COMMUNITY PERCEPTIONS OF COSTS AND BENEFITS OF DIFFERENT FOREST MANAGEMENT APPROACHES: A CASE STUDY OF UDZUNGWA MOUNTAIN FORESTS AND THE SURROUNDING MIOMBO WOODLANDS, TANZANIA

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ABSTRACT

As most of the countries in the African region are striving to move into Participatory Forest Management involving local communities adjacent to forest resources, there have been likewise, growing concerns among conservation and development agencies to try to find out how important are different forest management approaches to adjacent communities in terms of costs incurred and benefits accrued from the various participatory schemes including the participation levels of the intended beneficiaries. Much attention is also placed on the user rights as these have potential influence on the adoption of different forest management approaches and future sustainability.

This study was carried out in Udzungwa Mountains Forests and surrounding miombo woodlands. The study aimed at assessing early perceived costs and benefits from four different forest management approaches by adjacent local communities, and their implications to implementation of participatory forest management in the study area. The study focused much on assessing: community participation, costs and benefits, user rights and the perceived contribution of different approaches to poverty reduction in the study area. The guiding hypothesis of this study was that different forest management approaches have different costs and benefits to local communities, leading to different community responses.

Both primary and secondary data collection methods were employed, while analysis was done using qualitative and quantitative methods. From the results and discussions, the study revealed that local communities adjacent to Forest Reserves and Udzungwa National Park are involved in the management of natural resources and incur substantial costs but accrue some benefits at varying scale depending on the forest conservation approach applied. While CBFM showed superiority over the other three approaches followed by National Park, JFM and '*traditional*' Government Forest Reserves showed more weaknesses in terms of benefits to adjacent communities. Some legal aspects and operational mechanisms for improvement are recommended.

DECLARATION

I, Peter Ezekiel Sumbi hereby declare that:

- This work has not been accepted for any other degree nor is being concurrently submitted in candidature for such;
- The dissertation is being submitted in partial fulfillment of the requirements of the degree of MSc;
- It is a result of my own independent work, except where otherwise stated;
- I give my consent for the dissertation, if accepted, to be available for photocopying and for inter library loan, and for the title and summary to be made available to outside organizations.

Signed:_____ **Date:** _____

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LIST OF ABBREVIATIONS

ANR – Amani Nature Reserve

CBFM – Community Based Forest Management

CCS – Community Conservation Services

CFR – Community Forest Reserve

CGFRs – Central Government Forest Reserves

CPRs – Common Pool Resources

DANIDA – Danish Government Aid Agency

DCs – Districts Councils staff

FBD – Forest and Beekeeping Division

FGDs – Focused Group Discussions

FUGs – Forest User Groups

GDP – Gross Domestic Products

GN – Government Notice

HDI – Human Development Index

HIPC – High Indebted Poor Countries

IUCN – International Union for Conservation of Nature

JFM – Joint Forest management

JFMA – Joint Forest Management Area

JMA – Joint Management Agreement (under PFM)

KWS – Kenya Wildlife Service

LGFRs – Local Government Forest Reserves

LGRP – Local Government Reform Programme

MEMA – Matumizi Endelevu ya Misitu ya Asili

MNRT – Ministry of Natural Resources and Tourism

NFRs – National Forest Reserves (also Central Government Forest Reserves)

NGOs – Non – Governmental Organizations

NP – National Park

NPOs – National Park Officials

PF – Private Forest

PFAP – Participatory Forest Action Plan

PFM – Participatory Forest Management

PLM-ICDP - Protected Landscapes Management – Integrating Conservation and Development Programmes

PRSP – Poverty Reduction Strategy Paper

SPSS – Statistical Package for Social Sciences (software for data analysis)

TANAPA – Tanzania National Parks Authority

TANESCO – Tanzania Electricity Supply Company

TAS – Tanzania Assistance Strategy

TvT – Televisheni ya Taifa (National Television)

UNDP – United Nations Development Programme

URT – United Republic of Tanzania

USD – United States Dollar

VGS – Village Patrols Guards

VL – Village Leaders

VLFRs – Village Land Forest Reserves

VNRC – Village Natural Resources Committee

WWF - World Wide Fund for Nature

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the study

The African continent is unique in terms of social, demographic, and ecological changes. The continent has in a global perspective the most rapidly increasing population, the highest levels of poverty, and a wide variety of ecosystems undergoing constant transformation (Kessy, 1998). High levels of endemic biodiversity are to be observed alongside perhaps the longest experience of human involvement in the process of influencing that biodiversity. The above-mentioned characteristics of the African continent pose major challenges to the social and biological sciences, calling for integrated and yet specific studies on social processes affecting biodiversity in Africa and Tanzania in particular.

Tanzania as it is for the rest of the African continent, is rich in natural resources ranging from forests, wildlife, agricultural land, aquatic resources and minerals, all of which are important to local people, conservationists and the national economy at large. These resources are a major source of wealth and power in Africa and Tanzania in particular and they a are key to rural development and good governance. The remaining 10% consists mainly of coastal and inland evergreen forests, some of which being recognized as unique in terms of biodiversity and density of endemic species (Wily and Dewees, 2001; Frontier Tanzania, 2001b).

Approximately, 45 % of the forested area in Tanzania is reserved as either Central Government Forest Reserves (CGFRs), under the jurisdiction of the Forest and Beekeeping Division (FBD), or as Local Government Forest Reserves (LGFRs) under the jurisdiction of the District Councils (Wily and Dewees, 2001). During the entire post-colonial period, the forest resources in these reserves have been exposed to uncontrolled exploitation and the reason behind is that the Government of Tanzania has lacked the qualified human resources and financial capacity to properly enforce the rules governing forest extraction (Wily, 1998; Wily and Dewees, 2001). The remaining 55% of the forested area is now almost entirely composed of Miombo

woodland areas on general or village land, the majority of which falling under *de facto* open access resources (Malimbwi *et al*., 2000; Willy and Dewees, 2001).

Forests and woodlands are thus recognized as an important resource base for socio-economic development of the country as they provide many of the basic benefits and opportunities to rural and urban communities for sustainable livelihoods. The accrued benefits from forests and woodlands include ensured food security, improved income generation and the enhancement of agricultural productivity (Mariki, 2001). In essence, this has resulted into the evolution of community forests in village lands. However, a challenge that remains to be resolved when establishing a community forest is how the costs and benefits associated with these forests can be distributed among stakeholders.

Since colonial era, Tanzania has adopted different forest and savanna management approaches. While the biggest proportion of forest resources under management regimes falls under central government forest reserves, some of the forest resources are designated as either Game Reserves or National Park (managed by Tanzania National Park Authority (TANAPA)). Forest Reserves and Game Reserves continue to be managed by the Forest and Beekeeping and Wildlife Divisions respectively of the Ministry of Natural Resources and Tourism (MNRT). However, over 50% of the forests and woodlands in Tanzania still fall under general lands (without any formal gazettement), but still are controlled by central government and District Councils.

Traditionally, it has been the responsibility of the government to manage all forest resources in most of the African countries including Tanzania where the forests have historically been managed centrally through policing and generating revenues to the National and District treasuries. However, as time went on, the capacity of the government to manage its forest resources has dwindled. As a result, forest degradation through illegal activities and human pressure on the resource has increased. Poverty level especially on rural population economy remained on the higher side. It is only over the last decade that the Government of Tanzania in pursuit of the dual objectives of arresting forest degradation and furthering development has

officially supported devolution of ownership and management responsibilities over forest resources to local communities under Participatory Forest Management approaches (PFM) (URT, 1997; MNRT, 1998; Wily and Dewees, 2001).

In Tanzania context, Participatory Forest Management is used as a joint designation covering all forms of local participation in forest management. In reality, Participatory Forest Management approaches are well linked to other macro-economic policies in addressing poverty reduction. For example, recent efforts to tackle poverty problems are quite pragmatic but have still been pursued under relatively decentralized policy initiatives. These include the Tanzania Development Vision 2025 which is a principal vision of the Country to alleviate the widespread poverty by improving socio-economic opportunities, ensuring good governance, transparency, and improved and redefined public sector performance, with emphasize on appropriate balance between public and private institutions by year 2025.

Another initiative is the Tanzania Assistance Strategy (TAS) which is a medium-term national strategy encompassing joint efforts of government and the international community in improving the living standard of the normal Tanzanian (URT, 2000). The National Poverty Eradication Strategy Paper (PRSP) is another medium-term strategy of poverty reduction. This was developed through consultation with national and international stakeholders in the context of the enhanced Highly Indebted Poor Countries (HIPC). Government reform programs like the Public Service Reform Programme (PSRP) and the Local Government Reform Programme (LGRP) aim at improving the delivery of services particularly to enhance the role of local communities in decision making and hence ensure sustainable development (URT, 2000; MNRT, 2003).

For the purpose of this study, PFM denotes cases of devolving the entire management responsibility of forest resources to local communities by Community Based Forest Management (CBFM). It also denotes a joint agreement between concerned parties to manage national and local government forest reserves with

adjacent communities. Along with the National Forest Policy and legislation passed in the past few years, PFM allows devolution of ownership and management responsibility over forest resources to local communities (URT, 1982a; 1982b; 2002; MNRT, 1998). It is widely agreed that PFM may benefit Tanzania by arresting forest degradation and supporting the development and empowerment of rural communities (MNRT, 1998; Wily, 2000c; Petersen and Sandhovel, 2001; Wily and Dewees, 2001).

However, with regards to distributional issues, the effects of PFM are less clear cut and some researchers have argued that restrictions on resource use associated with implementation of PFM may actually adversely affect poor, marginalized and highly forest dependent groups in rural communities (Agrawal and Gibson, 1999; Kumar, 2002). Thus, the importance of addressing this issue is underlined by the fact that alleviation of rural poverty is stated as one of the main targets of the Tanzanian PFM process, and that poverty alleviation in general is a most important policy objective of the Government of Tanzania, as described in the Tanzanian Poverty Reduction Strategy Paper (PRSP) (URT, 2000).

The National Forest Policy of 1998 (MNRT, 1998) and Forest Act No. 4 of 2002 (URT, 2002) provide the framework for Community Based Forest Management (CBFM), which includes: (1) Village Land Forest Reserves (VLFRs) that are managed by the entire village community; (2) Community Forest Reserves (CFR) that are managed by a particular designated group of people in the village community; and (3) the Private Forests (PF) which are managed by individual designated households.

Other frameworks covered in the PFM approach include the Joint Forest Management (JFM) where local communities or Non–Governmental Organizations (NGOs) are involved in the management and conservation of National or Local Authority Forest Reserves are, managed with appropriate user rights and incentives (MNRT 1998). However, some forests are managed by National Parks. The National Forest Policy of 1998 recognizes and defines the National Park as an area

representing outstanding natural, archaeological or cultural resources of Tanzania's heritage and/or critical water and/or soil resources necessary to maintain ecological integrity. In this study, Udzungwa Mountains National Park (NP) was included and assessed as one of the existing and on-going forest management approaches in the area. In the National Park, the management approach is totally for protection of resources without any exploitation involving removal of natural resources but rather for non-consumptive utilization like photographic tourism.

1.2 Problem Statement and study justification

The Tanzanian National Conservation Strategy for Sustainable Development, (NCSSD, 1995) pinpoints the major environmental issues in relation to forestry including uncontrolled deforestation, weak concession and revenue collection systems, inadequate involvement of local communities, lack of sufficient staff and information on the state of resource, inefficient utilization of resources and a preference for a narrow range of forest species in terms of utilization. As such, the forest institutions in the countries of Eastern and Southern Africa including Tanzania are faced with the challenge of managing forests in a way that is sustainable and supportive to rural livelihoods.

The previous regimes that mostly excluded participation of local communities have proved incapable of ensuring sustainable forests management (Kigenyi *et al*., 2002). The authors added further that countries in the region including Tanzania are now beginning to respond to the need for participatory forest management, though the legislative changes have not kept pace with policy reforms. Although there are efforts to involve local communities in forest management, the communities next to protected area boundaries still frequently bear some substantial costs associated with management of these forests. These costs include lost access to forest resources and damage of properties and injury of human due from wildlife while receiving little return if any. This in turn has resulted into conflicts between protected areas and the adjacent communities. Although it is widely recognized that community involvement is important for sustainable natural resources management, little if any has been done to assess the level of local community participation in forest resources management

in the study area. In addition, no study has been carried to assess the contribution of different forest management approaches on poverty reduction among local communities in this area. Neither, a study has been conducted to assess the perceived costs and benefits of different forest management approaches to local communities in the study area.

1.3 Aim and objectives of the study

1.3.1 Aim of the study

The overall aim of the study was to assess early perceived costs and benefits of different forest management approaches by local communities and their implications to implementation of participatory forest management in the study area.

1.3.2 Objectives of the study

- To assess levels of local community participation in different on-going forest management approaches in the study area.
- To assess the perceptions of local communities on the cost and benefits of different forest management approaches.
- To assess the user rights of the local communities on the forest resources in selected sites being managed through different management approaches.
- To analyze the contribution of different forest management approaches towards poverty reduction and livelihood improvements of local communities and,
- Propose actions that may contribute to the development of policy and planning frameworks conducive to community forest management.

1.4 Research questions

- Do communities have access to the forest reserve and how?
- Do communities participate in forest management activities taking place in the reserve?
- How do communities participate in forest management?
- What are the costs and benefits of the existing forest management approaches?

- What is the contribution of these approaches to poverty reduction?
- How has access to forest resources changed with implementation of new approaches?

1.5 The Guiding Hypothesis

The guiding hypothesis of this study was that different forest management approaches have different costs and benefits to local communities, leading to different community responses.

1.6 Conceptual Framework

The conceptual framework for the study (see Figure 1 & chapter 2 for details) reflects the main hypothesis that in any proposed forest management approach, the institutionalized and perceived benefit and cost sharing mechanisms have the potential of serving as incentives for the acceptance or rejection of the proposed approach by the communities. As pointed out by Vorhies (1994), no matter what this generation would like to conserve in terms of natural resources it boils down to cost and benefit sharing at different levels. The implication here is that the way communities associate a particular environmental management option with specific costs and benefits dictates the acceptance or rejection of that management option. At the international level for example, nations ratify international conventions having satisfied themselves that the convention will be beneficial and in line with their national interests. At the local level, communities will only adopt a particular forest management option when they see some benefits in that approach.

