect and 12.6% felt that EKZNW was more respected than the *Inkosi*. Users (58.3%) were most likely to obey rules imposed by either the *Inkosi* or EKZNW with regard to access and use of the forest. One third (33%) of respondents indicated that they were more likely to obey the *Inkosi* than EKZNW, and only 6.8% of respondents were likely to obey EKZNW rules rather than the *Inkosi*. The rest (1.9%) did not have an opinion (did not know). These findings illustrate the power, respect and influence that the *Inkosi* has among the local community with regard to access and use of forest resources. Although community members respected and admitted the *Inkosi's* influence (64%) in the way the forest is currently used, the findings show some dissatisfaction among community members (61%) with the *Inkosi's* almost autonomous power to decide on who uses and accesses forest resources.

Multinomial logistic regression identified only site of settlement among the demographic and socioeconomic variables as an influential factor on users opinions of the strength of traditional authority (Likelihood ratio = 206.362; $\chi^2 = 76.598$, $df = 40$, $p < 0.0001$). Overall, users were of the opinion that the *Inkosi* should not have the power to decide over use of and access to forest resources. Most users in Qwayinduku (site 3) and Amanzamnyama (site 2) were strongly opposed to the *Inkosi's* right to constrain the use and access of the forest. At Endlovini (site 1) opinions on the right of the *Inkosi* to impose restrictions on forest use were evenly divided for and against. (Figure 4.1). Endlovini is much closer to the *Inkosi's* residence.

Multinomial logistic regression also confirmed the importance of household size, site of settlement and gender distribution of respondents to a question of the influence of traditional authority on controlling use and access of forest resources (Table 4.1). The final model fit was (Likelihood ratio = 132.589; $\chi^2 = 69.409$, $df = 30$, $p < 0.0001$). Households with more members (8 to 19 members) regarded the *Inkosi* as the most

influential in the community with regard to controlling the use of forest resources than those with fewer or smaller (less than 3 persons) households. Probably because larger households make greater demands on forest resources and have had to confront the rules of use and access to the forest imposed by the *Inkosi*. Furthermore, both males and females thought that the *Inkosi* was more influential, but more females than males thought that EKZNW was equally very influential in controlling access and use of forest resources. This was probably because females are typically collectors and used the forest more often than males, and therefore encountered EKZNW more frequently than men. In addition, users at Qwayinduku did not mention the *Inkosi* as an influential person/institution, while those at Amanzamnyama regarded the *Inkosi* as the only person/institution most important in controlling use and access to forest resources. Endlovini dwellers were spread across those who thought the *Inkosi* was the most influential (as the majority) and those who also included EKZNW (Figure 4.2.). Overall, it appeared that the reason users have refrained from openly harvesting forest resources is that conservation practices at Ongoye forest were underpinned by strong traditional (traditional leadership) practice.

Figure 4.1. Users' responses to the statement, "the *Inkosi* has the power to decide who has the right of access to forest resources". y-axis label = number of respondents.

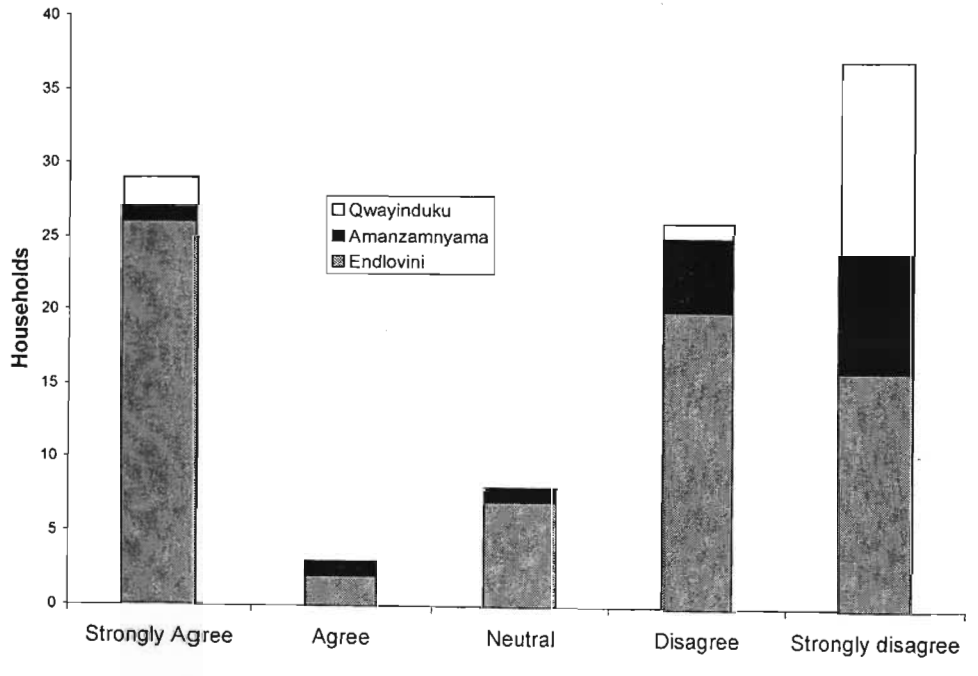

Figure 4.2. The influence of site of settlement on responses given by users regarding the influential institution/person on the use of forest resources. The question was "who is the most influential person/institution in controlling use and access to forest resources?" y-axis label = Number of respondents.