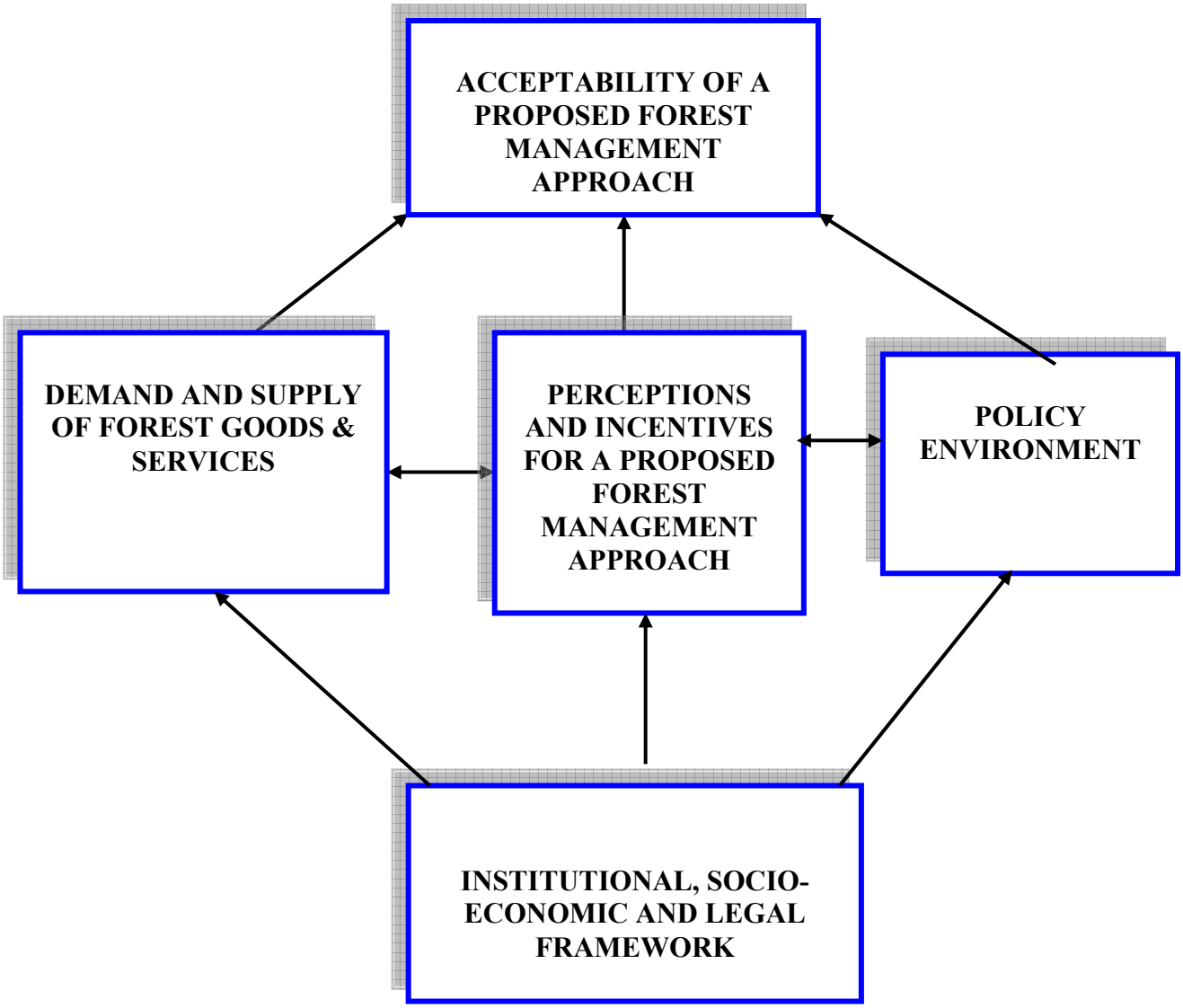


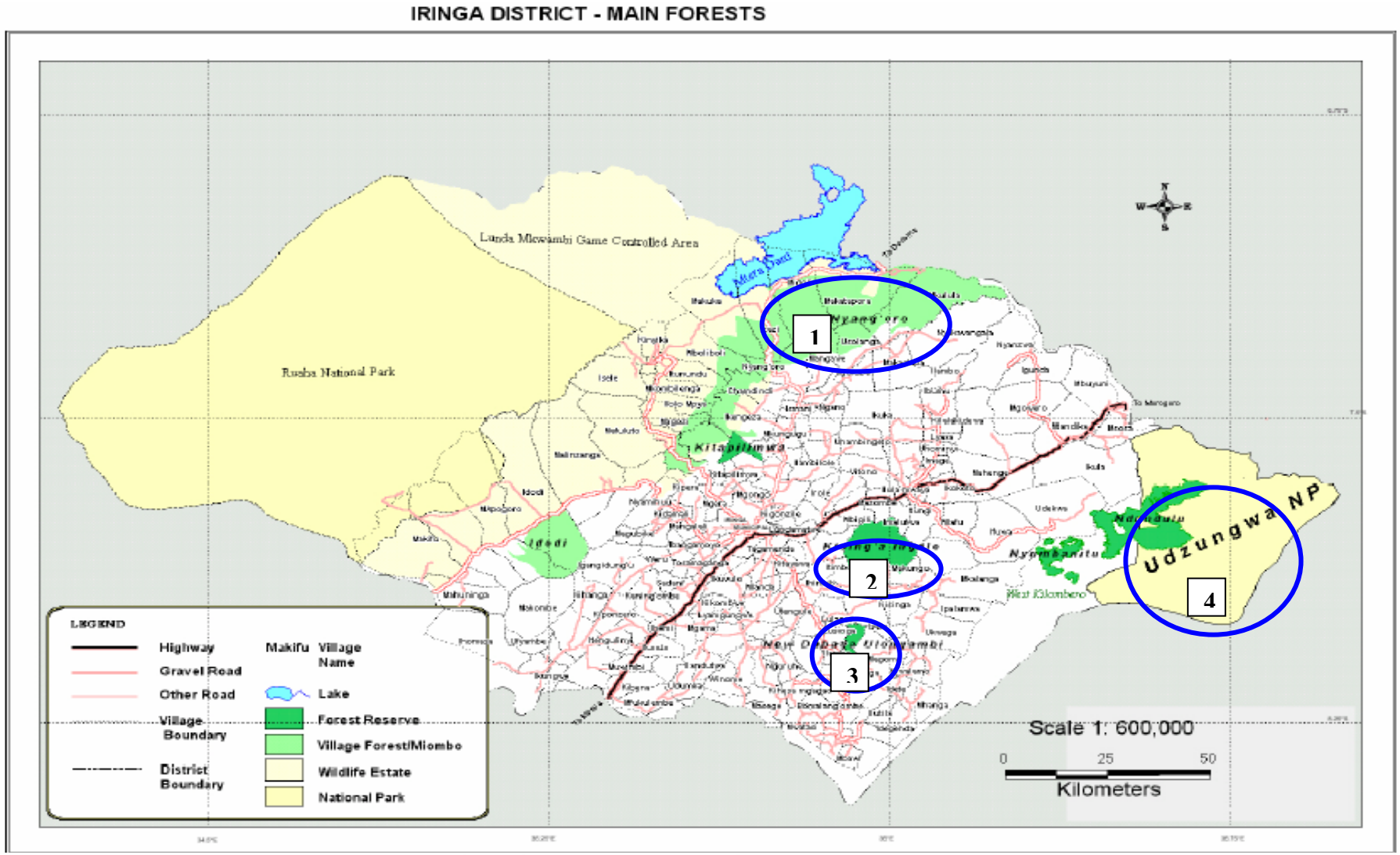
Figure 1: Conceptual Framework depicting stakeholders' perceptions on different forest management approaches

It is generally accepted that while most of the benefits from conservation accrue to the international community most of the costs are borne by local communities, which have to forego a number of current benefits by not utilizing the resources around them. Elaborating on the distribution of costs and benefits of conservation, Bell (1987) points out that the costs in terms of alienated land; restrictions on resource use and damage to life and property are mainly carried out by rural populations, particularly those at the interface between settlements and conservation areas.

Further, the political and financial costs of administering conservation programmes are carried mainly by national governments. At the same time, benefits of aesthetic and recreational experiences and scientific opportunities are enjoyed mainly by foreigners. The benefits of national prestige as well as revenues from both conserved and non-reserved resources are enjoyed mainly by national governments. Bell (1987) concludes that rural interface communities carrying much of the costs derive few benefits implying that there is uneven distribution of conservation costs and benefits between local, national and international communities. This reality signifies the need for studying community's perceptions in terms of anticipated benefits and costs in relation to different forest management options that are proposed in different localities.

This being the basic conceptualization then, other factors including the policy environment, institutional framework, socio-economic characteristics and forest resources governance and ownership structures do influence the supply and demand of forest products and services, providing the needed incentives for a particular forest management option to be accepted by communities. Figure 1 provides a schematic presentation that summarizes the key issues in as far as the conceptual framework for this study is concerned. In order to achieve the study objectives, four sites covering six villages (Migoli, Mangawe, Lulanzi, Kising'a, Msosa and Mgudeni) were purposefully selected representing four different forest management approaches namely Community Based Forest Management (Nyang'oro North and South Village Land Forest Reserves), Joint Forest Management (New Dabaga-Ulongambi Forest Reserve), government management without other intervention (Kising'a-Lugalo National Forest Reserve) and National Park Approach (Udzungwa Mountain National Park) (See map 1). Primary data were collected using participant observation, focused group discussions and questionnaire surveys while secondary data were collected by review of publications and reports. Then collected information were then analyzed and interpreted to address the study objectives.

Map 1: Study Areas numbered: (1) North and South Nyang'oro, (2) Kising'a-Lugalo, (3) New Dabaga-Ulongambi and (4)Udzungwa Mountains National Park



CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 An Overview of Forest Management world-wide

For a long time, the management of natural resources in general lands and forests in particular have been characterized by extensive state control popularly known as Territorial Forest Reserves without involvement of local community (Gombya-Ssembajjwe *et al*., 1999). Due to the state's poor management and law enforcement, forest resources have been degraded through unsustainable exploitation and encroachment. Public confidence in governments to own and manage forest resources through National forest reserve approach has consequently diminished. However, forest resources under National Park (For example, Udzungwa and Mahale Mountains in Tanzania) still retain their ecological integrity apart from their protectionist management approaches. In turn, local people throughout the world are now demanding some stake in the management of forest resources and share of the accruing benefits (Gombya-Ssembajjwe, 2000).

Vanden and Briesbrouk (2000) acknowledged that sustainable forest management involves a large number of stakeholders with disparate interests, hopes, expectations and rights. Many years of efforts to halt deforestation and forest degradation have not been successful, jeopardizing the livelihoods for large populations that depend on it and this is caused by disagreement between stakeholders on how to manage the forest and for what, and how to share the benefits and costs of forest management. In response to that situation, Governments have been responding in recent years to demands for greater equity in the distribution of forest resources and to the failure of traditional forestry approaches to achieve sustainable development objectives (CANARI, 2002; Headley, 2003).

In turn, community participation has become a fundamental strategy in developing and implementing national and regional forest management plans the world over. However, national level governments had neglected the needs and concerns of local communities and forest-dependent people in favour of

interests that are powerful or that benefit the national interests directly. This does not mean that local populations do not manage their forests, but their interests have little weight in national level decision-making.

In the island of the Caribbean for example, forest resources tend to be limited in extent, largely accessible to the human population, and under constant pressure for conversion to other uses. In the absence of a strong surveillance and enforcement capacity, which none of the countries of the region can financially or politically afford, stakeholder participation provides the only avenue for effective management. It is also the most effective framework for addressing objectives of poverty alleviation, economic development and social equity in the management of natural resources though with some difficulties.

In Nepal, Malla *et al*, (2004) reported that despite the scale of success of community forestry in the hills of Nepal, a number of significant challenges remain. One of them is the protectionist and passive forest management approach of the majority of forest user groups. As a consequence, the livelihood impact of community forestry is far below the potential and there is a growing concern and debates on these issues, and increased attempts as regards to how to facilitate user groups in the management of forests, making a move from passive to active and equitable management without compromising the future potential of the growing stock by adopting alternative ways to manage forest resources.

Participatory Forestry Management (PFM) is a suggested alternative way of managing common pool resources like forests (Arnold, 1998; Bromley *et al*., 1992; Edstrom, 1990). Vanden, *et al.* (2000) defines participatory forest management as a structured collaboration between governments, commercial and non-commercial forest resource users, interested organizations, community groups, and other stakeholders, to achieve shared objectives related to the sustainable use of forest resources. Participatory forest management (PFM) is used to encompass any situation in which a group of

local individuals exercise some control in the use of forests, especially those that are found in their local communities (Arnold, 1993).

As reported by Wily (2002), Participatory Forest Management (PFM) is sufficiently widespread and effective in Africa today to be recognized as a significant route towards securing and sustaining forests. On the other hand, forest management involves a large number of stakeholders with disparate interests, hopes, expectations and rights (Vanden and Biesbrouck, 2000). The social components of sustainable forest management emphasize the roles that forest play in enhancing human well being. This calls for a participatory approach to forest management by all stakeholders.

Willy, (2002) argues further that early developments tended to engage communities as local users whose cooperation was sought and bought through making some of their forest access legal and/or through sharing with them a portion of income generated from forest enterprises. Buffer zone developments also flourished with the intention of helping communities turn their eyes from the forest. Frequently, it is the case that local level institutional formation for the purposes of forest management is providing a platform for wider local level governance development.

In African context, action to involve forest adjacent local communities in the management of forests is well underway. Most of these developments have - or quickly acquire - policy and legal support through National Forestry Policies, National Forest Management Plans and particularly the new forestry legislations. Previous studies in African countries have revealed various aspects of changes in forest management and the need for close follow-ups on types and levels of local participation (Willy, 2002).

Many authors have recently been cited by Wily (2002) to report on growing interventions in Africa that involve forest adjacent local communities in accessing and managing forest resources. For example, co-management of Gusselbodi Forest in **Niger** (Babin & Bertrand 1998; Kerkhof, 2000; Vogt &

Vogt 2000; Montagne & Mamoudou, 2000); **c**ommunity based management of woodlands in Bankass District in **Mali** (Bocoum, 2000; 2002; Lavigne Delville, 2000). In **Burkina Faso**, a form of co-management of Kabore Tambi Park (85,440 ha) with 23 communities has been started (Nana, 2000; Dorlochter-Sulser *et al*., 2000).

PFM developments are especially well advanced in The **Gambia** where more than 500 communities are involved and at least 230 Community Forests have been declared (24,000 ha) and are being managed autonomously by communities (Sonko & Camara, 2000; Reeb 1999; Schindele; 2001). In **Nigeria,** Communities are now empowered to control where felling in their local forests occurs and to receive 70 percent of the royalty and 50 percent of revenue from felling in reserves (Saarela-Kaonga 2001). The Government Forest Development Agency of **Ivory Coast** has established 69 Farmer-Forest Commissions as routes for local consultation with more than 30 resulting plans of action for forested areas (Ibo & Leonard, 1997; Lorng, 2000). In **Ghana,** a Community Forestry Management Unit (1992) promotes creation of Community Forestry Committees as a contact point for consultation in forest reserve planning (Appiah & Pedersen, 1998; Willy & Hammond 2001). Eight distinct projects operate in **Cameroon**, are variously assisting communities to create Community Forests (1998) (Abbot *et al*., 1999, Auzel *et al*. 2001; Djeumo, 2001). In **Madagascar** a range of programmes promote state-people agreements, which transfer some management powers to communities for first three, then ten-year terms (Manantsara & Garreau, 2000; Rabetaliana & Schachenmann, 2000).

Tourist-related benefit sharing represents the extent of PFM in **Rwanda**, in respect of Nyungwe Forest Reserve (96,000 ha). More formal initiatives towards state-people cooperation (not co-management) have been launched in **Uganda** in three Forest Parks. Pilot co-management has been advanced in two Forest Reserves, planned for replication to several other Reserves (Scott, 2000, Hinchley *et al*., 2000; UFD 2000).

In **Zambia**, joint forest management continues as the objective of a donor-funded programme in four districts with five Village Forest Management Area Committees established in respect of one Reserve so far (Chiulukire, 12,000 ha). In **Malawi** PFM efforts are targeted to Non-Government Forest Reserves where communities are assisted to bring largely degraded woodlands under management as Village Forest Areas. A new national forest policy (1996) and law (1997) guide developments (Mauambeta, 2000, Dubbois & Luwore, 2000). In **Zimbabwe**, despite widespread wildlife-centered developments under the CAMPFIRE Programme, direct forest/woodland management initiatives involving communities are limited to self-started efforts in one or two communal woodland areas (Clarke *et al*. 1996; Vudzijena, 1998, Campbell *et al*., 1999; Katerere *et al*., 1999).

Another movement towards more community-based forest management is evolving in **Namibia**, where three vast woodlands originally demarcated to become State Forests are now being handed over to local owner-management (200,000+ ha). Several Community Forests are already declared within these areas (Jones, 1999; Corbett & Jones, 2000). In **Botswana**, communities compete with the private sector to gain leases and there are some joint community-private ventures (White, 1998).

In **Tanzania**, more than five hundred Village Forest Reserves (VLFRs) have been declared by communities out of communal lands since 1995. A national programme of support for PFM in all rural districts is in place and the Government has issued formal guidelines for assisting communities to bring either reserved or currently unreserved forests under community based management (2001). The new national forest policy (1998) and new forest law (2002) makes community based forest management a main focus (Wily, 2000c, 2001a; Iddi, 2000, Massawe, 2000; FBD 2001, and TFCG 2001).

From the above overview, it is clear that a significant evolution of forest management regimes is taking place in different countries activated by terrible lessons from old forest management approaches. There is thus increasingly

global shift in forest management from centralized policing approach to more community centered forest management approaches also backed with revised national policy and regulatory frameworks. Participatory Forest Management (PFM) seems to be the central focus and workable approach popularly adopted by many countries the world over.

This study will thus focus mainly on assessment of economic acceptability of PFM in the study areas with little touch on other existing forest management approaches in the area including the National Park and the 'traditional' National Forest Reserve (without PFM).

2.2 Participatory Forest Management in Tanzania

2.2.1 An Overview

In many respects, Tanzania remains in the forefront of participatory forest management in Africa (Bromley and Ramadhani, 2004). In the early 1990s a number of pilot PFM activities were started in Babati and Singida Districts (Manyara Region), which for the first time, provided a mechanism for the transfer of ownership and management responsibility from central to village government. Following these successful and well documented pilots, other forest areas were bought under community management or community co-management. Notable examples include the East Usambara forests of Tanga region, highland forests of Iringa as well as lower miombo woodlands, and more recently coastal forests in Tanga, Mtwara and Lindi regions. These pilots implemented by a range of actors including local and international NGOs, local governments and supported by bilateral donors, collectively demonstrated the viability of PFM under a range of social and ecological conditions. Currently around 2 million hectares of forest land are now under various PFM arrangements across the country, out of an estimated total of 33.5 million hectares of forested land (URT, 2001). These experiments across the country coincided with a review of the forest policy and legislation in the late 1990s, together with sweeping reforms in Tanzania's economic and political spheres, and directly contributed to a favourable legal environment for PFM in mainland Tanzania. Although not explicitly described by the law, two main

strategies for PFM are being developed: *Joint Forest Management (JFM)* and *Community Based Forest Management* (CBFM)

Joint Forest Management (JFM) is a collaborative management approach, which divides forest management responsibility and returns between either central or local government with forest adjacent communities. It takes place, largely on "reserved land" such as National Forest Reserves (NFRs) (for catchment, mangrove or production purposes) and Local Government Forest Reserves (LGFRs). It is formalized and legalized through the signing of a Joint Management Agreement (JMA) between village representatives and either the District Council or Director, Forestry and Beekeeping.

Community Based Forest Management (CBFM) takes place on "village land" (land which has been surveyed and registered under the provisions of the Village Land Act (1999). Under CBFM, villagers take full ownership and management responsibility for an area of forest within their jurisdiction and declared by village and district government as a Village Forest Reserves. Following this legal transfer of rights and responsibilities from central to village government, villagers gain the right to harvest timber and forest products, collect and retain forest royalties, undertake patrols (including arresting and fining offenders) and are exempted from local government taxes (cess) on forest products, regulations regarding "reserved tree" species, and are not obliged to remit any part of their royalties to either central or local government.

Therefore, PFM requires some mechanisms to be in place for support and effective implementation. These mechanisms include: (i) policy framework, (ii) legal framework and (iii) institutional framework.

2.2.2.1 Policy framework

PFM is related to a number of recent policy developments, including the National Forest Policy of 1998, the Local Government Reform, Gender Policy of 2001 and the Land Policy of 1995. Other policies and strategies are also

important when considering the implementation of PFM including the Wildlife Policy of 1998, Beekeeping Policy of 1998, Fisheries Policy of 1997, Water Policy of 2002, Mineral Policy of 1998 and Agriculture Policy of 1997 (Ramadhani, 2002).

The National Forest Policy of 1998 represents a dramatic departure in this respect. Key target groups include local communities, private individuals, NGOs and the private sector especially in commercial plantations. The policy contains a number of statements in support of PFM. For example **Policy Statement Number 39**: which states, *"Local communities will be encouraged to participate in forestry activities. Clearly defined forest land and tree tenure rights will be instituted for local communities, including both men and women"*. **Policy Statement Number 5** states that *"To enable sustainable management of forests on public lands, clear ownership for all forests and trees on those lands will be defined. The allocation of forests and their management responsibility to villages, private individuals or to the government will be promoted. Central, local and village governments may demarcate and establish forests reserves*" (MNRT, 1998).

The Gender Policy of 2001 is another policy reform that supports PFM. Women Advancement and Gender Policy (2001) emphasizes mainstreaming gender in all sectors. Moreover, the Land and Village Land Acts (1999) acknowledge equity in the right of men and women. Furthermore, the National Forest Policy of 1998 recognizes gender issues. Solving matters concerning Land tenure is pre-requisites to the success of PFM. National Land Policy of 1995 set out the direction for land reform in Tanzania that has been taken up by the Forest Act No. 14 of 2002. There is wide national commitment to the decentralize implementation of forest management to the local government.

2.2.2.2 Legal framework

Legal framework in support of PFM in Tanzania is revealed in the Forest Act No 14 of 2002, Land and Village land Acts of 1999, the Local Government Laws (*Miscellaneous Amendments Act No. 6 of 1999*) and the Poverty Reduction Strategy Paper (PRSP). Apart from Forest and Land Acts, implementation of PFM will be influenced by a number of legislation and laws from relevant sectors such as Wildlife Act, Beekeeping Act, Fisheries Act and legislation in agricultural sector (MNRT, 2002). The Forest Act No. 14 of 2002 supports PFM as it categorizes national, local authority, village, private and forestland and makes full provision for actors in each of these categories to declare forest reserves. The Act also aims at encouraging and facilitating active involvement of the local communities in the sustainable planning, management and in the use and conservation of forest resources through the development of responsibilities and rights to use and manage forest resources at the lowest possible level (Ramadhani, 2002). The Land and Village Land Acts of 1999 provide for among other things, management of village land by village councils on behalf of other villagers. Forests under the village land fall under the jurisdiction of village council and thus providing a good framework for PFM endeavors.

The Local government Laws (*Miscellaneous Amendments Act No. 6 of 1999*) provide direction for local government reforms to decentralize and devolve power not only from the central to local government but within the local government system from district council levels to lower level of government. This direction of local government reform provides a favorable environment for community based forest management system to flourish (Mariki, 2002).

As of 2001, a total of 1,502 forest reserves managed by local villages or communities covering an area of approximately 323,000 ha had been founded in Tanzania (Wily and Dewees, 2001). This figure excludes the DANIDA supported MEMA Project in Iringa region, by which an additional estimated 60,000ha of forest have been brought under local management (MEMA,

1999a; 1999b). MEMA, a Swahili abbreviation for *"Matumizi Endelevu ya Misitu ya Asili" means sustainable utilization of natural forests.*

2.2.2.3 Institutional framework

According to MNRT (2002), the central government level, Forest and Beekeeping Division (FBD) has taken keen interest in PFM strategies and has developed among others guidelines for CBFM. FBD is not responsible for implementing PFM activities. District councils have critical role to play in facilitating planning and implementation of forest management activities including PFM. Through local government reform programme, district councils will be able to increase their capability to support PFM activities. Village Councils perform executive and legislative powers together with other responsibilities and duties, including forest management (MNRT, 2002). All these are supportive frameworks for implementation of PFM in Tanzania.

2.2.2.4 Roles and responsibilities of different stakeholders under PFM approach

Since PFM is characterized by forest adjacent communities sharing power instead of just benefits and assuming owner/user rights of forests, it clear that roles and responsibilities of different stakeholders need to be well stated early in advance. Under JFM for example, there are contractual agreements specifying the authority, responsibilities and distributions of costs and benefits amongst concerned parties. Before JFM, exercise, the forest management had traditionally been run by government where all management decisions were made by forest officers and the involvement of local communities was limited only to employing as casual laborer for mainly forest border maintenance (Veltheim and Kijazi, 2002). The area of the forest reserves, under JFM is known as Village Forest Management Area (JFMA).

2.3 Community Participation in Forest Resources Management

The financial and human resources available to the forest departments are often inadequate to carry out the task of effective policing of forested areas without the participation of the local communities. Many forest resources are

scattered over large areas which makes monitoring and rule enforcement by the state very costly, if not impossible (Bromley, 1992). This situation calls for local community participation in ensuring there is sustainable forest resources management.

However, successful community participation in forest management depends on (i) availability of adequate land on which to practice community forest management, (ii) the land and tree tenure must be clear and legally recognized, clearly indicating the conditions and procedures for evoking and revoking; (iii) the legislature must guarantee security of tenure and benefits to participants. It must also be supportive of policy on community forestry management; (iv) Forest Policies must recognize people's traditional rights and capacity to manage tree/forest resources. The forest administrators must be committed to community forest management; and (v) the communities must be willing to participate in forest management.

Economic status of individual households has an influence on the level of benefits accrued from forest resources and the level of participation of local people in forest management. According to Ojha and Bhattarai (2000) and Agrawal (2000), poor households do not benefit from community forests as much as affluent households and are not very interested in community participation. Medium class households benefit the most in comparison to high and lower class households.

Equal participation is necessary to create effective and equitable management for collective decision-making, which ensures equal benefits for all user groups (Knox and Meinzen-Dick, 2001). Demand for forest products also affects participation in community forest management, but people's involvement in community forest management practices is necessary for them to have access to desired forest products and to bring success to the community forestry project (Devkota, 1998).

Involving minority groups and women in community forest management can enhance the productivity of the resource. For example, Pokharel (2002)

reported on the success of community forestry in achieving sustainable forest and community, though gender and equity issues are yet another challenges to be addressed. Baral (1993) argued that ethnic composition, political ideology and culture within the community could create problems at the user group level. Within common property resource management, participation of different interest groups is important to minimize the risk of excluding access to certain resource-poor groups of people (McAllister, 1999).

Participation in forest management varies from one country to another and from one forest management approach to another. Management Agreements represent the primary construct of PFM. It is rarely the case that communities declare management regimes autonomously and within which the state's role is largely advisory. The closest example to this is found in the creation of Village Forest Reserves in Tanzania where village governments inform the district local government of the actions they propose to take and will implement with or without formal support. Support from the central state is only required in respect of National Forest Reserves.

What is actually agreed in the terms of management agreements or contracts varies greatly. With over-simplification, these typologies broadly apply, sometimes within one country (Willy, 2002) include:-

- *Consultation* (e.g. as expressed in the Forest-Farmer Commissions in Ivory Coast or the Forest Committees in Ghana)
- *Co-operant management* where community roles and powers are limited (e.g. Zimbabwe, Zambia, Benin)
- *Contractual partnership* where community roles are more substantial but still inequitable (e.g. Cameroon, Ethiopia, Nigeria, Madagascar, Sudan, Niger, Mali, Guinea Conakry)
- *Consigned management* where the community has all operational powers save *ultimate authority* (e.g. as being promoted in The Gambia and Tanzania in respect of National Forest Reserves)
- *Community Based Forest Management,* where jurisdiction is fully devolved and sometimes including ownership of the estate (e.g. as found in The Gambia, Malawi, Tanzania, Zanzibar, Lesotho, and potentially Namibia and South Africa and Uganda).

2.4 Perceived Costs and benefits of different Forest Management Approaches

2.4.1 General overview

The past forest policies and management approaches in Eastern and Southern Africa have had major economic impacts at the local level, and exert a strong influence on the ways in which forests are managed today (Mogaka *et al*., 2001; Wily & Dewees, 2001). According to Mogaka *et al*. (2001), forest goods and services play an extremely important role in local economies in Eastern and Southern Africa countries. Household forest use has been estimated to worth between $350 and $450 a year for households living around Mau forest in Kenya (Lubanga, 1991); $160 for households living around Kakamega forest (Emerton, 1992d); $135 for households living around Arabuko Sokoke forest (Mogaka 1991a); $212 for households living around Mount Kenya forest (Emerton, 1996a); and, in rural areas of Central Copper belt and Luapula provinces in Zambia, forest products utilization is worth an average of $100 per year per household (PFAP, 1998). In Uganda although generating huge economic benefits including products worth more than $135 million a year, and services to a value of $50 million, natural forests also impose significant economic costs on adjacent communities, mostly in a form of opportunity cost which is estimated at some $113 million a year (MEMA, 1999).

Forest economic values are not always positive at the community level. The presence of forests and woodlands incur significant local costs. Maintaining forest cover in an area imposes opportunity costs such as precluding other uses of land particularly agriculture. The total value of the forest resources is usually not known in all cases. Neither the costs are not well documented (Mariki, 2002). Forest- dwelling birds and animals also give rise to a wide range of economic losses to adjacent farmers due to crop destruction, trees and domestic stock.

2.4.2 Costs and Benefits of different forest management approaches

2.4.2.1 Costs to local communities and other stakeholders

The long-term impact of PFM in Tanzania depends on the capacity to produce sustainable, tangible economic benefits to the communities (MNRT, 2003). A recent report on PFM lessons learnt in Tanzania has further revealed that all stakeholders incur costs in PFM implementation process (MNRT, 2003). The costs to communities include the sacrifices resulting from reduced access to the resources, and time and energy in forest protection, either for the benefit of the state (in JFM) or themselves (in CBFM). The opportunity costs in terms of foregone, but unsustainable, practices of forest resource exploitation to communities are highly variable and depend on forest type, the richness of the resource and the dependence of the community on the forest to be managed. There are direct community's investments such as attending meetings, providing village scouts, fire fighting and forest boundary maintenance. Additional costs to communities from PFM include increased threat from problem animals in their fields and livestock predation.

What community considers being a cost; the Wildlife and Forestry Divisions would probably consider being a benefit under national forest reserve approach. Veltheim and Kijazi (2002) have reported some costs incurred by local communities in starting forest reserves under JFM in East Usambara Forest Reserves. These include situation where communities are employed as casual laborers at different phases of expanding or establishing the reserve. For example, border clearing and tree planting in East Usambara Forest Reserve was reported to be 50 mandays/km at 1,000 Tshs/day and for border weeding, 40 man days/km at 1,000 Tshs. /day in the year 2000-2001.

Other costs include the direct forest management costs, the administrative and staff costs as well as the costs related to extension programs for communities and research that have traditionally been responsibilities of the Government under national forest reserve approach. The forest management activities that could be carried jointly with the local communities include time for patrolling and law enforcement, border maintenance, establishment of tree nurseries, fire

fighting, and monitoring and evaluation. Forest officers provide only technical advice to villagers. Apart from costs incurred by local communities, other stakeholders involved in PFM meet significant amount of operational costs. The cost of registering a Village Forest Reserve is estimated to be between Tsh. 3,000,000 – 7,000,000. Surveying cost per one-village averages Tsh. 700,000, but ranging from Tsh. 44,000 to Tsh. 1,500,000 depending upon forest size. The average cost per hectare is relatively low, about Tsh. 240. When compared to the potential estimated revenue from the forests the cost is dwarfed by the benefit.

Forests under National Park approach also pose significant costs to adjacent communities. These include the sacrifices resulting from reduced access to the resources (arable and grazing land, water, medicines, cultural sites, valley bottoms etc), and time and energy in forest protection and attending meetings, either for the benefit of the state or to the benefits of the Park Authority. Vermin is a common problem facing communities residing near National Park. Crop damages by wild animals, loss of properties and lives of people are commonly reported costs in many National Parks.

2.4.2.2 Benefits to local communities and other stakeholders

Apart from costs incurred, different stakeholders enjoy different kinds and magnitudes of benefits. These include improved microclimate, cash from sale of forest products and the collection of duties, fines and taxes. Professional forest managers' benefit from reduced encroachment, fewer forest fires and improved relationships with the forest adjacent communities. There are also financial gains in that many of the illegal harvesters of the forest become legal harvesters of the forest, so they pay the necessary royalties and other fees without community's coercion through PFM (MNRT, 2003). For example, in Sasilo village in Manyoni District, Tanzania, the village government and the Village Natural Resources Committee have protected a substantial area of forest in village and general land from fires and have rehabilitated it to health woodland. Other reported benefits include improved forest cover and increased water sources (Rwiza 2002; MNRT, 2003). In Amani Nature

Reserve (ANR), Tanzania, villagers get 20% of the entrance fees, which represent one of the most direct benefits from JFM to the local communities.

In terms of rural livelihoods, local communities are supported to some extent by non-income, indirect benefits such as schools, roads and bridges. For example, in Unyampanda village around Mgori Forest Reserve, Singida Tanzania, villagers have managed to renovate village office and primary school using funds that were raised from fines, visitor fees and material from their forest where as in Kilimanjaro Catchment Forest Project, communities benefit from involvement in tourism (MNRT, 2003). Wily and Dewees (2001) and Kajembe *et al*. (2001) reported similar benefits from Duru-Haitemba Village Forest Reserve in Babati District, Tanzania.
Sustained access to priority forest uses (benefits) by the communities in East Usambara Mountains was a main incentive measure focused at enhancing community involvement of the forest (Kessy and Mallya, 1999).

Veltheim and Kijazi (2002) reported further those local communities adjacent to the East Usambara Forest Reserve have access to free forest uses for domestic use. These include fetching water from permitted water sources, collecting dry firewood during the allowed days only (twice a week), collecting medicinal plants, collecting vegetables and mushrooms, conducting rituals and using the existing foot paths. The collected money is deposited into the village account for the benefit of all villagers in the respective villages.

Lund (2003) analyzed revenue collection and distribution in 15 villages practicing PFM in Iringa, Tanzania. The total registered revenue collection indicates that under the current efficiency of collection the fifteen villages collected approximately Tshs 10 million annually, corresponding to an average annual collection per village of approximately Tshs 700,000. Variation in revenue collected was explained by differences in resource characteristics, market access for woodfuel, local wood consuming industries and institutional factors.

Table 1: Status of the revenue collection for the fifteen villages after 14 months (Tshs.) July 2002 – August 2003).

Village	No of months – receipts	No of months-monthly reports	Total income 4	Estimated annual income5	Share of revenue from external sources6	Share of revenue spent on public goods7
Itagutwa	12	11	566,550	566,550	0.61	0
Kinywang'anga	12	11	411,600	379,938	0.66	0.09
Kitapilimwa	4	6	55,675	95,443	0.42	0
Kiwele	9	9	596,400	894,600	0.65	0.03
Mfyome	8	11	1,263,900	1,378,800	0.64	0.02
Izazi	5	7	731,650	1,254,257	0	NA
Makatapora	2	5	399,850	685,457	0	0
Makuka	3	0	87,150	348,600	0	NA
Migoli	14	13	2,627,690	2,252,306	0.03	0.09
Chamdindi	1	9	208,500	278,000	0	0
Ikengeza	0	10	192,500	231,000	NA	NA
Mangawe	13	11	428,000	395,077	0.21	0
Mkulula	0	7	521,600	894,171	NA.	NA
Nyang'oro	8	11	399,800	436,145	0.08	0
Usolanga	3	14	186,250	159,643	NA	NA
Average	6.3	9.0	578,474	683,323	0.25	0.04

Source: Lund (2003), NB: NA = Data not available

2.5 User rights on forest resources in different forest management approaches

Community forestry management approach in Nepal revealed different rights and responsibilities to local communities. The rights include that of forming forest user groups (FUGs), provision of memberships to new entrants under certain conditions. Other rights include establishing operational rules and on protection, utilization and infractions made by FUGs where users enter community forestry as per rules, harvest predetermined products and units of forest products, and the FUGs can price forest products irrespective of government royalty and use the funds for community development. Cash crops can also be planted without disturbing the main forestry species (Adhikari, 2004).

Adhikari (2004) argued further that FUGs have the responsibilities of paying membership fees and contribute to paying a guard, participate in monthly meeting and a small fee is payable to some forest products and the FUGs are expected to participate in obligatory community activities such as tree planting and pruning. Well-defined property rights give users incentives to work on common property (Arnold, 1992). Property rights also give people incentive to adopt technology that increases long-term benefits. This in turn gives resource users an incentive to improve the resource through management and determine the equality in the accessibility of the resources (IFPRI, 1999).

In East Usambara Forest Reserve, Tanzania (Veltheim and Kijazi, 2002), the forbidden uses that have to be dealt at the village level include grazing animals inside the reserve, cutting fodder or roofing grass, fishing inside the reserve, making new paths or roads inside the forest, cutting of different sizes of construction poles and ropes by debarking living trees, harvesting forest products for sale, and cutting ropes (climbers) without permit. Others include collecting stones without permit inside the reserve, beekeeping without permit, digging ditches for water pipes without permit, clearing existing foot paths without permit and taking visitors to the forest without a permit.

In order to motivate users to participate in the community forestry, users are given rights to extract products from the forest and exclude specific individuals who do not hold the rights.

Well-defined rights and responsibilities of each stakeholder are important for effective implementation of forest management interventions and sub-sequent contribution of these approaches to the improvement of local community livelihoods. The forest sector in Tanzania strives to provide individuals and communities with enabling environment that can impact positive and sustainable socio-economic development through management of forest resources.

Most of the protected area categories are strictly protective on national interests, with exception of Udzungwa Mountains National Park where local communities are allowed to collect dead wood for firewood (WWF, 2002).

2.6 Contribution of different forest management approaches to Poverty reduction and Livelihoods Improvement

2.6.1 Contribution on poverty reduction

Tanzania is one of the poorest countries in the world. In line with this, the Tanzanian Poverty Reduction Strategy Programme (PRSP) separates between income and non-income poverty (URT, 2000). While income poverty measures are concerned only with income of the individual or household, non-income poverty measures take into account other indicators of poverty i.e. education, survival, nutrition, access to drinking water and social well-being (URT, 2000).

While centralized policing forest management approaches have failed to provide tangible benefits to adjacent local communities in terms of poverty reduction, it is now necessary to conduct an analysis of the early effects of PFM on poverty reduction. Although poor rural communities may benefit greatly from increased revenue bases as a consequence of PFM and National Park approaches, the poor and marginalized households within these communities may well be adversely affected by restrictions on their access to forest resources.

Different researchers (Cavendish, 1998; 1999; 2000, Log *et al*., 2000; Monela *et al*., 1993; 2000) have accentuated the importance of forest resources in relation to rural poverty. The findings indicate that poor households within rural communities obtain a larger share of their total income from natural resources more than well off rural households and further that poor households are highly dependent on forest resources for subsistence products, especially in the periods of adverse climatic conditions when agricultural activities cannot support their livelihoods (Cavendish, 1998; 1999; 2000).

In recognition of the dependency of rural poor on forest resources the question has been posed as to whether or not PFM and forest management approaches actually affect poor and less powerful community members adversely, as they (i) stand less of a chance of effecting the rules governing appropriation of the resource and (ii) potentially are adversely affected by restrictions in access to the forest resources. A number of studies indicate that under some circumstances, rural poor are negatively affected by the implementation of PFM (Agrawal and Gibson, 1999; Kumar, 2002).