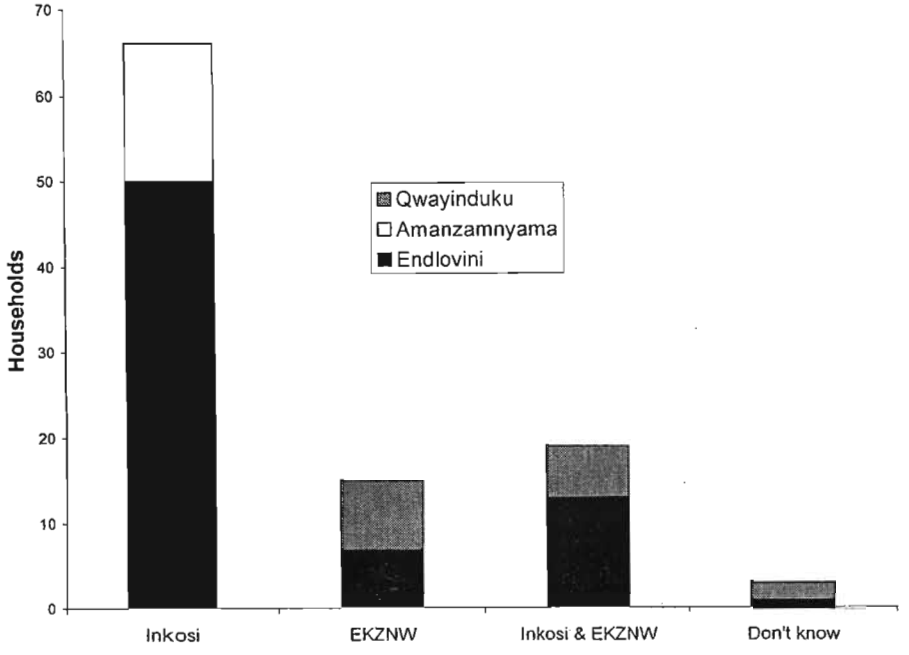

Table 4.1. Multinomial logistic regression of relationships between socioeconomic variables and people's options on the influence of forest local stakeholders (the *Inkosi*, EKZNW, the *Inkosi* together with EKZNW) to use and access of forest resources. Age = Age of respondents to questionnaire; Household size = the number of people staying in the same household; Duration of stay = the period that a respondent stayed in the community; Distance from forest = Distance from the household to the closest point of the forest; Settlement = the site at which questionnaire was administered (among the three sites); Gender = gender character of the respondent; Education = the education level of respondents (with categories from 1 = no schooling to 4 = post matric qualification).

Effect	-2 Log Likelihood of Reduced Model	Chi-Square	*df*	*p*
Intercept	132.589	0.000	0	.
Age of respondents	139.951	7.362	3	0.061
Household size	141.723	9.134	3	0.028
Duration of stay	139.392	6.803	3	0.078
Distance from forest	136.881	4.293	3	0.232
Site of Settlement	169.569	36.980	6	0.000
Gender	143.102	10.513	3	0.015
Education	140.918	8.329	9	0.501

DISCUSSION

Boudreau *et al.* (2005) showed that the present use of pole-sized stems from Ongoye is probably sustainable and this study shows that the *Inkosi's* considerable influence over patterns of use of resources at Ongoye may be responsible for sustainable harvesting levels. Users feared the *Inkosi* and as a result did not wish to appear before his traditional court. A similar situation exists in Zimbabwe (Tyynelä & Niskanen 2000). At Ongoye the *Inkosi* is widely regarded as working with the EKZNW in controlling access to the forest. However, respondents felt that the *Inkosi* should have less influence over who had the right of access to forest resources. Consequently, users wanted the forest to be under the ownership of the community independent of the tribal council (led by the *Inkosi*). Therefore, although community members were unhappy with the extent of the *Inkosi's* influence, his influence is largely responsible for current intensities of resource use being sustainable (Boudreau *et al.* 2005), and thus the *Inkosi's* influence on the use of forest resources must be seen as a positive contribution to the conservation and management of the forest. The *Inkosi* (local authority) was however only implementing rules that were favorable to the policies of EKZNW. His positive contribution did not mean that he (his committee) had the capacity to manage sustainable off-take from the forest; hence (93%) there is a need to train the local authority in managing Ongoye forest.

Recent changes in policy have created a participatory role for communities in managing natural resources. This approach has arisen over the last ten years from the finding that local communities are frequently unwilling to be the sole custodians and managers of forest resources because they lack the skills and finances to do so (Obiri & Lawes 2002). The implementation of the devolution of management powers to the local level has put the spot-light on the complex dynamics of local management institutions, with several studies examining the role of traditional authority in natural resource management (Mukamuri 2000, Ntsebeza 2000, Appiah 2001, Shackleton 2002, Grundy *et al.* 2002, Robertson & Lawes 2005). At issue is the ownership, power relations (relative to other local stakeholders and in relation to forest resources) and influence of traditional authority (the *Inkosi*) on the management of natural resources. At Ongoye EKZNW

currently manages the forest and is very willing to engage in cooperative management with the community, but is probably deterred by the authoritarian approach of the *Inkosi*. Furthermore, the powerful *Inkosi* affects the participatory role that the community currently plays and the community has indicated (see Chapter 2) that they would like more involvement in making management decisions. Respondents reiterated (see Chapter 2) their wish to own and have more control over access to and the use of forest resources. The community's willingness to own and control the forest was however intrinsically linked with their interest in accessing and using forest resources and not necessarily with the sustainable management of these resources. The power and influence of the *Inkosi* was seen by the community as restricting user access and control of forest resources, and hence community members were not in favour of the *Inkosi* controlling their use of forest resources. In terms of the conservation of the forest the *Inkosi's* dominant role is vital at this time. In creating any future participatory management institution it will be necessary to balance community opinion against their respect for traditional authority in developing a suitable committee structure for meaningful conservation of the forest so that usage patterns continue to be sustainable.

There can be no doubt that conservation practices at Ongoye forest, primarily introduced by EKZNW, were underpinned by strong support from the *Inkosi*. Adherence to rules governing local forest use was motivated by respect for the *Inkosi* (emanating from traditional practice) rather than from having derived a mutually agreeable solution through consultation among stakeholders (Keulder 1998). Traditional modes of governance clearly have an important role to play in guiding the use of resources, provided traditional authorities are informed about best practices and are sensitive to achieving conservation and sustainable harvesting goals. Given the adherence to traditional practise at Ongoye (Walker 1961, Hendry 1998), and the *Inkosi's* authority and positive influence on forest resources, it appears that the TA should continue to manage the Ongoye forest alongside EKZNW. To ensure that this scenario is perpetuated it will be necessary for the state, through EKZNW, to acknowledge the important role of the *Inkosi*.

The Ongoye forest is still guarded by the *Inkosi* who considers himself (or his clan) part owner of the forest (Hendry 1998). Studies have shown that traditional policies sometimes conflict with government policies (Virtanen 2000, Grundy & Michell 2004) and in such instances Amakhosi may ignore or disregard conservation policy in favour of traditional practices (Virtanen 2000). At Ongoye a traditional practice that conflicted with conservation policy was the Inkosi's Annual traditional hunt (Walker 1961). Together with poaching and other ecological factors the hunt has negatively affected the ecology of the forest. For instance, antelope numbers or densities at Ongoye were much lower than that at Nkandla Forest, which is also a community forest, and illegal hunters were often seen at Ongoye (Chapter 3). In addition, the *Inkosi* has used his considerable power to create a road through the Endlovini section of the reserve. This road links parts of his ward that are separated by the reserve. Thus, it is fair to conclude that Amakhosi are inclined to disregard conservation policies if they conflict with established tradition (Virtanen 2000) or local politics and Ongoye is no exception. Although the *Inkosi* currently supports conservation practices, there are nevertheless very real dangers associated with having so much power in the hands of a single individual, and the Ongoye community is fortunate that the *Inkosi* does act in their best interests, although they may not appreciate it. Nevertheless, a management institution that dilutes the *Nkosi's* power while recognising the importance of his influence may provide a better balance to the management of the Ongoye forest.

Grundy *et al.* (2002) observed that even where the community was involved in managing the natural resources, the community's recognition of the importance of using resources in a sustainable way was never translated into appropriate actions on the ground. Such tendencies by communities were probably because of the impact of population growth, increasing commercialisation of the natural resources and the absolute need to use the natural resources (von Maltitz & Shackleton 2004). It remains to be seen at Ongoye whether the general increase in demand for natural resources to support livelihoods will affect the *Inkosi's* ability to control or influence the use of forest resources in the future. At forests where the local community is highly dependent on forest resources to sustain their livelihoods, for example KwaYili and iGxalingenwa forests, weak traditional

leadership has resulted in overexploitation (Nomtshongwana 1999, Robertson & Lawes 2005). However, thus far, *Inkosi* Mzimela's positive influence towards use of and access to forest resources (except for hunting purposes) confirms the findings of other studies (Niskanen 2000, Campbell & Shackleton 2001) on the critical role that traditional authorities can potentially play in managing the sustainable use of natural resources. At Ongoye, like in Malawi and Zambia (Campbell & Shackleton 2001), traditional authorities are the backbone of community based natural resource management.

Participatory management institutions created by the state seek to distribute power among local stakeholders in managing forest resources. For instance, in participatory forest management (one of the three important management strategies; see chapter 2) all the stakeholders including the community, EKZNW and the tribal authority work together in the management of forest resources (chapter 2). Given the general feeling by users that they needed to be more involved, and that the *Inkosi* was equally powerful and feared by the community, it is unlikely that the *Inkosi* would tolerate too much dilution of his powers and be easily receptive to a participatory institution managing the forest. However, the current *Inkosi* has a positive influence on the management of the forest, but should he be replaced by another leader less interested in managing the forest, this would have dire consequences for the management of resources as there is no participatory local structure managing the forest. Thus, it would seem prudent to develop a participatory forest management institution at Ongoye, in spite of the anticipated reluctance of the *Inkosi*, that takes cognizance of the *Inkosi's* role, but that provides a framework for the future management of the forest should the leadership change.

CONCLUSIONS

The *Inkosi* (*Inkosi* Mzimela) and his tribal council is the most powerful institution at Ongoye forest with regard to the use and management of forest resources. Together with EKZNW the two institutions ensure the current largely sustainable use of forest resources. There was no local participatory institution with sole responsibility of managing the forest at Ongoye. Users on the other hand, were of the view that a local

structure independent from the tribal council was essential for the management of the forest. This local structure would have to be trained to manage the sustainable use of forest resources. The positive influence of the *Inkosi* on conserving the forest should be taken advantage of by EKZNW and a participatory forest management structure should be worked out that has a role for the *Inkosi* in ensuring the sustainable use and management of forest resources. Finally, given the strength of traditional leadership, the local tribal council should be trained and strengthened in terms of their capacity to manage natural resources (Lawes *et al.* 2004, Todd *et al.* 2004) to increase their legitimacy in the eyes of users and EKZNW.

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CHAPTER 2

User perceptions of conservation and management options at the Ongoye Forest Reserve

CHAPTER 5

Summary and Recommendations

CHAPTER 5

SUMMARY AND RECOMMENDATIONS

This study investigated the use and value of forest resources to communities (Amanzamnyama, Endlovini, & Qwayinduku) surrounding Ongoye forest. These aspects (use and value) were examined in relation to the challenges presented by the state's current policy of devolving responsibility for management of forest resources to local communities. I examined local institutional capacity as well as community's attitudes and opinions on the management and conservation of forest resources. The primary aims of this study were to: (1) examine user understanding and support for forest conservation practices and conservation as a concept; (2) investigate the attitudes of the local community toward ownership and access to resources; (3) establish the communities knowledge of conservation and management systems and their preferred system in both cases; (4) assess the value of the resource base to rural livelihoods; (5) study the role and influence of local authorities in managing, accessing and using the forest; and (6) identify prerequisites for community participation in new management strategies.

The study area comprised three communities surrounding the Ongoye forest, under the traditional leadership of *Inkosi* Mzimela. *Inkosi* Mzimela is the chairperson of the National House of Traditional Leaders in South Africa and is known to have strong views on the ownership and control of forest resources (Hendry 1998). The communities were located in the uMlalazi municipality (Statistics South Africa 2003) and in Ward 26. Households were relatively large (average 11.6 persons), unemployment high (51.5%), and users primarily dependent on grants from the government (mostly child and pension grants). The annual household income in 2001 was R16 677 (Statistics South Africa 2003). This is an inflated figure as it includes the entire uMlalazi district. The actual figure is probably much less given the fact that the study area comprised only communities who lived immediately after the forest (within 2km). There is not much economic activity beyond subsistence farming and some sizeable and locally owned sugar-cane farms, except for the new road that has been constructed through the

community. For many (S. Mzimela pers. comm) this road construction was hope for positive things to come for the economically depressed community. There were initial attempts to establish an ecotourism venture (Lewis *et al.* 1999) which so far has not come to anything for many reasons, among which is tension between Ezemvelo KwaZulu-Natal wildlife (EKZNW) and the local authority (*Inkosi*) over ownership of the forest. The issue of the ownership of the forest remains unclear and controversial. However, the management of the forest is currently under EKZNW's care, although the administration of rules and penalties for not complying with these rules on access and use, are dealt with by the *Inkosi* through his tribal council.

I could not conduct participatory rural appraisal exercises to investigate the value of and preference for forest resources because the community was either unwilling to gather for such a forum to take place or were distracted from the meetings at short notice by other more pressing activities. Nemarudwe & Richards (2002) raised similar concerns about the difficulty of conducting PRA in studies that do not have tangible and immediate economic benefit for communities. The Induna (headman) would initially agree to a meeting and later change to attend unscheduled engagements. On numerous occasions, I made plans together with the Induna and on my arrival, was informed that the meeting was postponed. I therefore used structured questionnaires administered to individual households in favour of PRA procedures to gather socio-economic data.