2.6.2 Contribution on livelihood improvement

One of the biggest challenges of the old approach of forest management approach has been failure to consider local communities livelihood issue. Most of the benefits especially revenues from this approach were used by the central government and Local Authorities (MNRT, 2001). Even with the recent introduction of PFM which encompasses both JFM and CBFM approaches, the rules and regulations that govern management and utilization of forest resources from the two forest management approaches are different. Thus, the accrued benefits and the magnitude of the contribution to livelihood improvements of local communities are also different.

Apart from National Park Authorities investing in infrastructure development and improvement of social services, livelihood opportunities at household level is still limited as a result the attitude of local people towards protected areas concept continued to be negative (Mayeta, 2004).

Large differences exist between JFM implemented in areas of evergreen forest comprising large biodiversity and catchments values, and CBFM implemented in miombo woodlands on village land, where biodiversity levels are low, while large values are related to livelihood diversification possibilities and wood fuel products. In areas with good resource status and market access there is a good chance that poor rural communities can benefit from PFM by possibilities of providing immediate tangible benefits in the form of forest revenue collection, while the interests of poor households within the

community are safeguarded by retaining an open access regime for subsistence products. A very different situation may prevail in areas with poor resource status where the poor groups in a community risk suffering from imposed restrictions on appropriation of forest products for subsistence use (Lund, 2003).

CHAPTER THREE

3.0 STUDY AREAS

The study covered four forest reserves namely the New Dabaga-Ulongambi Forest Reserve, Kising'a-Lugalo Forest Reserve, North and South Nyang'oro Forest reserves, Msosa Village Forest Reserve and the Forest Reserves in

Udzungwa Mountains (Map 1 and Table 2). The six Forest Reserves fall under four forest management approaches namely Joint Forest Management (JFM), National Forest Reserve (NFR), Community Based Forest Management (CBFM) and National Park (NP) approaches for New Dabaga-Ulongambi, Kising'a-Lugalo, North and south Nyang'oro and Udzungwa Mountains National Park respectively.

Table 2: Study sites and type of forest management approaches

Study site	Village	Forest management approach
Nyang'oro North Village Land Forest Reserve	Migoli	Community Based Forest Management (CBFM)
Nyang'oro South Village Land Forest Reserve	Mangawe	Community Based Forest Management (CBFM)
New Dabaga-Ulongambi Forest Reserve	Lulanzi	Joint Forest Management (JFM)
Kising'a-Lugalo Forest Reserve	Kising'a	National Forest Reserve with no other interventions
Udzungwa Mountains National Park	Msosa	CBFM and National Park (NP)
	Mgudeni	National Park (NP)

Source: Field survey, 2004.

3.1Udzungwa Mountain forests

The Udzungwa Mountain forests lie within and outside the Udzungwa Mountains National Park (UMNP) in Kilombero and Kilolo Districts, both of which are in Morogoro and Iringa Regions - See Map 1 (MEMA, 2003). The prevailing climate is tropical to sub-humid of a moderate character. There are four distinct seasons, namely the hot-wet season (December to March), the

cool-wet seasons (April to June), the cool-dry season (July and August), and the hot-dry season (September to November). The temperatures fluctuate from one season to the next, with the average lowest being 12^{o}C and the highest 38^{o}C. The average temperature is 26 ^{o}C. The annual rainfall ranges from 1,200 to 1,400 mm. In extreme cases rainfall can be as high as 2,000mm and as low as 800mm.

Udzungwa Mountain Forests provide a sanctuary for many unique plants, animal; bird, amphibian and insect (including butterfly) species and the forests are unique in the sense that they represent a major part of the eastern Arc forests, which are one of the 25 global biodiversity hotspots. The reserve has the highest levels of species endemism per unit area of remaining intact natural vegetation worldwide. It also contains the major part of the closed forests found in the group of Eastern Arc forests and these are extremely important, both for their biodiversity and water catchment's values. The water that drains from the area is of both local and national importance for domestic consumption, livestock, irrigated agriculture and hydroelectric power production. Economic activities of adjacent local communities in the area are mainly agricultural with minimal livestock keeping due to presence of tse-tse flies.

3.2 North and South Nyang'oro Forest Reserve

North and South Nyang'oro village owned Forest Reserves are located in Iringa rural district, southern highlands of Tanzania (Map 1). The Nyang'oro Range Forest is further to the north stretching in a belt in a Northeasterly direction starting some 60 km north of Iringa town and having a total estimated area of approximately 36,000 ha. In the Mtera Basin, north of the Nyang'oro Range, the average annual precipitation is 450 mm at an elevation of approximately 700 m and concentrated in a rainy season between November to April. Most of the rain falls during December and January.

Soils are generally red brown lateritic, made of loam, silt, sand and gravel in the miombo woodlands, which however are rocky outcrop. Alluvial black "cotton" soils are found in flat the lowlands. *"Mbuga*s" refers to areas where

there is accumulation of fine sediment in poorly drained valley bottoms. Fine clay and silt cover the *mbuga* limestone. The major vegetation communities represented are *Brachystegia* woodland on higher elevation along the Nyang'oro Range; *Acacia* - *Commiphora* at the lower elevations merging into the *Acacia* induced woodland at the valley bottom where clearance for agriculture has not been completely effectuated. The main resources available are trees for fuel wood, timbers, wild animals, birds, insects and stones. Local communities adjacent to this reserve depend on agriculture and livestock production as their major sources of income. Social services available in the area are primary and secondary schools and dispensaries. Services depended by the community from the forest include fuel wood for various uses, fruits, mushrooms, honey, rituals, timbers, poles, withes, pastures, game meat, ropes, water, and carvings.

3.3 Kising'a-Lugalo Catchment Forest Reserve

Kising'a-Lugalo Forest Reserve is located between latitude 07°44'25" - 07°53'00"S and Longitude 35°53'52" - 36°03'40"E 40km from Iringa (Map 1). The reserve covers an extensive area of undulating plateau with an elevation range of 1700 - 2332 m. Kising'a-Lugalo Catchment Forest Reserve was established in 1934 with a declaration, GN No. 31 of 1934. The Gazetted area is 35,000 acres (14,164 ha) with a measured area of 14,154 acres (14,163.7 ha.). 8 villages surround it and the major economic activities of inhabitants of this area are agriculture, livestock keeping and timber trade from planted woodlots and illegally from Kising'a-Lugalo Forest Reserve. It receives oceanic rainfall with oceanic/continental temperatures. The estimated rainfall ranges from 1500 - 2000 mm/year, with higher on the eastern side than on the western side. The reserve is a mosaic of montane and upper montane forest with areas of edaphic grassland. Measured areas of vegetation cover are moist closed forest with bamboo, 9016.2 ha; moist open forest with bamboo, 344.0 ha; bush grassland, 683.1 ha; scrub grassland, 3360.0 ha; mbuga grassland: 683.1 ha; outcrop rock: 77.3 ha. The forest is rich in both plant and animal species.

3.4 New Dabaga-Ulongambi Forest Reserve

New-Dabaga-Ulongambi is located in Iringa Region Tanzania between 35°54' and 35°57' east and is between 8°01'S and 8°06'S. It covers an area of 3728 ha or 37.3 m $^{2.}$ Its boundary is 40km long, which is clearly marked with eucalyptus trees, except along parts of the New Dabaga-Ulongambi Forest Reserve, which is located 45km southeast of Iringa. It is bordered by Kidabaga village (southwestern border). Other nearby villages include Ilamba, Lusinga, Magome, and to a lesser extent Isele and Lulanzi. (See map 1).

The forest is surrounded by grassland fields, small patches of black wattle *(Acacia mearnsii*) and Pine *(Pinus sp*.) plantations, tea plantations and patches of *Parinari excelsa.* Ulongambi Forest Reserve was gazetted in 1930 while New Dabaga Forest Reserve was gazetted in 1932. The elevation of New-Dabaga/Ulongambi is between 1740 – 2100 m a.s.l. Soils are brown sandy loams over crystalline gneiss with areas of clay with stones. Climate is that of oceanic rainfall with oceanic/continental temperatures. Estimated rainfall is between 1500-2000 mm/year. Estimated mean temperature is ~20°C max. (December) and ~15°C min. (July). The dry season is between June and November.

The New Dabaga/Ulongambi forests are a mosaic of upper montane and montane forests, with patches of bamboo. Species more typical of montane forests occur in the valleys with upper montane species occurring on upper slopes. The forested, bush heartland and grassland, areas cover 3296 ha; 308 ha; 96 ha of the forest reserved land respectively. Both montane forest and high montane forests are found in New Dabaga-Ulongambi Forest reserve. Montane forest has canopy height up to 25 m in the valleys. Trees found include *Albizia gummifera, Bridelia micrantha, Cassipourea gummiflua, Chrysophyllum gorungosanum, Ochna holstii, Ocotea usambarensis, Polyscias fulva, Schrebera alata, Syzygium guineense,* and *Zanthoxylum gilleti*i. The upper Montane Forests have a canopy height of 10-15 m on the upper slopes. Trees found in high montane forest include Albizia *gummifera, Aphloia theiformis, Bersama abyssinica, Diospyros whyteana, Macaranga*

kilimandscharica, and *Prunus africana.* There are numerous small streams with their origins in the reserve; in the Ulongambi part of the reserve 13 streams cross the forest reserve boundary. These streams are used locally for crop irrigation and general water supply.

Economic activities of local communities adjacent to New Dabaga-Ulongambi include agriculture, livestock keeping, hunting (outside and inside the forest), trade (Agricultural crops and forest products fro their own farms). Social services available in the villages include primary schools, dispensaries and roads. However, some of the social services are accrued from New Dabaga-Ulongambi Forest Reserve. These include game meat mainly for food and sale (live animals for tourism and for medicine and the mostly animal products collected are Elephant dung & elephant fat). Other services include traditional medicine for treatment & trade, trees for timber, firewood, building poles, charcoal (for household and sale), ropes: (for household use and sale), "*Milulu*" (for household use and sale), honey: (for household use and sale), mushrooms :(for household use and sale). Fish: (for household use and sale), birds: (for household use and sale), rituals: customs and taboos. Most of these activities have negative impact on the forest.

CHAPTER FOUR

4.0 RESEARCH METHODLOGY

Different methods were employed in primary data collection namely focused group discussions, household questionnaire surveys and participant observations while secondary data collection involved review of publications and reports.

4.1 Primary data collection methods

4.1.1 Focused Group Discussions

Focused group discussions (FGDs) were carried out with the key informants guided by a checklist of questions (Appendix I). Key informants are important in FGDs because they are accessible, willing to talk and have great depth of knowledge on issues under consideration (Katani, 1999). The key informants for this study were the village government leaders, village elders of sexes and Village Natural Resources Committee members, the Chief Park Warden and Community Conservation Warden in Udzungwa National Park and the Districts Natural Resources officers for Iringa Rural and Kilombero Districts. Others were the district forests catchments officers, district beekeeping officers and the Park ecologist (Udzungwa Mountains National Park). FGDs provide access to large body of knowledge of general community (Mikkelsen, 1995) and yet are cheaper and quicker to conduct than individual interviews with the same number of respondents. FGDs are also useful in understanding the perspectives, attitudes, behaviors; and concerns of different groups e.g. project staff.

Focused group discussions provided more clarification on issues arising from the structured interviews and facilitated collection of very useful and relevant information for the study. It enabled collection of information on people's early perceptions on the impacts of the different forest management approaches on local people's economy and ownership rights, costs and benefits of each of the forest management approaches and local people's opinions with regard to the introduction of JFM and CBFM in the area.

4.1.2 Questionnaire surveys

A cross-sectional design as suggested by Casley and Kumar (1988) and de Vaus (1993) was employed in this study. The design allowed collection of information at one point in time and data collection was done once through structured, semi-structured or unstructured interview. Sampling units for this study were the households, which were randomly selected from the village registers. Structured questionnaires with both open and closed-ended

questions were used as tools for individual households questionnaire surveys (Appendix II). The study covered six (6) villages out of 35 namely Mangawe and Migoli (Iringa Rural District), Lulanzi, Kising'a, Msosa (Kilolo District) and Mgudeni (Kilombero District). From each village, a sample size of 5% of all households was selected for the household interview in accordance with Boyd *et al*., (1981) cited by Kajembe and Luoga (1996) who argued that a significant representation of a population is achieved when a random sample of 5% is taken for the study. However, according to Akitanda (1994), a minimum size of sampled unit for a population ought to be not less than 30 for each sampling category. Based on the argument by Akitanda (1994), when the sample size was less than 30, it was raised to 30 for conveniences of the study and thus making a total of 180 heads of households.

4.1.3 Participant Observation

Participant observation was also employed in this study. As the name implies, it is distinguished from other methods of data collection by the fact that the observer become part of the situation he/she is studying (Kajembe 1994). Under this study, the method facilitated collection of information on the status of forest before and after introduction of the new forest management approaches (Tanzania National Park (TANAPA), JFM and CBFM) in the study area. The method involved observation of the present forest and taking some photographs of forest cover in some of the forests, in particular Nyang'oro Forest reserve and observing local people's activities, behaviors, relationships, phenomenon, networks and processes in the field to supplement information collected through other methods.

During data collection by this method, it was important to keep an eye open during in order to check for what has been reported and then compare with what I observed physically (Mettrick, 1993). Curiosity, willingness to learn from other people and the ability to adapt to the rhythm and life style of local communities are the key tools of the researcher for ensuring effective use of participant observation methods in data collection (Martin, 1995). The method is preferred as it ties together all the discrete elements and information

collected by other methods, which are examined together within the context of the social system and which are in most cases isolated when other methods are used.

4.2 Secondary data collection

Secondary data were collected through documentary reviews of both published and unpublished documents.

4.3Data Analysis

Both qualitative and quantitative methods of data analysis were employed in order to address the study objectives.

4.3.1 Qualitative Data Analysis

Content and Structural-Functional Analyses techniques were employed to analyse qualitative data and information. Content analysis is a set of methods for analysing the symbolic content of any communication with an intention to reduce the total content of communication to some set of categories that represent some characteristics of research interests (Singleton *et al*., 1993). By using this method, the information collected through verbal discussions with the key informants was analyzed in details whereby the recorded dialogues with key informants were broken down into smallest meaningful units of information.

Structural-Functional Analysis techniques were used to explain the way social facts relates to each other in a social system and the manner in which they relate to the physical environment. It also helped the researcher to distinguish between obvious and concealed functions. Obvious functions are those consequences that are 'intended and are recognized by actors in the system' (Katani, 1999), where as the concealed functions are those consequences that are neither intended nor recognized (Kajembe, 1994). For example, an obvious function of a village forest extension officer is to advise local

community members, while a concealed function is to act as 'broker' between local communities and the project officials.

4.3.2 Quantitative Data Analysis

The data collected through structured questionnaire was coded to facilitate data entry in the computer. Both descriptive and inferential statistics were carried out for quantitative data. The completed interview schedule was coded, sorted and wherever applicable data from open-ended responses were categorized and transformed to enable further analysis. All quantitative analyses were performed using Statistical Package for Social Sciences (SPSS 11.5). Frequencies and percentages, tables and graphs were used to summarize the data. Cross-tabulations involving Chi-Square tests was also employed in testing association between variables and the test of hypothesis.

Inferential statistics was also carried to provide an idea about whether the patterns described in the sample are likely to apply to the population from which the sample was taken. Logistic regression models were then developed and used to explain the relationships between dependent and independent variables. In this study, a number of explanatory variables were used in explaining the response of adjacent local communities on different forest management approaches in the study area.

The following logistic regression model was adopted:

$$\mathbf{Y_i = \beta 0 + \beta 1X1 + \beta 2X2 + \beta kXk + \ldots + ei} \quad \textbf{(1)}$$

Where: Y_i = the i^{th} observation value of the dependent variable (Response of adjacent local communities on different forest management approaches i.e. JFM, Tanzania National Parks and CBFM). $\mathbf{Y_i}$ represents a linear combination of independent variables, which was then used for prediction of people's perceptions on these approaches.

X1 to Xk were the independent or explanatory variables (Marital status, Age, household income, access to forest resources).

β0= Y_i-Intercept term.

B1-βk = Independent variable coefficients showing the marginal effect of the unit change in the independent variables on the dependent variable.

ei = random error term

i = 1, 2, 3……..N (Total number of respondents) = Sample size i.e. 180 for this study)

k= Total number of independent variables (k = 10).

This model was applied to find out the relationship between the response of adjacent community on the new forest management approaches and the underlying factors (Appendix III). The linear combination of independent variables (equation 1) was used in calculating the probability of accepting (equation 2) or rejecting (equation 3) a particular forest management approach respectively and for explaining the significant contribution of independent variables on changes in the dependent variable..

$$\textbf{Prob (accepting)} = \frac{(e^{Yi}) \ldots}{(1+e^{Yi})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(2)}$$

Where $Yi = \beta 0 + \beta 1X1 + \beta 2X2 + \beta kXk + \ldots + ei$

$e = 2.71818$

The probability of rejecting an approach is given by:

$$\textbf{Prob (rejecting) = 1-Prob (Accepting)}$$

$$\textbf{= 1-}\frac{(e^{Yi}) \ldots\ldots\ldots}{(1+eYi)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(3)}$$

CHAPTER FIVE

5.0 RESULTS AND DISCUSSIONS

5.1 Socio-economic Characteristics of Respondents

The socio-economic characteristics discussed in this section are sex, marital status, education level, ethnicity, farm size, sources of household income and household size.

5.1.1 Sex of respondents

Table 3 shows the distribution of respondents by sex in the study area.