To penetrate all the issues that pertain to the use, management and value of the forest to local communities, I broadly investigated the following: (1) user perceptions of conservation and management, (2) use and value of forest resources to livelihoods, and (3) the influence of traditional authority on the use and management of forest resources.

Perceptions of conservation and management issues at Ongoye forest

Ongoye forest is presently under the management of Ezemvelo KwaZulu-Natal wildlife (EKZNW). Local communities were not aware of any independent management

institutions (PFM, CFM, SFM) nor the government's desire to involve communities in managing resources. However, after an explanation of the three management institutions:

- Most respondents were favorably disposed toward participatory forest management (PFM). Forest users were of the view that such a system (PFM) would give them more control over resources while ensuring that resources were also not depleted. The involvement of all stakeholders was critical to the local community, particularly EKZNW which has the capacity to deploy security guards in the forest. But, more importantly, users' desire for greater community control over access to the forest appeared to have been motivated by the prospect of relaxing the rules pertaining to the issuance of harvesting permits and not by a desire to conserve the forest over the long-term. This stance by the local community will necessarily require the active involvement of EKZNW in future management institutions to ensure the sustainable use and management of the forest.
- The unpopularity of community forest management (CFM) was due to the concern by users that without the presence of forest guards, community management would lead to uncontrolled use and depletion of much needed resources. This situation was regarded as only marginally better than open access by the communities and there was some indication of an awareness of the need to sustainably manage resources critical in supporting their (rural) livelihoods. Because of the reasons given above, CFM was so unpopular that, given a choice between State Forest Management (SFM) and CFM, users chose SFM over CFM. This is regardless of the fact that SFM would be (to them) essentially the current situation where they are unable to freely use the forest for their needs. Users chose SFM because they were convinced that under SFM resources would be available in abundance in the future. However, user opinions were consistent with the view that the conservation of the forest was to protect resources for their continuous and sustainable use.
- State Forest Management was only chosen as an alternative to participatory forest management, rather than (CFM). These findings show that regardless of resource demand and the communities dependence on forest resources, users were willing

to continue to use the forest guided by the current management institution (EKZNW and *Inkosi*), than to allow CFM, which was viewed as tantamount to open access. The findings also shows how valuable forest resources were to the community.

Because participatory forest management recognizes the vital role that communities play in environmental management and development (Grundy & Michell 2004), and because there is willingness from community members to take part in managing resources, PFM should be implemented at Ongoye. However, as highlighted in Grundy & Michell (2004), the concern about the tendency to erroneously describe participatory forest management as meaning equal partnership between all the partners involved should be clarified. This would avert community concerns (resulting from frustration and disappointment over control and use) if all stakeholders understand clearly the nature of their partnership. In addition other critical factors such as building trust between stakeholders, defining the resources, clarifying security of tenure, fulfillment of community needs, and locally acceptable returns among others (Murphree 1993, Campbell *et al.* 2001) should be addressed. The implementation of PFM should be done in tandem with reviving the ecotourism venture. Elsewhere in South Africa (e.g., Harkerville Tree-Top forest chalet; Tsitsikama Big Tree - view point and picnic site and hiking trails; Karkloof canopy excursions), ecotourism ventures have proven to be economically viable and have attracted large numbers of visitors (Vermeulen 2004). Ongoye forest with its rich species composition (Pooley 2003) has great potential to boost the Ongoye economy and benefit the local community (Lewis *et al.* 1999). This would ensure that the community benefits economically from the forest, and such a move would encourage increased participation.

The use and value of forest resources to livelihoods

Resource Availability

Ongoye is home to rare and endemic animal species such as *Paraxerus palliates* (red squirrel), *Stactolaema olivacea* (Woodward's barbet), *Phyllastrephus flavostriatus*

(yellow-streaked bulbul) and *Papilio nireus* (green butterfly). It was also home to the giant *Encephalartos woodii* (Wood's Cycad), extinct in the wild since the early 1900s. Unusual trees found here are *Millettia sutherlandii, Chionanthus peglerae, Alchornea hirtella, Atalaya natalensis, Garcinia gerrardii, Syzygium gerrardii* and *Ficus bizanae* (Pooley 2003). The dominant tree species are *Drypetes gerrardii, Englerophytum natalense, Millettia sutherlanddi, Rinorea angustifolia, Rothmania globosa, Harpephyllum caffrum* and *Garcinia gerrardii*. The mean number of understorey and canopy trees per ha is 718 and 246 respectively and the mean canopy tree species richness per 0.0625 ha plot is 9 (Krűger & Lawes 1997). The forest was logged for saw-timber from the 1890's and intensively from 1909 to 1919 by the 'Ngoye Forest Company' owned by Johnson and Carmont. No further legal extraction of large timber trees occurred after 1924. Since then it has been the perception of the conservation management institutions responsible for the Ongoye Forest Reserve that timber has been exploited by the local community to 'an alarming extent' (Anon 1983).

Resource Use and Value

The forest was used for the collection of fuelwood by 91% of respondents. Although, permission is currently granted by EKZNW to collect deadwood from the forest, it appears that live wood was harvested and not immediately collected but collected later as deadwood. This implies that deadwood stocks are in short supply. Future management of the collection of deadwood should also consider the ecological implications of the removal of all deadwood from the forest.

Users generally denied cutting wood from the forest for either building or fencing poles. There was also widespread denial of the use of the forest for building, fencing, or carving purpose. Contrary to claims by respondents, an ecological study (Boudreau *et al.* 2005) showed that the forest, mainly pole-size stems, was extensively used but probably not over-exploited at this time. The ecological study estimated that 3-4% of the standing stock of poles was recently (i.e., over the last 3 years) harvested (Boudreau *et al.* 2005), while users' reported using only 0.2-0.6% of available pole-size stems per annum. Use of

resources was not limited to timber. The forest reserve was also a source of thatching grass for homesteads and provided medicinal items to the community. Although the local community did not admit to collecting medicinal items from the forest, most respondents preferred medicinal products collected from the forest. There is no doubt that the forest is an important source of medicinal products to the surrounding communities and possibly to larger markets in city centres.

The local communities continue to harvest the forest for bush meat. On some occasions hunters using firearms were encountered in the forest (S. Boudreau pers. comm). In addition, the density of ungulates at Ongoye was low in comparison to other community forests (e.g., Nkandla forest). The challenge at Ongoye and other places in the southern Africa (e.g., Zimbabwe; Dore 2001) is how to adjust deeply entrenched traditional rules and practice, such as the *Inkosi's* annual traditional hunt, towards more sustainable natural resource management.

There was no electricity at Ongoye and an average household cooked twice in a day. Only 8% households used paraffin stoves in place of fuelwood burning stoves. It is clear that households were highly dependent on fuelwood from the forest to sustain their cooking frequency. This is also because the price of paraffin was not within reach of most households who were dependent on government grants. The total value of resources to users amounted to R2 757, which translated to 16.5% of the annual household income. The above findings question users' claims that building supplies were purchased from local dealers rather than harvested from the forest. There can be no doubt, given the findings of the ecological survey, that forest resources are extensively used in spite of user claims to the contrary, and furthermore that these forest resources are critical to sustaining local livelihoods.

The influence of traditional authority on the management of the forest

There are moves in South Africa to devolve management of forest resources to communities surrounding such resources. These moves are informed, in South Africa, by

the democratic government post 1994 (Grundy *et al.* 2002, Campbell & Shackleton 2001) and the general global trend (Wily 2001). The Department of Water Affairs and Forestry (DWAF) is facilitating such processes in South Africa, essentially because the country's natural resources are viewed as a valuable resource for sustaining rural livelihoods (Grundy *et al.* 2002). DWAF is mandated to ensure that the already small (0.5%) land cover of indigenous forest is conserved through partnership with communities living around such resources. At the local level, particularly in communities surrounding forest resources, local authorities are still dominated by traditional authorities who are not democratically elected but determined or appointed through ancestral ascendancy and hereditary (Keulder 1998). The issue of the management of resources with regard to the devolution of powers to communities is thus naturally linked to power dynamics at the local community level.

Traditional leadership (*Inkosi* Mzimela) was very powerful and influential in the Ongoye communities. The *Inkosi* is also the chairperson of the National House of Traditional Leaders in South Africa (NHTL). He is known to have strong views on the ownership and control of Ongoye (Hendry 1998). I discovered that his influence was largely responsible for the limited use of forest resources at Ongoye. The *Inkosi* was widely respected and through his powerful tribal council, prosecuted those who accessed and used the forest without a permit. His overwhelming power, terrified users who did not want to be called to his traditional court where stringent fines were often imposed. The *Inkosi's* influence is a positive one on the conservation and use of resources at Ongoye. The Inkosi's positive influence was however not motivated by any knowledge of sustainable forest management, as he (local authority) did not have the capacity to mange Ongoye forest.

However, there are dangers attached to so much power concentrated in one individual (the *Inkosi*). A worst case scenario is a situation where the present *Inkosi* is replaced by a leader with different and negative (in relation to conservation principles) views on the use of the Ongoye. The traditionally powerful *Inkosi* is in a position to impose his views on use and access to the forest and will ultimately determine its sustainable use. Thus, if he

is of the view that there should be open access, then it will be difficult to prevent the local community from openly accessing and plundering forest resources. Secondly, suppose the new *Inkosi* is also positive about sustainable use of the forest, but does not have the respect and influence that *Inkosi* Mzimela wields, forest resources may be equally subjected to over-exploitation under this scenario. Thus, it is imperative that a management institution, a participatory institution, be established that acknowledges the important role of the *Inkosi*, but also tempers his influence so that continuity in management principles is maintained when the traditional leadership changes hands.

The process of democratizing rural institutions (governance) by government has faced consistent resistance from traditional leaders, at both national and provincial level. At national level, the chairperson of NHTL who happens to be *Inkosi* Mzimela (Ongoye chief) represents the voice of the Amakhosi nation-wide (TLG – FB 2003). His counterpart Chief Patekile Holomisa of the powerful Congress of Traditional Leaders of South Africa is also one of the vocal voices against the government's attempt to democratize local institutions (Ntsebeza 2005). There are clear tensions in government policy with regard to local governance (Grundy & Michell 2004, von Maltitz & Shackleton 2004, Ntsebeza 2005). On the one hand the government has a constitutional responsibility to establish local governance made up of elected councilors. On the other, the constitution recognizes the existence of traditional leaders (who are not democratically elected) and provide for the establishment of legislation to define their role in a democracy (Ntsebeza 2005, TLG – FB 2003). This tension has caused confusion and resulted in power struggles at a local level. The more the number of organizational institutions at the local level the more complex things become, and the greater the likelihood that jurisdictions and mandates will overlap (Campbell & Shackleton 2001, Campbell *et al*. 2001). In KwaZulu-Natal this issue is further complicated by the fact that chiefs are affiliated to and take open membership of different and opposing political factions, and in particular the ruling African National Congress (ANC) and the Inkatha Freedom Party (IFP). For instance, the Provincial Chairperson of the traditional leaders is also the president of the Inkatha Freedom Party, Mr Mangosuthu Buthelezi. The leader of the Congress of Traditional Leaders in South Africa, Chief Patekile Holomisa is known to be a member of the ANC, and *Inkosi* Mzimela is aligned with the IFP. This allegiance

to party politics has also added to the deterioration of respect for traditional authorities in some local communities. A member of a different organization is unlikely to respect and adhere to an *Inkosi's* rule because he belongs to a different political party.

Initially chiefs were non-partisan with no affiliation to political organizations (Palmer 1998). The situation has since changed. Prior to 1994, and particularly the late 80s and the early 90s, the violence between supporters of the IFP and ANC in the province can be said to be responsible for an uneasy *status quo*. Local communities are now divided among supporters of either of the parties and their *Inkosi's* are also caught in the middle of party politics. One option could be to introduce local institutions that are more directly accountable to the community and supercede the powers of traditional authorities. However, neither colonial nor post-colonial policies have managed to destroy traditional leadership (Campbell & Shackleton 2001, Dore 2001) and such over-riding institutions are unlikely to be effective or even possible. Furthermore, in the Transkei, the lack of local institutional authorities has made it increasingly difficult for government to identify the correct community structures for liaison and implementation of PFM and for the community to fulfill their role in PFM (de Villiers 2004). At Ongoye the situation is such that the *Inkosi* is unlikely to tolerate too much dilution of his powers and may not be completely receptive to a participatory institution managing the forest. This does not, however, mean that such an institution should not be introduced, but does indicate a need for careful collaboration with the *Inkosi* for it to be successful.