Table 3: Distribution of respondents by sex

Sex	Village name						
	Mangawe	**Migoli**	**Lulanzi**	**Kising'a**	**Msosa**	**Mgudeni**	**Total**
Males	27 (90)	22(73.3)	15 (50)	17 (56.7)	24 (80)	25 (83.3)	130 (72.3)
Females	3 (3)	8(26.7)	15 (50)	13 (43.3)	6 (20)	5 (16.7)	50 (27.7)
Total	30 (100)	30 (100)	30 (100)	30 (100)	30 100)	30 (100)	180 (100)

Source: Field survey (2004) NB: Figures in brackets represent %

From the results, majority (72.3%) of respondents were males with few females (27.7%). Chi-square tests showed high significant difference in sex between villages at 5% level of probability (Chi Square value = 18.498, df = 5, $p < 0.002$). However, an exception was observed in Lulanzi village, where males and females were equally represented during the discussions and interviews. This implies that in Lulanzi village local community members were more aware of the importance of gender balance in natural resources management. It also implies that gender balance is not given priority in conservation and management of forest resources in most villages and women are in most cases denied rights of representation and their needs are poorly addressed. This in turn leads to poor women participation in conservation and management of forest resources. Poor representation of women in decision-making process implies that they tend to be disadvantaged when decisions are made against their interest.

As pointed out by Kessy (1998), gender dimensions reflects clear division of labour observed at the household level, as most parts of Africa females do most of the household chores such as cooking and taking care of children while males go out to search for opportunities to improve household welfare.

Sex of respondents influences local people's participation in forest resources management. This is due to gender-based utilization of forest products. For example females are usually more knowledgeable of tree species used for firewood and grasses for mat making. This is because they are the principal collectors, consumers and marketers of certain forest products; usually those connected with household livelihoods e.g. firewood, craft materials, wild foods, and some medicinal plants.

This is also due to the obvious fact that, many African societies are built on clear division of labour in different age classes and gender groups. For example, males may be more informed on the conservation approaches than women because majority attends meetings as compared to females. On the other hand, males are usually involved in more physically strenuous activities of collecting and processing materials for construction and agricultural production e.g. poles and timbers, household items and agricultural implements like hoe and axe handles. Males are also more informed of tree species used for timber, building poles and thatching grasses. However, both males and female may equally be knowledgeable on plant species used for medicinal purposes. The differential knowledge on multiple uses of plant species influences peoples' participation in forest resources management.

5.1.2 Marital status of respondents

Table 4 shows distributions of respondents by marital status.

Table 4: Distribution of respondents by marital status

Marital status	Village name						
	Mangawe	Migoli	Lulanzi	Kising'a	Mosses	Mgudeni	Total

Married	26 (86.7)	23(76.7)	25 (83.3)	25 (83.3)	28 (93.3)	28 (93.3)	155 (86.7)
Single	3 (10)	5(16.7)	2 (6.7)	4 (13.3)	2 (6.7)	1 (3.3)	17 (9.4)
Widowed	1 (3.3)	2 (6.7)	3 (10)	1 (3.3)	1 (3.3)	1 (3.3)	8 (4.4)
Total	30 (100)	30 (100)	30 (100)	30 (100)	30 (100)	30 (100)	180 (100)

Source: Field survey (2004). NB: Figures in brackets represent %.

From the results, majority (86.7%) of respondents were married heads of households, while 9.4% and 4.4% of respondents were single and widowed heads respectively. The chi-square test indicated no significant ($p > 0.05$) difference in marital status between villages (chi-square value = 8.55, df = 10, $p = 0.575$). This implies there is gender-balanced division of labour and shared responsibilities in managing forest resources for sustainable livelihoods. Marital status influences decision making at the household level, including the use of forest products. Understanding the distribution of marital status of respondent is important for assessing management and utilization of forest resources.

5.1.3 Education level of respondents

Table 5 shows the distribution of respondents by education levels in the study area.

Table 5: Distribution of respondents by education level

Education level	**Village name**						
	Mangawe	Migoli	Lulanzi	Kising'a	Msosa	Mgudeni	Total
Primary level	27 (90)	25 (83.3)	24 (80)	30 (100)	24 (80)	27 (90)	157 (87.2)
Secondary level	1 (3.3)	2(6.7)	1 (3.3)	-	6 (20)	3 (10)	13 (7.2)
No formal education	2 (6.7)	3 (10)	5 16.7)	-	-	-	10 (5.6)

Total	30 (100)	30 (100)	30 (100)	30 (100)	30 (100)	30 (100)	180 (100)

Source: Field survey (2004). NB: Figures in brackets represent %.

Majority (87.2%) of respondents had attained primary education. However, Chi-square test indicated no significant difference ($p > 0.05$) in education level between villages (Chi-square value = 24.36, df = 10 and $p = 0.07$). The high level of education promoted acceptance of PFM in the area. For Kising'a village, all (100%) interviewed respondents had attained primary education. The findings confirm previous studies by Onu (1991), Kajembe (1994) and Mbwilo (2002), who reported level of education to affect the adoption of new land use and management techniques.

Education is also vital in terms of natural resources conservation and utilization and in planning and monitoring interventions (Kajembe, 1988; Nsia, 1994; Onu, 1991). Education level of an individual has influence on local peoples' attitude and adoption of different forest management approaches. This in turn have influence on sustainability of different natural resources management projects/interventions in a given area. Focused group discussion with key informants in Kising'a village revealed the intention and concerns raised by villagers to change the management of the reserve from state control to Joint Forest Management approach. Local communities in Kising'a village are eager and willing to implement JFM for Kising'a-Lugalo Forest reserve. As a starting point, they have established a village natural resources committee as the forest manager.

5.1.4 Average farm size of respondents

Figure 2 shows distribution of respondents by farm size in the study villages.

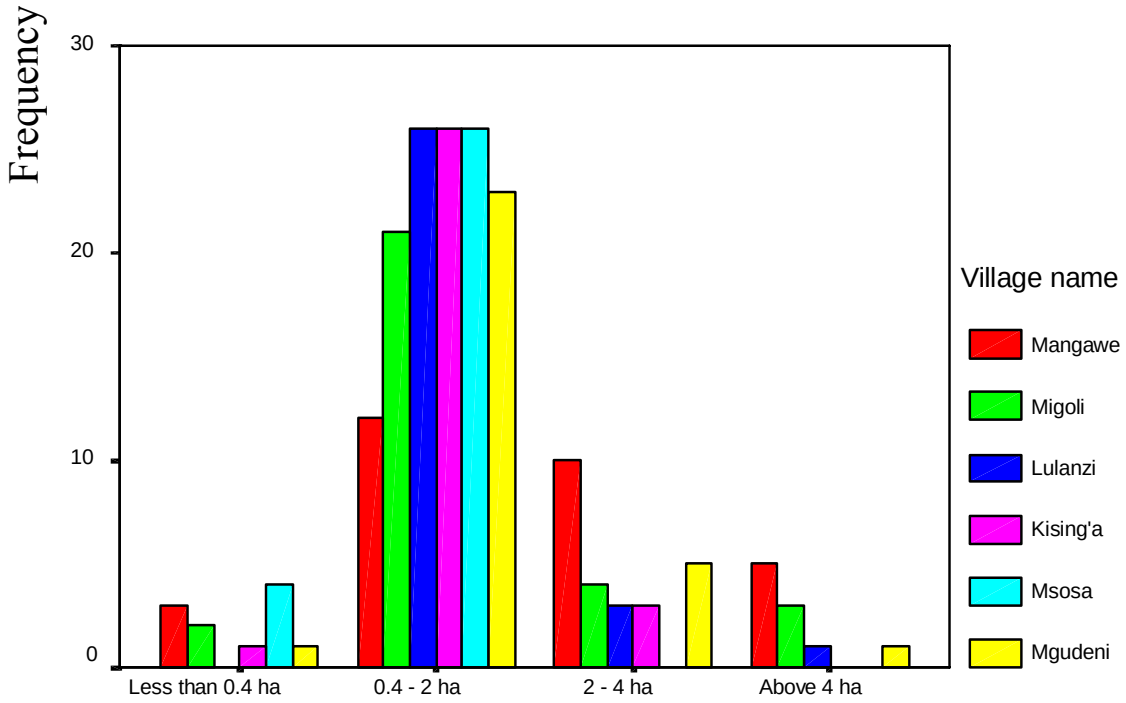


Figure 2: Distribution of respondents by farm size

From the results in all villages, most of respondents had farm size ranging from 0.4–2 ha, with Lulanzi, Kising'a and Msosa villages having more respondents with 0.4–2 ha and none with more than 4 ha in Msosa and Kising'a villages. The Chi-square test indicated a highly significant ($p < 0.01$) difference in farm size between villages, with computed Chi-square value being 37.36, at 15 degree of freedom and 0.001 significance probability levels. Farm size of respondents has implications on the perception of local people on availability of land for different uses. It also reflects the impacts of the reserve and wild animals on peoples' livelihoods. This is because the smaller the farm size the more people would encroach into the reserve to meet varied needs.

5.1.5 Major sources of income

The major sources of income in the study villages were crop production (CP) and livestock production (LP). Others, though at small scale include small businesses (SB) like carpentry (CPTRY) and masonry (MNSRY) (Figure 3). These supplemented income of local communities.

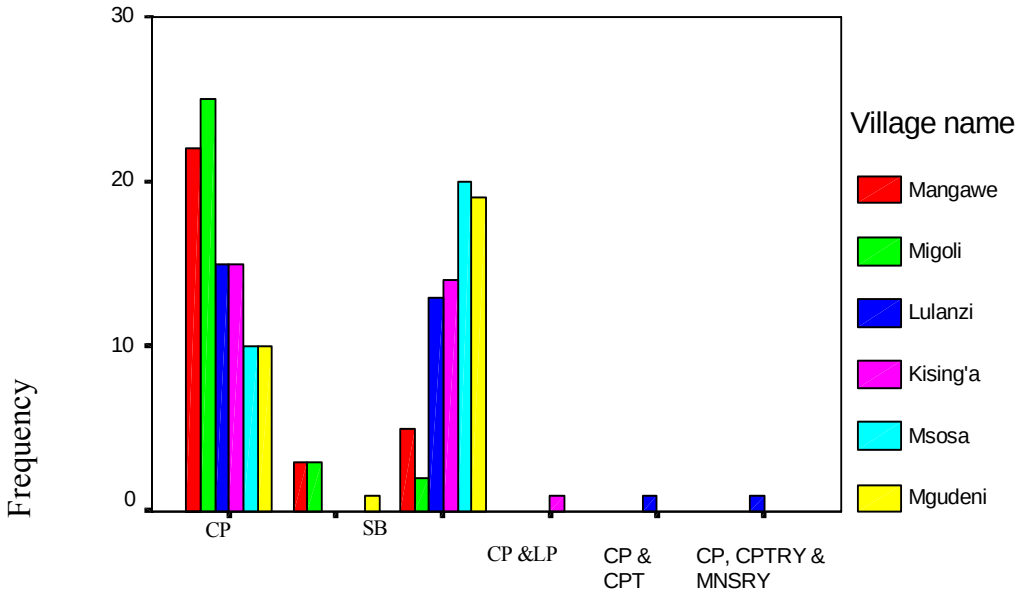


Figure 3: Major sources of household income

This means that there is competition over land uses among stakeholders. Stakeholders under this study include livestock keepers, crop producers, conservationists and many others who depend on forest products to support their livelihoods. However, PFM has provided room for legal use of forest reserves for extraction of different forest based products like firewood, charcoal, timber and medicine. Although not reflected in the bar chart – since the charts portray usual household traditional incomes, at community level, CBFM in Migoli and Mangawe has recently (See table 1 above) provided more opportunities for local communities to benefit from both timber and non-timber forest products including research fees and ecotourism fees, JFM in New-Dabaga Ulongambi has been providing regulated non-timber forest products such as honey, mushroom, dyes, medicines, thatching material, ropes, water, research fees, mat material just to mention a few, to adjacent communities including Lulanzi village. The regulated use of forest resources through PFM interventions in Mangawe, Migoli, Lulanzi and Msosa villages have improved the relationships between forest staff and local communities in the study area. The controlled use of forest-based products in both PFM sites, much more in Nyang'oro Village Land Forest Reserves where there has been noticeable improvement of the local economy of local communities in the

sense that people can now legally collect and sell some of these products to the nearby markets.

5.1.6 Distribution of respondents by ethnicity

In terms of ethnic composition of the study villages, more than half (53.9%) of respondents were Hehe. However, the composition varied significantly at 5% level of probability in terms of ethnic groups. For example, in Mangawe, Migoli, Lulanzi, and Kising'a villages, Hehe comprised of 66.7%, 60%, 100% and 90% respectively. About 93.35% of Msosa respondents are Sagala by ethnicity. Pogolo and Luguru dominated Mgudeni villages by occupying 23.3% of sampled respondents. See figure 4 below.

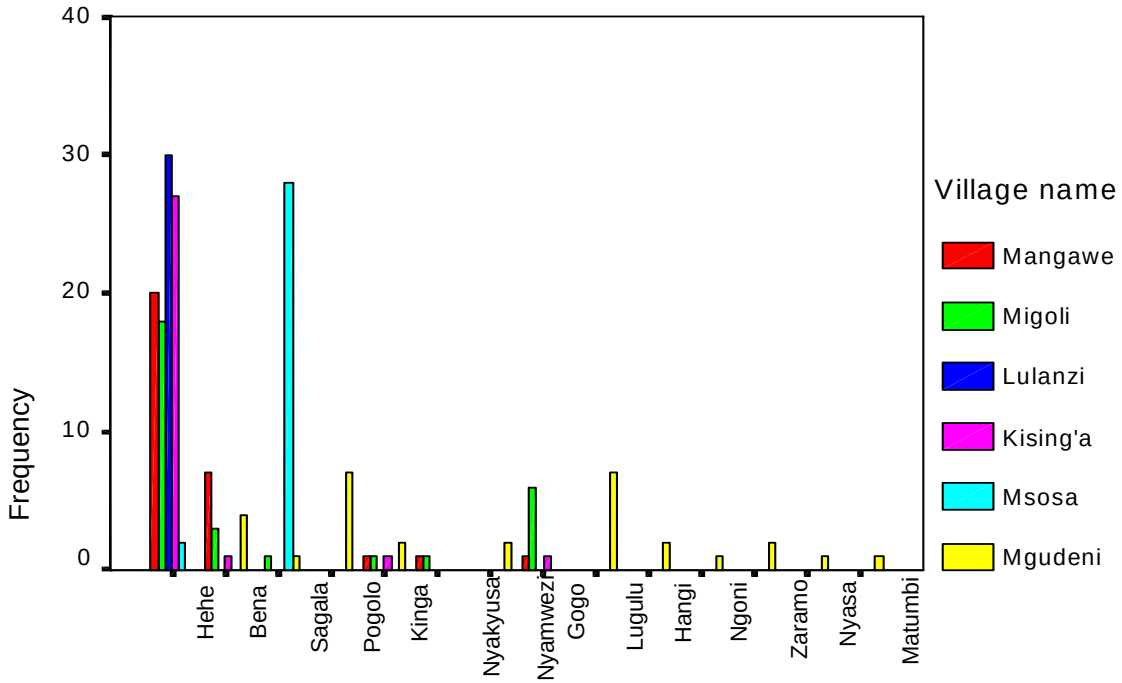


Figure 4: Ethnicity of respondent by village

5.1.7 Household size and age of respondents

Table 6 shows the average household size and age of respondents under different forest management approaches. The household size ranged from 1 to 26, 2 to 12, 2 to 11 and 1 to 11 with average of 5.87, 6.33, 5.17 and 5.63 peoples for CBFM, JFM, NFR and NP respectively. The age of respondents ranged from 20 to 65 years with highest standard deviation of 11.09 years under CBFM.

Table 6: Distribution of respondents by household size and age

Approach used	Variable	N	Minimum	Maximum	Mean	Std. Deviation
CBFM	Household size	90	1	26	5.87	3.605
	Age of respondents	90	22	65	39.23	11.09
JFM	Household size	30	2	12	6.33	2.309
	Age of respondents	30	20	65	38.23	12.17
National Forest Reserve	Household size	30	2	11	5.17	2.245
	Age of respondents	30	20	52	31.10	9.953
National Park	Household size	30	1	11	5.63	2.484
	Age of respondents	30	20	62	38.83	10.750

From these figures in table 6, the average household seems to be very high. This implies that as the household increases, the demand for forest products increases as well. The findings concur with that by Kessy (1998), who documented that development pressures over resources is caused by among other things by increasing human population. This is because increased human population increases demand for different products from the forest. In that case, rural communities are alleged to have a very high real social rate of time preference i.e. they prioritize short-term development problems more than conservation of the same resources. This might also be magnified by uneven distribution of conservation benefits, which act as disincentives for effective conservation and hence ineffective positive conservation interventions (e.g. poor enforcement of conservation laws (Wells, 1992).

It is believed that the different age groups respond differently to the existence of the forest. The older people are more open-minded and often, express the need to have the forest conserved, unlike the youth whose major interest is to create economic benefits out of forest. This has influenced people's participation in different forest management approaches.

5.1.8 Socio-economic factors influencing perception of local communities on Forest

Management approaches

Table 7(a) (b), (c) and (d) for CBFM, JFM, NFR and NP show the influence of socio-economic factors on people's perception on different forest management approaches.

Table 7(a) Logistic regression results on whether people are happy with CBFM Approach or not.

Variable	β	S.E (β)	Wald	Df	Significance level.	Exp (β)
AGE	1.111	0.431	6.639	1	0.01*	3.037
ACCESS	-13.291	6.088	4.766	1	0.029*	0.000
MARITAL	-2.443	2.004	1.486	1	0.223 ns	0.087
INCOME	-6.809	3.237	4.426	1	0.035*	0.001
ACQUIRE	-4.476	2.446	3.348	1	0.067 ns	0.011
CONSTANT	5.595	5.863	0.911	1	0.340ns	268.963

Source: Field survey (2004). ns = Not statistically significant at 5% probability level, * = statistically significant at 5% probability level. Model Chi-square = 57.55 df=7, (P<0.001), Overall classification = 97.6%, -2Log likelihood = 11.041

The results in table 7(a) above indicate that age of respondents (AGE), restricted access (ACCESS) to the forest reserve and average household income (INCOME) have significant (P<0.05) influence on people's perception on CBFM approach, while marital status (MARITAL) and type of land acquisition (ACQUIRE) have no significant (P>0.05) influence on people's perception on CBFM. The variables with significant influence on the response were included in the prediction model while insignificant variables were removed from the model. The basis for removal or inclusion of a particular variable based on its significance level is accordance to Norusis (1990) and Pampel (2000). According to these authors, variables whose significance levels is greater than the cut-out value (P>0.05) are dropped from the model, as they have no significant contribution to the response reported. In this study

marital status and type of land acquisition were dropped and the following prediction model for CBFM was thus developed.