Summary of Recommendations

- The management of fuelwood extraction from the forest requires urgent attention, for two reasons: (1) dead wood collection may arise from earlier cutting of live stems and so affects the standing stock of live trees in the forest; and (2) the extensive removal of deadwood could affect soil nutrients, ecological processes in the topsoil, and the diversity of epigaeic faunas.
- A thorough livelihoods analysis of the Ongoye resource user community should be conducted as forest products appear to be essential to the survival of most

households. In addition, current moderate levels of use are such that the management of future use is likely to be successful and will not require reversing current levels of demand for resources.

- Participatory forest management should be introduced now while there is a powerful traditional leader (*Inkosi* Mzimela), who is prepared to work with local government and EKZNW.
- The process of establishing this institution (PFM) should be linked with strengthening the existing traditional institutional structures (tribal council) so that users' and stakeholders who wish to participate in managing the forest are not seen to be challenging the *Inkosi's* authority (Campbell & Shackleton 2001).
- Having assented to the Act on the role and recognition of traditional leadership, government needs to reconcile such recognition with conventional democratic practices and be able to clarify tensions between democratic and hereditary institutions.
- There is a need to ensure that the introduction of forest management systems appear beneficial to the local community (Campbell *et al.* 2001, Dore 2001).
- The ecotourism venture should be revived to uplift the economic status of the local community, but also because it will benefit the conservation of the forest.
- There is a need for training in management principles to improve the capacity of the local authority to ensure sustainable harvesting targets and use.
- The Inkosi must be initially involved in calling the community together, and not just his committee or Indunas, as they tended to show lack of commitment.

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ANNEXURE

Study Questionnaire

QUESTIONNAIRE FOR ONGOYE STUDY

Interview Number		House number (GPS coordinates)	
Time and Date		Name of area	

Introduction

This interview is conducted to assist Lehlohonolo Joseph Phadima (a M.Sc. student in the University of KZN, School of biological and conservation sciences) to devise new management strategies that are ecologically sound, and also consistent with the needs and desires of the user community. The information obtained from these interviews shall be made available to the community at their request, and if any management changes need to be made as a result of the study, these will be through negotiated with the community. I therefore assure the community that this is not an attempt to intrude or introduce unpopular rules that will be binding on communities. At the core of this study is the requirement for me to complete a Masters degree.

Demographic questions

1. Age: _____
2. Gender:

Male		Female	

3. How many people including children stay in this household?

Adults		Children	

4. What level of education do you have?

No Schooling = 1; Junior Primary School = 2; Completed Std. 8 = 3; Completed Matric/10 = 4; Post matric qualifications = 5

5. How many of the household members derive income from elsewhere other than the forest?

6. Does the household have anyone receiving a government grant? And how many are they

Child care	
Disability	
Old age	
Illness (HIV/ any other illness)	

7. Who owns the land that you stay on?

Yourself = 1; the chief = 2; the tribe = 3; the community = 4; others = 5

8. Do you have livestock, and how many are they?

	Yes	Number	No
Cows			
Goats/Sheep			
Pigs			

9. Do you have agricultural land (including vegetable garden), and if yes how big is it?

Yes		Size		No	

10. How long have you stayed here for?

10 to 20 years = 1; 21 to 30 years = 2; 31 to 40 years = 3; 41 to 50; = 4; 61 & more = 5

11. If longer than 20 years, how was the harvesting quality of the forest resources in the earlier years?

Very Good = 1; good = 2; not different = 3; poor = 4; very poor = 5;

RESOURCE USE

12. Do you use the forest for…?

	Use (Y=1/ N=2)	How often Days/Wks	Species	How much (Weight/kg)	Time spent harvesting
Fencing					
Fuel wood					
Medicinal					
Building					
Crafts = weaving?					
Grazing					
Carving					
Food					
Selling					

13. What is the most common harvesting period? Winter = 1; spring = 2; summer = 3; autumn = 4

Fencing		Medicinal		Food	
Building		Crafts		Selling	
Fuelwood		Carving			

14. Traditional muti is more effective for treating diseases than western medicine provided by a doctor.

Strongly agree = 1; Agree = 2; neutral = 3; Disagree = 4; Strongly disagree = 5

15. Where do you get most of your muti? (Please rank)

	Rank
Forest,	
grassland	
Sangoma/iNyanga	
Friends	
Clinic	

16. How far do you have to travel on foot to the forest?

17. What are your three most preferred species? Please name and rank them using 1 to 7

		Ranking			
Scientific name	**Zulu name**	Fuelwood	Building	Fencing	Craft
Chrysophyllum viridifolium	UmGwinya/umEmezi				
Englerophytum natalensis	umThongwane				
Rinorea augustifolia	IThwakela/umZungulu				
Garcinia gerrardii	isiBinda				
Tabernaemontana ventricosa	uKhamamasane				
Oxyanthus speciosus	Umkhulu-omncane				
Drypetes gerrardii	UmHlwakela/isikhumaphuphu				

18. Have some species become easier or difficult to find in the forest?

Scientific name	Zulu name	Difficult to find	Easier to find	29. Used to be easier to find - Y/N
Chrysophyllum viridifolium	UmGwinya/umEmezi			
Englerophytum natalensis	umThongwane			
Rinorea augustifolia	IThwakela/imPicamaguma			
Garcinia gerrardii	isiBinda			
Tabernaemontana ventricosa	uKhamamasane			
Oxynathus speciosus	Umkhulu-omncane			
Drypetes gerrardii	UmHlwakela/isikhumaphuphu			

(Zulu names taken from Moll, 1992 and Pooley, 1994)

19. Do you feel that harvesting has negatively affected forest structure and caused big gaps?

Yes		No	

20. If yes, what forest resources have decreased?

Building Poles	
Muti species	
Fencing materials	
Food species	
Fuel wood	
Dead wood	
Curio/carving wood	

21. If harvesting from the forest was banned, would you/could you obey this ban?
(This could be from trust committee, EKZNW, inkosi or anyone above)

Yes		No	

22. If the ban was justified with good explanations, would you be more inclined to observe the ban?

Yes		No	

23. If you were employed, would you still use the forest?

Yes		No	

27. If answer to 26 is yes – what resources would you continue to use?

Building poles		Fencing poles	
Fuel wood		Dead wood	
Muti		Curio/carving	
Food		Grazing	

24. Which of the following might persuade you not to use the forest

Employment		Provision of fuelwood	
A nearby clinic		Access to decent shops	
Provision of electricity		None of the mentioned	
Other specify			

Outsider Use

25. Are there any people who are not from this community that use the forest? If yes, how many?

No	Yes	Number

26. If yes, how often do outsiders harvest in the forest?

Daily		Fortnightly		Yearly	
Weekly		Monthly		Biannually	

27. What do outsiders take? And what do they use to remove this?

Building poles		Food	
Fuelwood			
Muti		Vehicles	
Fencing poles		Trucks	
Dead wood		Head load	
Curio/carving wood		Wheelbarrows	
Other, specify:		Other, specify:	

28. Outsiders should not be allowed to harvest in the forest.
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

29. Do they (outsiders) in anyway affect your access to the forest, or the amount of resources you take?

FOREST MANAGEMENT (KNOWLEDGE & ATTITUDES)

Introduce the three management systems and briefly discuss their use.

Community forest Management (CFM); It's a management system where all adults from a community vote to elect a Committee (community forest management committee) to manage the forest. Villagers are consulted about rules through meetings , but the committee makes the ultimate decisions on behalf of the community.

Participatory Forest Management (PFM); all groups with an interest (stakeholders) in the forest (this could be community, Inkosi, Ezemvelo Kwazulu-Natal Wildlife, municipality, and business) form a joint committee, similar to that in CFM, to manage the forest. The community does not necessarily split responsibilities equally with other stakeholders. The community could have a large stake in the management relative to other stakeholders. All the rules are jointly established through representation of all the stakeholders in the process.

State Forest Management (SFM); the government manages the forest through Ezemvelo KZN Wildlife. There is some discussion with the community but management rules are devised and carried out by the State only. A process defined by KZNW enforces all the rules, as established by the KZN Wildlife on behalf of the government.

30. Is forest management about securing rights of access to resources/the forest.
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

31. Is management about restricting the community's access to resources.
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

32Is management about establishing equitable benefits from harvesting.
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

33. Is management about ensuring sustained yield of resources into the future.
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

34. Management is about ensuring that future generations also benefits from management.
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

36. To what extent are management rules enforced at this time?
Always enforced = 1; nearly always enforced = 2; enforced most of the time = 3; rarely enforced = 4; never enforced = 5

37. Who makes these management rules?
Inkosi = 1; ezemvelo = 2; community = 3; Inkosi with ezemvelo = 4

38. Who enforces them?
Inkosi = 1; ezemvelo = 2; community = 3; Inkosi with ezemvelo = 4

39. Under what conditions would you be prepared to participate in forest management, ranking your criteria of preference with, 1 = best, 2 = better, and 3 = Worse;

Different conditions	tick	rank
if rules & policy were clarified for me		
If trained to manage		
if given the opportunity		
if I was to benefit		
If resources begin to become unavailable to me (e.g., low stocks)		
I won't be involved at all		

40. Could the local (trust) committee have the capacity to manage Ongoye forest?

Yes		No	

41. if the community was to be involved in managing the forest, would you have to establish a new committee or would you prefer if existing committees manage the forest on your behalf?

Yes		No	

42. Could there be a need for training (further training if they have capacity above) the local (trust) committee to manage ongoye forest? (I'm trying to respond to prerequisites, particularly on the need to strengthen existing local structures for managing the forest, these two are however not the only question trying to respond to this)

Yes		No	

43. What management practice exists at Ongoye?
SFM = 1; CFM = 2; PFM = 3; open access = 4; other = 5

44. I would prefer to have a system that enables me to have more say about access and use of Ongoye forest than now

Yes		No	

45. How would your preferred system affect levels of use of the forest?

Use will be banned	
Use will be reduced	
Use will be same	
Use will be more	
Overuse	

46. What would happen if the local community were permitted to manage Ongoye without EKZNW assistance?

Much increased use permitted		Much better control of use	
Increased use permitted		Better control of use	
Same use as now		Same control of use	
Less use permitted		Worse control of use	
Much less use permitted		Much worse control of use	
Permit granted for live wood harvesting		Unable to control outsiders	

44. Are you prepared in principle to consider/discuss alternative methods of forest management to the current system.

Yes		No	

45. The forest should not be managed at all and there should be open access for everyone.
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

46. Would you be willing to contribute your time or money to the management of Ongoye forest?
Strongly agree = 1; agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

47. Would you be prepared to reduce use to allow the forest to recover?
Strongly Agree = 1; Agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

48. Would you be prepared to stop harvesting for two to three years to allow the forest to recover?
Strongly Agree = 1; Agree = 2; neutral = 3; Disagree = 4; Strongly Disagree = 5

49. Who owns the forest and who should own the forest? Who controls the forest and who should control it?

	Owner	Should be owner	Controller	Should be controller
Inkosi				
KZN wildlife				
The Government				
Community				

50. Is there a need to protect the forest?

Yes		No	

51. If you had to stop harvesting, for how long could that be until you cannot take it anymore?

52. At the rate that Ongoye is used now, do you think that harvesting will still be the same in 5 years to come?

Yes		No	

53. Would you be prepared to reduce your use of Ongoye forest so that your children can use it in 15 years to come?

Yes		No	

54. What are EKZNW objectives regarding Ongoye forest? (Rank)

Protect forest from overuse		Stop all forest use	
Stop outsider use		Involve communities in managing forest	
Protect forest so that it benefits them		Protect forests so that it benefits community later	
Protect it so that whites benefit		Don't know	
Protect it for benefit of wildlife only		Others, Specify:	

55. Would you be prepared to participate in a licensing agreement with the state for access to resources

Yes		No	

56. Permission is required for any person who intends to graze or herd animals in the forest reserve.
Strongly agree = 1; agree = 2; don't know = 3; Disagree = 4; Strongly Disagree = 5

57. Inkosi has the power to decide who has the right to forest resources.
Strongly agree = 1; agree = 2; don't know = 3; Disagree = 4; Strongly Disagree = 5

58. Do you know of any agreement that can/has be/been entered into between the state and the community so far as management of the forest is concerned?

Yes		No	

59. If yes, did you find the contents of the contract easy to understand?

Yes		No	

CONSERVATION (KNOWLEDGE & ATTITUDES)

60. What does conservation mean?

_____

61. Conservation is about the management of forest resources in a way that secures the livelihoods of the community.
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

Conservation refers to the management of the forest/resources for purposes of sustaining use over long periods. It is concerned with harmonizing the user's needs with the protection of resources for purposes of sustenance. In a conservation scenario, the community's use of resources would be balanced with the capacity of the forest to provide such resources.