Yi = 5.595 +1.111 (Age) -13.291 (Access) -6.809 (Income)……. (4)

From the model developed from Table 7 (a), age of respondent has a positive regression coefficient (1.111) implying that an increase in age increases people's awareness and acceptance of CBFM approach. The plausible explanation on this fact is that mature people are assumed to have accumulated enough wealth and thus do not encroach the reserve for different motives. They also respect rules and regulation guiding management and utilization of forest resources in the reserved land. The finding concurs with the study by Kajembe and Mwihomeke (2001) in Handeni District who reported that elders are usually committed to conservation and they do insist on conservation rather than over-exploitation of the resources. The elders in the study area were happy with CBFM approach as opposed to the youth. Therefore, an increase in age of respondents increased the odds ratios of responding positively on CBFM approach by a factor of 3.037. By taking a person who is aged 45 years while accessibility and income remaining constant, then the probability that such a person will accept CBFM can be computed as follows:

$$\textbf{Prob (accepting)} = \frac{(e^{Yi}) \ldots}{(1+e^{Yi})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(5)}$$

Where: Yi = 5.595 +1.111 (Age) -13.291 (Access) -6.809 (Income).

By substitutions, Age = 45, Access=0, Income = 0

: Yi = 5.595 +1.111 (45) =55.59

e = natural logarithm equal to 2.718.

$$\text{Prob (accepting)} = \frac{(e^{55.59})}{(1+e^{55.59})} \ldots\ldots\ldots = 0.9839 = 98.4\%$$

This implies that the higher the age of respondents, the higher is the chance (98.4%) of accepting CBFM.

On the other hand the probability of such a person rejecting CBFM approach was computed as follows:

The Prob (rejecting CBFM) = 1 – Prob (Accepting)……(6)

= 1 - (0.9839)
= 0.01608 (or 1.6%)

This implies that the higher the age of respondent, the lower the chances (1.6%) of rejecting CBFM approach. Similarly, income and accessibility influence can be computed in the same way.

The negative coefficient of accessibility (-13.291) implies that increased restriction to access the forest reserve under CBFM reduces the motive of local people accepting the approach. Increase in average income of respondents reduces the motives of accepting CBFM approaches as well. The explanation to this could be that increased income increases diversification of economy of respondents. This implies that apart from crop and livestock production, people tend to engage in forest-based business like selling sawn timber, charcoal, and building poles, and thus introducing CBFM tend to some extent reduce freedom of entry and extraction of the forest leading to rejection of the approach.

Table 7(b) Logistic regression results on whether people are happy with JFM Approach or not.

Variables	β	S.E (β)	Wald	Df	Significance level.	Exp (β)
AGE	0.081	0.055	2.130	1	0.144*	1.084
ACCESS	-3.403	1.483	5.262	1	0.022*	0.033
MARITAL	-0.046	0.980	0.002	1	0963ns	0.955
INCOME	-.302	1.101	.075	1	0.784ns	0.739
ACQUIRE	-0958	0.900	1.132	1	0.287ns	0.384
CONSTANT	6.571	3.46	3.476	1	0.59ns	714.329

Source: Field survey (2004).

ns = Not statistically significant at 5% probability level, * = statistically significant at 5% probability level For JFM:

Model Chi-square = 8.88, df = 5 (P > 0.05)

Overall classification = 75 %.

-2 Log likelihood =24.62

Table 7(b) shows the logistic regression results on JFM. The results indicate that age and accessibility to the forest reserve under JFM have significant (P< 0.05) influence on people's response to JFM intervention. Marital status and land acquisitions have no significant (P> 0.05) influence on people's response on JFM intervention. Therefore, marital status, and land acquisitions were dropped from response prediction model and the following prediction model included only age and accessibility to the forest reserve.

Yi = 6.571+0.081(Age) -3.403 (Access)…… (7)

Taking the same person aged 45 years as it was for the case of CBFM above, while access to the forest reserve under JFM is held unchanged (0), the probability of that person accepting JFM approach can be computed as:

Prob (accepting) = $\frac{(e^{Yi}) \ldots}{(1+e^{Yi})}$ ……(8)

Where Yi = 6.571+0.081(45) -3.403 (0) = 10.216

e=2.71818

Prob (accepting) = $\frac{(2.71818^{10.216})}{(1+2.71818^{10.216i})}$ = 0.9999 (or 99.99%).

The probability of accepting JFM approach by elders represented by such a person is 99.99%. This implies that to the elders, they see JFM as a blessing as compared to the old system (National Forest Reserve) as they can now sign agreements with the central government on how to manage and use the resources inside the reserve. Elders have vast experience and knowledge on how to utilize non-wood forest products such as medicinal plants, mushrooms, dyes and mat materials and so on. Since most of resources that local communities are allowed to access are non-wood forest products, which could be the reason why elders have high probability of accepting JFM approach as compared to youths. The new concepts are easily understood by elders who for a long time have witnessed the negative impacts of the old restrictive

system (NFR) hence happier with JFM approach, which at least allows limited access to the resources. Previous studies by Lynch and Talbott (1995) and Saxena (1993) reported further that JFM give promising results to local communities, though with criticisms.

The accessibility (Access) is a dummy variable with value of 1 if no restriction and 0 if there are restrictions to access the forest reserve. The negative coefficient (-3.403), on accessibility implies that local people are not happy with imposed restriction and this reduces acceptance of JFM approach in the area. By imposing restrictions of access to the reserve, it reduced the odds ratio of accepting JFM by a factor of 0.0333. The forest under JFM in this study (New Dabaga-Ulongambi) is a forest reserve protected primarily for its National catchment values where destructive use such as logging, pole cutting, firewood collection and hunting are strictly prohibited. This is a major driving force for the negative attitude of local communities towards the approach. Moreover, there is a general feeling that there exists unfair pay back to the efforts (boundary demarcation, patrol, time for meetings, boundary tree planting and so on) employed by local communities in the management of the forest under JFM. The prediction equation above (Equation 8) can also be applied to accessibility, as it is the case for age.

Table 7(c) Logistic regression results on whether people are happy with NFR Approach or not.

Variable	β	S.E (β)	Wald	Df	Significance level.	Exp (β)
AGE	-0.009	0.053	0.031	1	0.859ns	0.991
ACCESS	-17.546	43566.544	0.000	1	1.000ns	0.000
MARITAL	-17.830	13231.908	0.000	1	0.999ns	0.000
INCOME	-20.318	10368.097	0.000	1	0.998ns	0.000
ACQUIRE	-0.579	0.789	0.537	1	0.464ns	0.561
CONSTANT	74.626	94895.058	0.000	1	0.999ns	2.6E+32

Source: Field survey (2004).

ns = Not statistically significant at 5% probability level.

Model Chi-square = 8.33, df = 5, (P> 0.05).

Overall classification = 83.30%

-2Log likelihood = 15.24

The results (Table 7c) confirm the negative impacts of the old prohibitive forest management approach to the local communities. None of the socio-economic factors (Age, Access, marital, income and land acquisition) can explain the reasons behind negative response towards NFR approach. This is because local communities are not involved at all in planning, decision-making, management and benefit sharing by the central government. The forests under this category are managed by policing and formalized law enforcement. No model can be developed from these results. These results explain the reasons why most of respondents in Kising'a village were anxiously pushing for introduction of either CBFM or JFM in the area.

Table 7(d) Logistic regression results on whether people are happy with NP Approach or not.

Variable	β	S.E (β)	Wald	Df	Significance level.	Exp (β)
AGE	0.493	504.496	0.000	1	0.999ns	1.637
ACCESS	-20.066	7849.049	0.000	1	0.998ns	0.000
MARITAL	-5.627	14925.225	0.000	1	1.000ns	0.004
INCOME	2.458	19228.116	0.000	1	1.000ns	11.676
ACQUIRE	-13.078	6493.146	0.000	1	0.998ns	0.000
CONSTANT	78.365	46893.847	0.000	1	0.999ns	1.1E+34

Source: Field survey (2004).

ns = Not statistically significant at 5% probability level

Model Chi-square = 5.93, df = 5, (P> 0.05).

Overall classification = 96.60%

-2Log likelihood = 2.77

From the results in Table 7d, none of the socio-economic factors can significantly (P>0.05) explains the reasons on accepting or rejecting national park approach in the area. However age and income level had positive regression coefficients. The positive coefficients on age variable could be explained by the readiness of the elders to accept new interventions and their willingness to adhere to rules and regulations. Moreover, elders consider

access to the park for dead wood collection to be an incentive for them and their families to accept NP approach.

On the other hand people with higher income have positive attitude towards NP Approach. The explanation here could be that they consider a park to open new economic opportunities (Hotels, Lodges, Restaurants, shops and hand crafts), for them to invest. It is only the interventions, rules and regulations by the Tanzania National Park that can influence the response and acceptability of National Park (NP) approach by the local community.

5.2 Community Participation under Different Forest Management Approaches

Figure 7 represents findings on level of participation in forest management under different forest management approaches namely CBFM, JFM, NFR and NP. It can clearly be observed from the figure 7 that different stakeholders are involved in management of the forest in the study area. These include village natural resources committee (VNRC) members (25%), village leaders (VL) and VNRC members (75%), National Park officials (NPOs) (12%) in collaboration with adjacent local communities through community conservation services (CCS), MEMA Project staff and government forest staff

(DCs) (9%) and the village game scouts and patrol guards (VGS) (15%).

Communities in Migoli village demarcating Village Forest Boundary

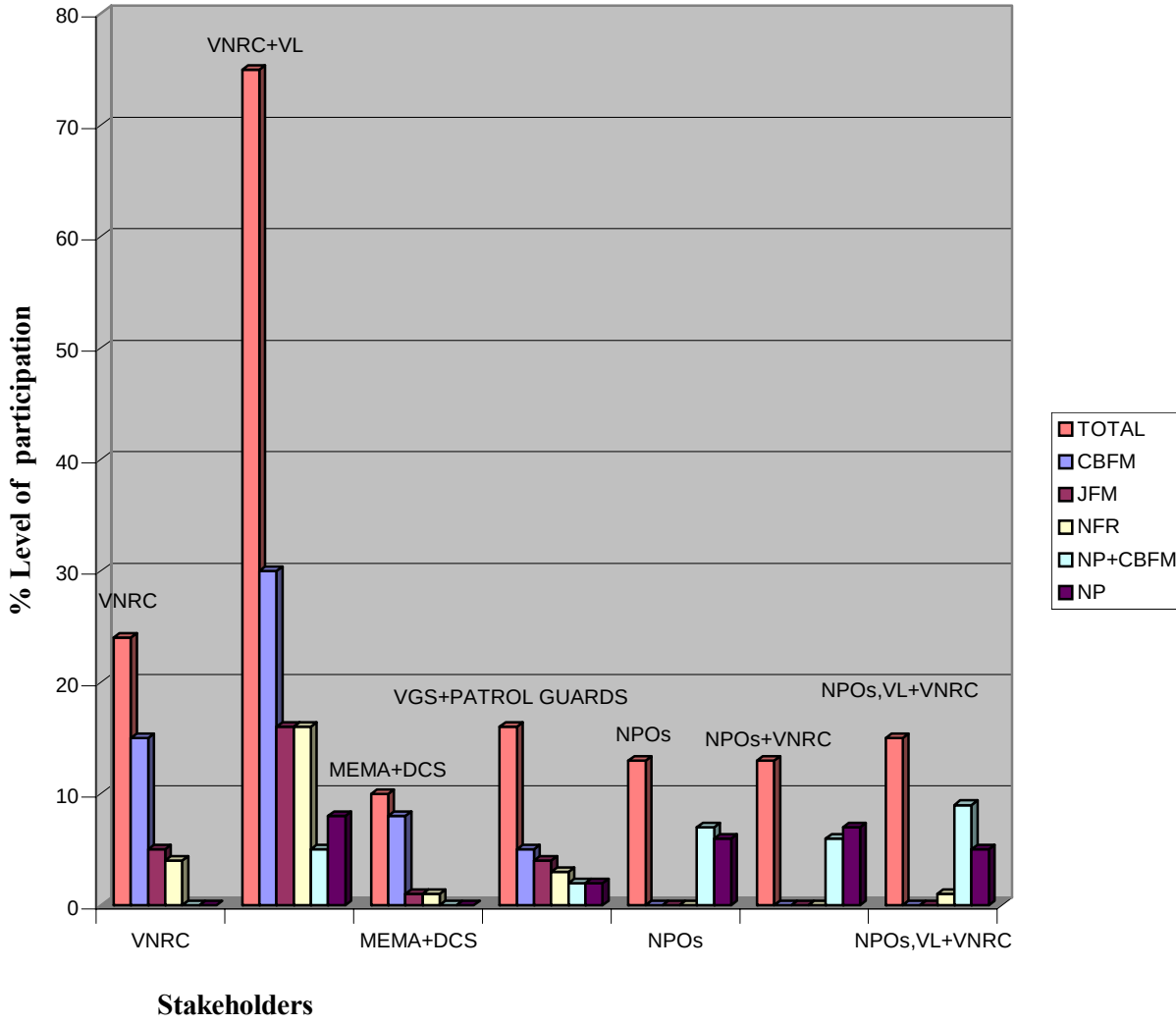


Figure 5. Stakeholders' participation in different forest management approaches

The stakeholders played different roles in the management of forest reserves. For example, while MEMA Project and government staff provided guidance on CBFM and JFM, they were also responsible in providing technical assistance to the local communities involved in these approaches. They helped the local communities in developing of forest management plans, village by-laws and record keeping as well as law enforcement. Village leaders and village natural resources committees are involved in day to day implementation of activities of the general management plans of the forests in question, with village leaders assuming a supervisory role to the VNRC and

patrol guards. Common activities undertaken by local communities include forest boundary demarcation, forest patrols, boundary tree planting, issuing permits and collection of fees and fines from the local community members who apply for the permits. They also determine the level and sizes of harvestable quantities, reporting to the district councils on the progress of CBFM and JFM activities respectively in the area

In Kising'a–Lugalo National Forest Reserve, which is not under PFM, the responsibility of managing the forest is still under the central, government staff that is not even enough to manage all the forest reserve reserves under this category in the study area. The VNRC in Kising'a village has been established as a pre-requisite towards JFM in the Kising'a-Lugalo Forest Reserve and has been playing a limited role in controlling illegal harvesting and of forest products from the reserve.

In Udzungwa Mountain National Park, the National Park officials (NPOs) are the main actors in the management of the park. However, VNRC in Msosa and Mgudeni villages do collaborate with the NPOs in ensuring that there is sustainable management of park resources and thus the integrity of the Park is maintained. Villages adjacent to the Park are involved in the management of the Park through the established VNRC and appointed VGS. Moreover, villages adjacent to the park especially on the Eastern side are allowed to collect dead wood twice a week from the park for their firewood requirements under the supervision of the VGS.

Apart from the observed participation level, local communities have limited powers to make decision in forest management processes. This has influenced their response to different forest management approaches under this study. This confirmed finding by Shepherd (1992), who argued that genuine and dynamic participation in forest, can only be observed in those initiatives whereby all interested parties have had a substantial say in decision making process. These arguments are against the 'traditional' Forest Reserves (i.e. NFRs), which have tended to be closely linked with national needs and

priorities. In India and Nepal for example, PFM has taken the form of JFM that according to Sarin (1993) trying to enhance partnerships between government departments and village institutions on the basis of clearly defined rights and responsibilities of both parties. Inglis (1994) distinguished between passive, interactive and dynamic participation. According to Inglis just raising people's awareness of what is taking place in the project (e.g. through extension) is referred to as passive participation. Participation is said to be interactive when for example the project involves local entrepreneurs and companies in tendering. This requires some interaction and sharing of information between the projects and interested parties. Dynamic participation goes deeper to address issues such as implementation of JFM with local communities and other interested parties.

According to the new Forest Act No. 14 of 2002, communities in Tanzania are recognized as forest owners and forest managers, the law having new opportunities for local investment. The Forest Act concurs with the new Land Act No. 4 of 1999, which removes any notion of reserved land as automatically the property of the Government by declaring it a land management, not land tenure category. The Reserved Land now stands as a class alongside General Land and Village Land. The law also supports community involvement in the management and utilization of forest resources in Tanzania.

Community involvement in conservation and management of forest depend on the nature, security and complexity of people's livelihood strategies. These strategies determine the type of forest products used, the way they are used and type of forest resource users. It also calls for a trade-off between the direct and indirect uses of forests in the context of, for instance, agriculture and livestock rearing. It is also associated with the relative importance of the forests for spiritual, cultural and other indirect benefits. All these determine the nature and level of involvement of local communities in conservation and management of forest (IUCN, 2001). Access to diverse forest products by local communities under PFM approaches has contributed to a great extent on

the observed participation of local communities in forest management in the area. This concurs with Wiersum (1993) and Kessy (1992) who argued that community participation in PFM is influenced by the need of forest products.

5.3. Perceived Costs and Benefits of Forest Management Approaches to Local Communities

Costs and benefits associated with different forest management approaches including PFM vary greatly depending on the type of forest management approach and the stage of implementation of a particular approach. At early stages, it is very difficult to quantify the benefits of these approaches as the benefits are usually out weighed by costs of their establishment and implementation. The benefits are usually long term as compared to the priority needs of the local communities.

5.3.1 Community Based Forest Management

Under Community Based Forest Management (CBFM) approach, the costs incurred by local communities include loss of agricultural land, which is now under the forest reserve. Other costs to the local community include time spent in forest patrols and guarding of the forests, time of attending meetings, boundary demarcation and slashing which subsequently reduces manpower to the village. The time spent on CBFM activities could have been used for paid casual labour to some of the community members. Patrols of the forests increased the workload to local communities, which was formally carried out by the government officials. The government officials are now playing advisory and partial monitoring roles.