62. The practice of conservation is critical for the sustainable existence of the forest
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

63. Should people be allowed access to forest resources only through a permit system?
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

64. Should conservation be about securing stocks of resources into the future for everyone to use in a sustainable way?
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

65. Forest can be better conserved if managed by state authorities (SFM) rather than local communities (CFM).
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

66. I would use the indigenous forest less if there were a woodlot nearby.
Strongly agree = 1; agree = 2; don't know = 3; Disagree = 4; Strongly Disagree = 5

67. Should only dead wood be harvested?
Strongly agree = 1; agree = 2; don't know = 3; Disagree = 4; Strongly Disagree = 5

68. Forest can be better conserved if managed by the community (CFM) rather than the state (SFM)
Strongly agree = 1; agree = 2; Neutral = 3; Disagree = 4; Strongly Disagree = 5

69. Which resources should be harvested less?

	Should be reduced	Should not be reduced
Building poles		
Fuelwood		
Fencing poles		
Muti		
Dead wood		

Carving wood		
Food		

70. Forest should be jointly run (PFM) under a participatory forum to ensure its conservation. Strongly agree = 1; agree = 2; don't know = 3; Disagree = 4; Strongly Disagree = 5

FOREST VALUATION

71. How important are the medicines harvested from the forest in terms of its contribution towards your livelihood. Critically important = 1; Important = 2; neutral = 3; not very important = 4; not important at all = 5

72. If critically important, important or neutral above, why? (If for trading reasons, how much do you sell for?)

Reason	
Cost	

73. If you did not have to harvest from the forest what would be the best use of your time that this would free up? Clean the homestead = 1, work in the garden = 2, fetch water = 3, go to school = 4, look after livestock = 5, sell/trade = 6, do nothing at all = 7

74. If any of the above besides doing nothing, how long (time spent) does it take you?

75. If you where to charge someone for doing the above activity for them how much would it be?

76. If you where to pay someone to do the above activity for you, how much would it be? (To ask 75 & 76 separate)

77. Do you use any form of transport to harvest the following? And if yes, at what cost?

	No	Yes	Costs if yes
Building poles			
Fencing poles			
Fuelwood			
Carving wood			
Dead wood			

78. How often do you cook a day?

1/Ones	2/Twice	3/Thrise

79. If you where to sell the material that you harvest from the forest how much would you charge?

	Cost
Fuel wood	
Fencing poles	
Building poles	
Dead wood	
Crafting	
Carving wood	

80. If you where to buy the material that you harvest from the forest how much would you expect to pay? (To ask 79 & 80 separate)

	Cost
Fuel wood	
Fencing poles	
Building poles	
Dead wood	
Crafting	
Carving wood	

81. If you where to harvest for your neighbour in the forest, how much would you charge them?

	Cost
Fuel wood	
Fencing poles	
Building poles	
Dead wood	
Crafting	
Carving wood	

82. If your neighbour was to harvest for you in the forest how much would you pay them? (To ask 81 & 82 separate)

	Cost
Fuel wood	
Fencing poles	

Building poles	
Dead wood	
Crafting	
Carving wood	

83. The forest is a place where we communicate with our ancestors and conduct some of our cultural and religious rituals.

Strongly Agree = 1; Agree = 2; don't know = 3; Disagree = 4; Strongly Disagree = 5

INTERACTION WITH STAKEHOLDERS

84. How much contact do you have with the EKZNW Zone officer?

Very frequent (1/month) = 1; Frequent (1/2 months) = 2; Regular (1/4 months) = 3; Occasional (1/6 months) = 4; Never = 5

85. How much contact would you like to have with the EKZNW Zone officer?

Very frequent (1/month) = 1; Frequent (1/2 months) = 2; Regular (1/4 months) = 3; Occasional (1/6 months) = 4; Never = 5

86. While in the forest, do you avoid the EKZNW Zone officer?

Yes		No	

87. If yes, why?

S/He arrest us		We are not sure we are allowed to be there	
S/He will scold us		S/He will take our wood	
S/He has taken our wood before		S/He will fine us	
S/He will stop us from cutting down the tree		Take me to Inkosi for discipline	

88. To what extent does EKZNW try to affect your use of Ongoye? Does try to prevent use = 1, tries to persuade to use a little = 2, try to persuade to use when there's no alternative = 3, try to persuade to rarely use = 4, tries to persuade to never use = 5.

89. To what extent has EKZNW affected your use of Ongoye forest? No effect – use as much as always = 1, small reduction in use = 2, moderate reduction in use = 3, rarely use = 4, never use = 5

90. How would you describe the community's relationship with EKZNW?

Very Good = 1, Good = 2, neutral = 3, Bad = 4, Very bad = 5

POWER DYNAMICS AND CONTROL

91. Who is the most influential person or institution when it comes to controlling the use of the forest at this time (Inkosi = 1; ezemvelo = 2; community = 3; Induna = 4)

92. Who is the most important/respected person or institution after the Inkosi with regard to controlling the use of the forest?

Induna = 1; Councilor = 2; Trust Committee = 3; Ezemvelo KZN Wildlife = 4; others = 5

93. Who is most likely to be obeyed [with regard to access and use of the Ongoye forest reserve]

ALTERNATIVE RESOURCE USE

94. Have you tried any of the following fuel resources?

Paraffin = 1; Gas = 2; Coal stove = 3; electricity = 4; Dung Cakes = 5; solar cooker = 6; No = 7

95. If not, why?

Too expensive to use = 1; too expensive to buy = 2; does not cook well = 3; do not know how to use = 4; time consuming to use = 5; do not know existed = 6

96. Which resource/s would you be most likely to try?

Paraffin = 1; Gas = 2; Coal stove = 3; electricity = 4; Dung Cakes = 5; solar cooker = 6; No = 7

97. Why?

98. Would the availability of an alternative resource of your choice at a cheaper cost stop you from using the forest resources? How much would that cost have to be?

Yes	No	Cost if cheap

Status of interviewee:

Harvester/Collector	

Non-collector/ordinary informer	

Decision maker	
Ordinary informer	

Post-interview measurements

1. Examine huts, woodpile, and fencing

	Av diameter	Av length	Specie majority
Fencing			
Woodpile			
Huts			

2. Weigh a headload/bundle of poles and fuelwood

Fuelwood	
Poles	

Additional tree specie (used) given by communities

Building poles	Dead wood	Fuel wood

Fencing poles	Muti	Crafting wood

CHAPTER 3

Resource use and the value and importance of forest resources to the livelihoods of users surrounding the Ongoye forest

CHAPTER 4

Evaluating the influence of traditional authority on the use and management of forest resources