The benefits received by local community from adoption of CBFM approach include access to direct use of forest products like timber, firewood, medicinal plants and building poles. Others include the non-wood products like honey, mushrooms, fruits, wild vegetables, and game meat. Fodder, dyes and thatching grasses are also some of the benefits received by local communities from the forest reserve. Apart from being accessible to these resources, village natural resources committees have established fees for different products from the forest and they are collecting enough money from permits. The results of this study confirm that of Wily and Dewees (2001), Kajembe et al. (2001), Rwiza (2002) and MNRT (2003), who documented similar benefits from PFM implementation in Tanzania. The results are also in agreement with Kessy (1998), who argued that forests have both cultural and utilitarian benefits to local communities. The findings also concur with that of Otieno *et al.* (2001) that trees constitute higher proportion of medicinal plants compared to other types of vegetations. The author argued further that roots are the most used parts for medicine. Some of the forest products are for domestic use while others are sold to earn more income for the household. Ives (1988) argued that the inability of smallholder farmers to produce enough food contributes to increase in illegal woodcutting for sales especially near urban centers. It is clear that if people receive tangible benefits from the forests, then they will be willing to participate in all or most of the forest conservation activities in a particular area. When the benefits accrued from participating in CBFM is less

Controlled pit-sawing in Nyang'oro Village Forest Reserve

than the costs, and then the situation acts as an incentive for local people to engage in illegal activities. In some situation the accrued benefits are higher than the costs and the approach is perceived to be an incentive for people's participation in sustainable management of the forest resources in the study area since it involves sharing of power and benefits.

According to (MNRT, 2003), the sharing of benefits is supported by the institutional arrangements and capacity, which also provide room for conflict resolution and land security among stakeholders. It also stimulates socio-economic infrastructure development and income generation from micro and small enterprises. This is because the development of CBFM plans involves extensive capacity building and institutional support to enable the Village Natural Resources Committees become organized and able to prepare and submit their plans and undertake a range of other development activities related to CBFM. Much of the skills and knowledge acquired through this participatory leaning process are useful in other areas of rural development. This constitutes a significant indirect benefit for the population.

The results has also revealed that there is increased awareness of villagers' on communal and individual rights, and a better understanding of the process by which these are maintained is a crucial indirect benefit that has resulted from CBFM operations. Another indirect benefit is conflict recognition and resolution, especially related to the land use planning process stimulated by CBFM. It was revealed that conflicts related to land use-planning process are now managed properly at the local level through the village natural resources committees and village planning committees.

Other benefits received by the local communities are those related to projects supported under CBFM. These include fish farming, beekeeping with 20 beehives in Migoli village, tree nurseries and eco-tourism development in Migoli village. Migoli village has established a Chapuya Campsite, which is generating on average Tshs. 960, 000/= per year. The villages under CBFM

have also managed to apply and secure land certificates and thus they have legal access to resources found in the reserved land within their villages.

The study has revealed that social services have been improved in the study area. This is through construction of school buildings, supply of piped water, improved markets for agricultural products, road rehabilitation to provide reliable transport and accessibility to markets and installation of radio calls to facilitate efficient communication. All these have been achieved in collaboration between local communities and DANIDA support to MEMA projects. The findings are in line with that of Barrow *et al.* (1996) and Mogaka *et al*. (2001) in Kenya, Kessy and Mallya (1999) in Tanzania and Gordon and Ayienda (2000) in Kenya, which documented benefits of PFM approaches being improved of social services, assured sustainable access to priority forest uses and supporting of community development projects. These benefits have significant contributions to improved livelihoods of local communities and sustainable development of the country at large.

However, some constraints to this approach were also revealed. These include the need close follow-ups by technical staffs otherwise over-exploitation of resources is a common issue in the areas of high market demand for forest products like timber, charcoal and firewood. Other constraints were the existing conflicts between individuals who used to benefit when the forest was not under CBFM and the patrol guards. Lack of transparency in the use of money collected from resource revenue was reported to be a common problem under CBFM. This is because some village leaders and village natural resources committee leaders tend to use the money even without informing the community members. This has negatively affected people's response towards introduction of CBFM approach in the study area.

5.3.2 Joint Forest Management (JFM) and National Forest Reserve (NFR)

Under Joint Forest Management (JFM) approach (for New Dabaga-Ulongambi Forest Reserve) and National Forest Reserve (NFR) approaches (for Kising'a-Lugalo Forest Reserve), local communities have also incurred considerable

costs associated with these approaches. These include denied access to the forest and water resources found in the New Dabaga-Ulongambi Forest Reserve. Local people have denied forest for timber, firewood, charcoal production, medicinal plants, fruits, wild vegetables, and access to ritual areas. According the Forest Act No. 14 of 2002, local people can no longer graze their livestock inside the forest reserves. This is because grazing of livestock inside the reserve is a criminal offence and is punishable by the law. The establishment of the forest reserves under these approaches has thus denied local people's access to resources found inside these reserves and the approaches are regarded as a cost to local people's livelihoods.

In the study area, local people are no longer allowed to collect fodder from the reserve. The approach has also denied local people their rights to ownership of the resources inside the reserve. According to Mariki (2000), local people are used as sources of cheap labour. JFM to a large part is based on and follows the old management system (NFR), involving fewer stakes and having less attitudinal change since the same old forester now wears a face of new concepts (Talib *et al*., 1999).

However, local communities reported some benefits associated with this approach. For example, focused group discussion with key informants revealed that local communities do benefit from improved social services like water supply, school building construction for provision of better education to children. The other benefit is the improvement of road network for easy transportation of agricultural products from the point of production to the markets. This is especially important where funds for these activities come from JFM activities. Other benefits include participation of local people in joint management of the forest resources. Fees from research permit s, visitors fee, bamboo leaves for mat making, artisanal products, fine and offences improves the village incomes thereby improving people's livelihoods.

The findings confirm that of MNRT (2003) in Unyampanda Village adjacent to Mgori Forest Reserve, Singida Region Tanzania that village leadership

considers that JFM is beneficial in the sense that it improves community participation in forest conservation. JFM has also facilitated renovation of social infrastructures such as village office and primary school and raising village income from sell of contraband forest products that are confiscated from illegal forest harvesting, fines that are collected as a punishment to offenders, and visitor fees. The funds that are generated are used to carry out renovations. This encourages local people to participate in forest management under JFM approach.

However, the benefits received from JFM approach are less compared to the costs incurred by local communities in the study area. This demoralizes people and discourages them from participating in management of forest resources under JFM approach. This is because most of the forests managed under this approach are protective in nature and is primarily for water catchment purpose. Complains from local people for compensation from the government is now a common agenda where forest resources are managed under JFM. Under the National Forest Reserves where no other interventions are introduced, follow up of illegal activities is still a problem due to the shortage of funds, staffs and transport facilities to facilitate patrols. For that case, just like other Forest Reserves without PFM in Tanzania, illegal activities are still high in Kising'a-Lugalo Forest Reserve.

5.3.3 National Park approach

Forest resources management under Tanzania National Parks approach is a bit different from other approaches (CBFM, JFM and NFR) discussed earlier on. The costs incurred by local communities here is through denied access and utilization of park resources, time spent for meetings with TANAPA staff, Vermin problems, participation in law enforcement and patrols of adjacent communities to Udzungwa Mountain National Park in conservation activities. The benefits received include those related to collection of dead wood collection from the park, which is done twice a week. However, this is carried under the conditions that no "pangas' or any weapon should be carried while

collecting dead woods. This is also under the escort of village game scouts who has been trained and entrusted to do so by the National Park Authorities.

Other realized benefits associated with TANAPA approach to management of the catchment forest include building and improvement of school and health facilities. Water supply and road improvement are also supported by fund from TANAPA under the so-called "Ujirani Mwema" or literally known as Community Conservation Services (CCS). This has of course motivated people's participation in conservation and management of natural resources in the study area. The approach is now an incentive to local people participation in anti-poaching activities. This is because people have realized the importance of protecting of natural resources to their livelihoods.

It was revealed that before establishment of Udzungwa National Park in 1992, the forest resources in the area were poorly managed. This is because only forest officers and forest guards employed by the government were involved in conservation and harvesting of forest in general land, local and central government forest reserves. This resulted into degradation of water resources and hence unsteady water flows down streams. Fire incidences were also higher and common and thus speeded up the disappearance of both fauna and flora in the area. This was also associated with poor and unsustainable harvesting, which resulted into disappearance of some woody species like Mvule (*Melicia excelsa*), Mninga (*Pterocarpus angolensis),* Mkangazi (*Khaya anthotheca*) and other durable and valuable timber species. However, this trend is no longer a problem as local communities have now started participating in the conservation activities of natural resources in the area.

A signboard towards Udzungwa Mountains National Park

The results revealed that TANAPA has contributed to large extent in the restoration of Mwanihama Forest Reserve, part of Udzungwa Escarpment, which was at the risk of deterioration through uncontrolled cutting of trees in the reserve for different domestic and commercial uses. Illegal activities in the park have been reduced. Fire incidences have been reduced as well. Wildlife populations have increased particularly the forest duikers and primate species can now be easily seen on roadside. Some primates are visiting and damaging field crops adjacent to the park. Since the National Park Authority has a relatively small area to manage in Udzungwa National Park compared to its capacity in terms of funds and manpower, is therefore able to allocate enough fund and manpower for better management of the reserve area and support adjacent communities. The other benefits reported were training of local people on natural resources conservation and supporting community based conservation and development activities thereby improving and sustaining people's livelihoods.

The findings confirm the report by Lufungulo, the Chief Park Warden, Arusha National Park that TANAPA supported local communities adjacent to the park for improvement of social services. The reported documented that TANAPA as supported Ngurudoto Women Group in Beekeeping project worth 5 millions Tshs, construction of 2 Songoro Primary school buildings worth 10 millions Tshs and one dispensary worth 8 millions Tshs, and construction of

Longido Girls Secondary School buildings worth 18 millions. In total, TANAPA contribution to the development of local communities adjacent Arusha National Park is worth 41 million Tanzanian Shillings (Erastus Lufungulo, TvT media news 21/6/2004).

5.4 User rights of the local communities on the forest resources

The study revealed existence of resource user rights that encourage sustainable management and utilization of forest resources in the study area by regulating and/or controlling accessibility and collection and utilization of different forest products in the forest reserves. These products include firewood, building poles, fodder for livestock, medicinal plants, and thatching grasses and mat making grasses, and human foods from wild vegetables and fruits (Table 8).

Table 8: Wood and Non-wood forest products collected

(n = 136)

Type of products	%
Firewood	90.4
Building poles	51.5
Fodder	5.9
Water	0.7
Wild fruits	25.0
Medicine	30.1
Bamboo leaves	8.8

Source: Field Survey (2004)

Controlled access to these products is an incentive for people's participation in management of forest resources in the area. Village by-laws (Appendix IVa and IVb) state clearly all the procedures that are followed in order to have access to forest reserves for collection of different products. It was revealed that some resources are harvested without permits while others need special permits from village natural resources committees. According to Sarin (1993), the physical proximity to the forest resources by local communities, formal and informal rights, forest dependence, resource scarcity and traditional and cultural values have influence on peoples' participation in PFM. Usually, the users' rights regulate access to forests and harvesting of products with equitable distribution of benefits.

Participation in forest management is also dependent on existence of local markets, property rights, and institutional controls, the intensity of use, household wealth status, education, availability of labour, alternative sources of products and income, the level of livestock ownership, and cultural preference (IUCN, 2001).

The author argued further that local communities can manage and use natural resources sustainably if there is clear tenure and rights to the resource at stake. Insufficient tenure to resources is in most cases regarded as a disincentive to sustainable management and utilization of common pool resources. This is because people tend to give high priority to current value and uses than it is for the future value of the same resources. It is traditionally acknowledged that local people have customarily managed and used natural resources sustainably. This has been possible under the traditional rules and regulations. Introduction of PFM approaches has changed some of the condition guiding access to and control of natural resources in the area. In turn has at times improved and sustained the use of natural resources. These rules and regulations specify conditions for access to and use of some resources in the study area. The rules also specify which uses are permitted and hence legal, and those, which are prohibited and thus illegal. An in-depth interview with key informants revealed that introduction of PFM and NP management approaches played great role in ensuring sustainable management and use of forest resources in the area.

Some of the rules that guide access to and utilization of resources in the area are those controlling collection of firewood from the reserves, prohibiting grazing inside the reserved area, regulating and prohibiting hunting in the reserved forests and National Parks respectively and controlled collection of honey, building poles and harvesting of timber and logs for charcoal production under CBFM. For example fees for charcoal is 500 Tshs. per bag, dry firewood is 12,000 Tshs per for lorry weighing seven tones, or 1000 Tshs for one ox-driven cart, or most frequently 50 Tshs per head load. For more details on fees and fines in some of the study areas see Appendix V.

For fresh firewood, the fees are 10,000, 2000, and 7,000 Tshs for a lorry, ox-cart and tractor respectively. Research fee in the area is 10,000 Tshs per visit. Commercial logging for timber is charged a fee of between 40,000 - 50, 000 Tshs per tree depending on a tree species. Grazing permit is 5000 Tshs per year. Veltheim and Kijazi (2002) reported similar benefits to local communities in Eastern Usambara Catchment and Development Project, Tanzania. All the revenue collected is kept in the village bank account that can be withdrawn for different uses. In fact the study has revealed that CBFM is perceived to be more beneficial to the local communities in the study area as compared to JFM and NFR approaches. The reported CBFM benefits concur with the reported by Mariki (2000) in Kilimanjaro regions where the forests are used to supply timber, firewood, ropes, building poles, fruits and charcoal to local communities.

The study revealed further that hunting permit fee for greater kudu is 50,000 Tanzanian Shillings in Mangawe village while the fine for illegal hunting was 100, 000 Tshs. The fine was set higher to discourage illegal hunting of animals in the study area. The fee charged for a head load of firewood was 500 Tshs., while fees for charcoal was 2000 Tshs. for one bag of charcoal but this was carried out in specific sites of the reserve. The price for sawn timber was variable. The minimum price reported was 3,000 Tshs.

Other rules prohibited setting fires in the reserved area and those specifying fines for law violators. It was revealed that these rules and regulations specifying user rights of the resource have been instrumental for sustainable management and utilization of forest resources in the area. According to these regulations some activities were regarded legal while others were reported illegal depending on the approach in place. For example activities are legal under CBFM viewpoint while under JFM, NFR and NP views are illegal. A distinction between the approaches is therefore necessary justice decision on who is a legal or illegal user of the resources.

Under CBFM, the legal activities included permitted harvesting, firewood collection, grazing in some specific sites, charcoal burning in some specified locations, farming in some specified location depending on the management zone plans of a particular village, hand craft activities, collection of honey and access to the forest for sacred activities. However, these were legal provided that a permit was given and the necessary fees was paid and carried out in specified sites. Access to the forest products inside the reserved forest was allowed three times a week in Migoli and Mangawe villages. Contrary to that these could also be illegal and punishable as per established rules and regulations. Illegal activities under CBFM include setting fires inside the reserve.

Under the JFM, NFR and National Park regulations, timber harvesting, hunting animals, setting fires, grazing and farming inside the reserved forests were categorized as illegal activities and punishable as per established regulations. The legal activities under these approaches include dead wood collection under the escort of the game scouts or village natural resources committee member and are done on specified dates, usually twice a week. However, in order to ensure effective implementation of these approaches and appropriate law enforcement, every sub-village in each village has selected three game scouts for doing patrols in and around the forest.

Adoption of these approaches was reported to contribute positively and indirectly on household income. The contributions of these approaches include improved quality of the environment and habitat in general due to controlled use of the resources, improved and stead flow of water and sustainable supply of water for domestic and small scale irrigation and improved household revenue as some of the forest products can easily be sold to the market. It was also revealed that the losses due to unplanned fires on crops, forest products and other properties have been reduced thereby contributing to the improvement of local economy.

Through controlled incidental fires and regulated access to forest resources, the poor communities adjacent to the reserves are now assured of sustainable and quality supply of thatching grass for their houses. This is because poor rural communities are not able to afford purchasing of other alternative building materials such as the corrugated iron sheets for their houses. Controlled fires and regulated use of forest resources resulted into increased health conditions of biological resources and hence sustainable supply of quality products such as water to local communities. However, the failures of the approaches were also reported. These include failure of the government to devolve benefit sharing as it has only managed to devolve sharing of management responsibilities and not benefit sharing. This has led to low realized benefits from JFM in the study area. As a result incidences of fires are still a problem in NFR. Other weaknesses reported include limited number of committed and dedicated forest staff to lead the PFM processes.

Problems related to availability of forest products under JFM, NFR and TANAPA approaches respectively were also documented. These include denied access to some products like timber and grazing land and inadequate supply of dead wood to meet firewood requirements of the growing population. In the case of CBFM, the problems reported were inadequate supply of building poles, timber, fuelwood and honey as the demand for these resources is higher compared to the supply. This was in particular due to limited extraction level and higher fees charged for some products like logs for timber.

In terms of management of natural resources management, it was reported that some of management guidelines have to be improved to provide conducive and sustainable environment for natural resources management and utilization. These include need for more involvement of local communities in planning and decision-making. To reduce illegal activities, it was reported that established fees have to be lowered so that more poor people can afford to pay for required fees and thus become legal users of the resources. Patrol

arrangement in the forest should be clear among stakeholders so that roles and responsibilities for each stakeholder are clearly stated

5.5 Contributions of PFM to Local community Livelihood Improvement

In the study area, JFM and CBFM have received positive support from the local community and this encouraged local community participation in forest management. The focused group discussions with village natural resources committees, village leaders and government officials at the district level reflected participation of local people in management and utilization of diverse forest products. The most commonly used parts of the forest products from the forest were shoots, roots, leave and bark for medicinal purposes.

Dead woods or some tree parts were usually collected for fuel wood for supply of domestic energy. Fresh tree were collected for building poles and either timber under CBFM approach. Neither poles nor timber were harvested under the JFM, NFR and National Park management approaches respectively. The reasons behind popular participation of local community in management of forests include effectiveness of the CBFM approaches and controlled and sustainable supply of forest products (fuelwood, building poles), steady water flows from the water catchments and increased population of wildlife. The increased population of wildlife have now attracted and encouraged tourism activities in the area that in turn generate income for the villages.

Income generated now enables local communities to pay for school fees for their children and they are also able to support school building rehabilitation for provision of improved education and health services to their children. These benefits have promoted the spirit of participation of local communities in sustainable management and utilization of natural resources in the area. The local communities are now involved in decision-making process under JFM and CBFM.

Much of the value of the forest products to users lies in the way they are used to maintain livelihood stability, controlling risks, and enhancing the resilience

of livelihood systems. Forest product users therefore, focus on products which are readily available on a daily basis and they heavily discount the values of those products which rare available only in the future or periodically. Thus, only the immediate realizable values are likely to be of relevance to most users, with the exception of important cultural values for sacred places.

Forest products are clearly one, often important but under recognized component in rural people's livelihood. It is a capital basis particularly used to mitigate risks (IUCN, 2001). Forest conservation and management under different management approaches differ significantly in contributing to the livelihoods of local communities. In this study the contribution of CBFM, JFM, NFR and NP management approaches was assessed to find out the perceived contributions of these approaches to the improvement of household income and livelihood in general. Therefore, the likely contributions of PFM to local people's livelihood can be in term of monetary terms, food security, water supply, health services, education facilities, energy supply and environmental conservation and sanitation thereby resulting into sustainable biodiversity conservation.

5.5.1 Increased food security and energy supply

Table 9 shows the percentage of response on awareness of local communities on the contribution of CBFM, JFM, and NFR to local level livelihoods. Local communities argued to benefit more from CBFM approaches than it is for JFM and National forest Reserves without any interventions. This is due to limited extraction of both wood-based and non-wood based forest products from these reserved forests. Under CBFM and, local communities are enjoying more benefits from these approaches due to high contribution to the improvement of social services which in turn lead to poverty reduction and hence sustainable livelihoods at the local level.

Table 9: Responses on the awareness of local communities on the contributions of CBFM, JFM, NFR and NP to the Livelihoods of local Communities

Approach	Contributions	%
CBFM (n = 90)	Improved habitat conditions	11.00
	Improved water catchments and stream flows	52.40
	Improved supply of forest products	2.40
	Improved revenue from sale of forest products	28.60
	Reduced losses due to forest fires	35.70
	Thatching grass	4.80
JFM (n = 30)	Improved habitat conditions	7.10
	Improved water catchment	21.4
	Improved supply of non timber forest products	7.10
	Improved revenue from sell of non timber forest products	71.10
NFR (n = 30)	Collection of non-wood forest products	40.00
	Revenue from sell of non-wood forest products	60.00
NP(n = 30)	Improved habitat conditions	9.10
	Improved water catchments	18.10
	Improved supply of dead wood for firewood.	27.30
	Reduced losses due to forest fires	27.10

Source: Field survey (2004).

5.5.2 Improved, diversified and sustainable local economy

Improved forest habitat conditions in CBFM provides good habitat for wild animals hunted for game meat. Increased animal population also increases wildlife-based tourism and increased earning of foreign currency. Increased diversity of wild plants increases the supply of forest-based products including timber and non-timber forest products such as wild fruits and vegetables thereby increasing food security of the households. Increased food security means improved local livelihoods and hence sustainable development at the local level.

Forest products collected for commercial purposes increase household income, which in turn increases diversification of economy and hence independent economy of local communities. These products collected and sold include

timber, charcoal, firewood and poles (in CBFM), dry firewood for local brewing and drying of fishes, medicine for traditional practitioners and witch doctors, grasses for selling, charcoal production for energy supply to civil servants and town dwellers, collection of sand, soils and stones for modern house construction, cutting trees for canoes, beehives and traditional stools, ropes for sale, collection of gum-arabic for sale and there possibilities for tourism and camping sites. Tourism and camping sites in Migoli is reliable source of income to the village and has high contribution to the economy of the village.

The collected revenue can also be used to buy other basic needs for the household. The involvement of local communities in CBFM was reported to improve skills and knowledge of local communities on sustainable conservation and utilization of forest resources. This is because local communities are provided with environmental conservation education thereby building their capacity in natural resources management. This implies that local communities are now able to integrate conservation and development activities in their struggle to achieve sustainable development in the rural areas. The contribution of PFM to the improvement of the livelihoods of local communities is perceived to be due to the controlled and sustainable access to and use of the forest resources in the area. Accessibility of local people to the forest enabled them to collect different forest products essential for survival and sustainable livelihood as the collected products find their routes to the available markets. In this case, access to forest products and the subsequent selling of the products has impacts on poverty reduction and hence improving the livelihoods of local communities (Table 10).

Table 10: Response of local community on accessibility to the forest

	Response on accessibility to the forest	
Approach	Yes	No
CBFM (n = 90)	64 (72.7)	24 (27.3)
JFM (n = 30)	19 (65.5)	10 (34.5)
NFR (n = 30)	11 (37.9)	18 (62.1)
NP (n = 30)	21 (70)	9 (30)
Total	115	61

Source: field survey (2004).

NB: Figure in brackets represent %. Need for Chi-Square values to tests for significant difference in accessibility to forest products.

This is in agreement with previous studies by Cavendish (1998; 1999; 2000), Luoga et al. (2000) and Monela *et al.* (1993, 2000), Wunder (2001), White (2002), Ellis and Bahigwa (2003), Ellis and Mdoe (2003) as there is a tendency of selling more products and getting more money. In their studies, Cavendish (1998), Wunder (2001), White (2002), Ellis and Bahigwa (2003), Ellis and Mdoe (2003), access to and ownerships of assets by local communities reduces poverty and improves their livelihoods.

5.5.3 Improved provision of quality social services at local level

Provision of quality and improved social services was reported to be one of the beneficial contributions of PFM and NP in the study areas. The social services provided were construction of primary and secondary school building, buildings for health centers and dispensaries in Migoli and Mangawe villages. Improvements of road networks was under way to ensure that farm produce get access to local market and thus minimize post harvest losses associated with crop loses due to lack of improved road networks. Improved water catchment has contributed to the improvement of water supply at local level. It has also increased knowledge of local people on water resources management. Increased knowledge and skills on water resources conservation and management is a key foundation to sustainable water resources in rural areas. The knowledge also improves understanding of the local communities in the participation and management of these resources. The understanding of water rights also backs the need for multi-stakeholders involvement in natural resources management. This argument is in line with the New National Forest Policy (MNRT, 1998) and the New Forest Act No. 4 of 2002 (URT, 2002) that emphasized on devolution of ownership and management responsibilities over the forest resources to local communities.

CHAPTER SIX

6.0 Conclusion and Recommendations

6.1 Conclusion

From the findings, it was clearly observed that CBFM approach is the most recognized and acceptable forest management approach and is popularly considered by local communities as a significant route towards securing and sustaining forest resources. CBFM came up the highest in-terms of providing direct tangible benefits both timber and non-timber forest products to communities followed by National Park. Apart from the fact that Udzungwa National Park was managed on total protection basis, regulated permission to allow communities collect dead wood for firewood and support to the improvement of community's socio services made the Park more acceptable than Joint Forest Management in New-Dabaga Ulongambi Forest Reserve and Kising'a-Lugalo National Forest Reserves both protected as Catchment Forests for National interests with very limited benefits from the JFM scheme, mostly non-timber forest products.

The findings indicated varying levels of participation in forest management under different forest management approaches namely CBFM, JFM, NFR and NP. Different stakeholders played different roles in the management of forest reserves. Village leaders and village natural resources committees are involved in day to day implementation activities of the general management of the forests in question, with village leaders assuming a supervisory role to the VNRC and patrol guards.

Common activities undertaken by local communities include forest boundary demarcation and boundary tree planting, forest patrolling, issuing permit and collection of fees and fines from the local community members who apply for the permit. According to the new Forest Act No. 14 of 2002 of Tanzania, with exception of the National Park, communities are recognized as forest owners and managers, the law having new opportunities of involving key stakeholders. The law also supports community involvement in the

management and regulated utilization of forest resources in Tanzania and the world at large.

Community involvement in conservation and management of forest was found to depend on the nature, security and complexity of people's livelihood strategies. These strategies determine the type of forest products used, the way they are used and type of forest resource users. For example, access to diverse forest products by local communities under PFM approaches has contributed to a great extent on the observed participation of local communities in forest management in the study area.

Costs and benefits associated with different forest management approaches vary greatly depending on the type of forest management approach and the stage of implementation of a particular approach. For instance, under Community Based Forest Management (CBFM) approach, the costs incurred by local communities included loss of agricultural land and free access to forest resources which are now under the village forest reserve. Patrols of the forests were reported to increase the workload to local communities, which was formally carried out by the forest government officials. The benefits received by local community from adoption of CBFM approach include regulated access to forest products like timber, firewood, medicinal plants and building poles. Fodder, fruits, dyes and thatching grasses are also some of the reported benefits accrued by local communities from the forest reserve. Apart from being accessible to these resources, village natural resources committees have established fees for different products from the forest and they are collecting enough money from permits. The results are also in agreement with Kessy (1998), who argued that forests have both cultural and utilitarian benefits to local communities. Other benefits received by the local communities are those related to projects supported under CBFM such as village social services infrastructure development.

Under Joint Forest Management (JFM) approach (for New Dabaga-Ulongambi Forest Reserve) and National Forest Reserve (NFR) approaches (for Kising'a-

Lugalo Forest Reserve), local communities have also incurred considerable costs associated with these approaches. These included denied access to the forest and water resources found in the New Dabaga-Ulongambi Forest Reserve. Local people have been denied access to forest products such as timber, firewood, logs for charcoal production, medicinal plants, fruits, wild vegetables, and access to ritual areas. According the Forest Act No. 14 of 2002, local people can no longer graze their livestock inside the forest reserves. The establishment of the forest reserves under these approaches has thus resulted into increased costs to local people's livelihoods, especially in catchment areas where monetary benefits from royalties and cess are in principle non-existent and the lack of clarification of benefits is considered a problem.

Benefits associated with JFM include participation of local people in joint management of the forest resources and regulated use of non-timber forest products. The findings confirm that of MNRT (2003) in Unyampanda Village adjacent to Moro Forest Reserve, Singida Region Tanzania that village leadership considers that JFM is beneficial in the sense that it creates opportunities for community participation in forest conservation and limited access to forest goods and services. However, it was observed that the accrued benefits are not tangible enough to attract active local community participation in forest management under JFM approach. This demoralizes most of the people especially the youths from participating in management of forest resources under JFM approach. Complains from local people for compensation from the government is now a common agenda where forest resources are managed under JFM. For that case, this could be the reason why most of Forest Reserves without PFM in Tanzania such as Kising'a-Lugalo Forest Reserve are still facing rampant illegal activities.

Forest resources management under Udzungwa National Parks approach is a bit different from other approaches (CBFM, JFM and NFR) described above. In this approach, the National Park Officials are key players in Park resources management with very superficial involvement of adjacent communities

through Community Conservation Services Department as Village Patrol Guards. The realized benefits associated with this approach include support of building and improvement of school and health facilities from TANAPA budget. Other reported benefit, though not common to most of the National Parks in the country is permission to collect dead wood for firewood. Adjacent communities to the park reported further that training on natural resources conservation and support on community based conservation and development activities were given for improving adjacent people's livelihoods.

With exception of Kising'a-Lugalo Forest Reserve, the study revealed existence of resource user rights in different forest management approaches (CBFM, JFM and NP) that in a way encourage sustainable management and utilization of forest resources in the study area by regulating and/or controlling accessibility and collection and utilization of different forest products in the forest reserves. User rights are stipulated in forest management plans, Joint Forest Management Agreements and Village by-laws. Controlled access to different products is an incentive for people's participation in management of forest resources in the area. Such user rights arrangements confirm Sarin (1993), who argued that physical proximity to the forest resources by local communities, formal and informal rights, forest dependence, resource scarcity and traditional and cultural values have influenced peoples' participation.

Forest conservation and management under different management approaches differ significantly in contributing to poverty reduction and improved livelihood the livelihoods of local communities. Local communities acknowledged benefiting more from CBFM approaches than it is for JFM and National forest Reserves without any interventions. This is due to limited extraction of both wood-based and non-wood based forest products from these reserved forests. Increased diversity of wild plants increases the supply of forest-based products including timber and non-timber forest products such as wild fruits and vegetables thereby increasing food security of the households. Increased food security means improved local livelihoods and hence sustainable development at the local level.

Forest products collected for commercial purposes increase household income, which in turn increases diversification of economy and hence independent economy of local communities. The involvement of local communities in CBFM was reported to improve skills and knowledge of local communities on sustainable conservation and utilization of forest resources. This is because local communities are provided with environmental conservation education thereby building their capacity in natural resources management. Accessibility of local people to the forest enabled them to collect different forest products essential for survival and sustainable livelihood as the collected products find their routes to the available markets. In this case, access to forest products and the subsequent selling of the products has impacts on poverty reduction and improved livelihoods of local communities. However, proximity to reliable markets for forest products was observed to be another factor, which differentiated levels of income from village to village involved in PFM.

Improved water catchments have contributed to the improvement of water supply at local level. It has also increased knowledge of local people on water resources management. The knowledge also improves understanding of the local communities in the participation and management of these resources. This argument is in line with the New National Forest Policy (MNRT, 1998) and the New Forest Act No. 14 of 2002 (URT, 2002) that emphasized on devolution of ownership and management responsibilities over the forest resources to local communities.

Contribution of National Park approach to improved social services (health centers, schools and road network) should not be undermined. Park adjacent communities appreciated park authority contributions to improvement of social services that ultimately lead to improving the livelihoods of local communities.

6.2 Recommendations

From the results and discussions of this study the following seem to be pertinent recommendations:

- Rules and regulations guiding management and utilization of the resources should be improved to provide more tangible incentives for local communities to use their optimal potential in the management and utilization of the resources to meet their priority needs. Among others, these include creation of a favorable environment for local community involvement and benefit sharing mechanisms, and the need for strict enforcement of regulations. This will ensure improved and sustainable livelihoods of local communities adjacent to the National Forest Reserves. .

- There is a need for capacity building (training) for local communities on appropriate law enforcement and sustainable management of natural resources in the study area. This is based on general observations from both interviews and focused group discussions with village leaders that local communities lacked skills and knowledge on law enforcement and financial management, planning and management of revenue collected from fees and permits. Local people are not able to plan and carry out forest resource assessment and utilization plans.

- There is also a need for improving the Joint Forest Management Agreement to include a third party in the agreement signing process that can oversee and supervise both parties on their responsibilities. Negotiations should be headed by or carried out under the auspices of a third party to avoid that the state overpowers rural people in the negotiations due to better access to knowledge, resources, experience and to avoid undue pressure by other secondary stakeholders

- As a matter of principle, protection forests, including catchment forests, should not be subjected to JMAs as these forests, in the absence of financial transfers and with a limited utilization opportunities, will not be able to provide local communities with the benefits they need to cover the cost of a JMA. Instead, FBD and Local Authorities should pay local communities for the protection of these forests through simple labour contracts for activities like boundary clearing, planting and patrolling as these contracts are considered far more sustainable for protection forests than JMAs.

  In order to widen funding base towards protected forests, the government should see to it that, main water user companies like Hydropower and Water Authority should set aside some percentage of their revenues and plough back to the management of catchment forests. Such companies should consider forest management as their primary role since water resource is their main capital. The contributions could be determined by deliberate studies on payments for environmental services. From the study findings, it was observed that local communities were getting low deal in terms of benefit sharing under JFM and NFR approaches as compared to the costs incurred on forest resources management.

- From the findings above, it is clear that participatory forest management not a panacea or magical tool for the solution of sustainable forest management and prevailing poverty reduction problems, local community participation in forest management,

improving user rights and equitable distribution of benefits and costs to stakeholders. A thorough consultation and analysis of viability of forest management approaches should be a pre-requisite to adoption of any forest management approach. For example Udzungwa Mountain National Park approach was observed to be more superior to JFM and NFR approaches. Even some of the villages under CBFM where accessibility and proximity to markets for forest products were poorly developed, the approach was not perceived as the best option.

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Appendix I: Checklists for key informants

Village Government leaders

1. Village population
2. Number of households

3. Environmental strategies available in the village and their roles
4. List importance of forest to local communities
5. Neighbouring villages with directions
6. Major sources of income in this village
7. Total revenues collected from various sources per month/year
8. What are the forest revenue/benefits sharing mechanism between village and the government?
9. What are the uses of village government money?

Appendix II: Questionnaire Form

Questionnaire for Government Forest Management Officials

Region ---------- District ---------- Date ----------
Name of the interviewee ---------- Position ----------
Name of enumerator ----------
Education level ----------
Age ----------
Major sources of income in the Department (Please list them) ----------
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1. Average income per month/ year in both the District Council and Forest Division (Please fill in the table below)

Activity	Income per month	Income per year

Information on forest conservation approaches

3. Which approaches do you use for regulating forest resources use in this region/district? (Please list them and explain their roles)

Type of approach	Role(s) played
National Park JFM in National Forest Reserve JFM in Local Govt Forest Reserve Village Land Forest Reserve Forest in General lands	
Community Forest Reserve Private Forests National Forest Reserve (without JFM)	

4. When did each of the mentioned approach start in this region/district?
5. What was the situation of the forest resources before commencement of the mentioned approaches? Why? (Please use a separate sheet for this question)

6. What are the costs and benefits of initiating/ establishing of the mentioned approaches to the project, local people and government as a whole? (Please use a separate sheet for this question)

Types	**Project**	**Local communities**	**Government**
1. Costs			
Loss of property			
Loss of income			
Opportunity cost			
Loss of opportunity			
Time used in mangt			
Forest patrol			
2. Benefits			
Direct forest products			
None wood forest products			
Project related			
Employment			
Social services improve			
Ownership/rights			

7. What is your opinion(s) with regard to the introduction of the mentioned approaches in this area?

Questionnaire for Village Natural Resources Committee (This is for group discussion)

Region ---------- District ---------- Ward ----------

Village ---------- Date ----------
Name of organization (e.g. CBO, VNRC, VFC etc) ----------
Names of members and their positions

Name	Position

Information on forest conservation approaches

8. List importance of the forest to local communities
9. List types of forests found in this village (NP, Village forest, Forest Reserve etc.)
10. What type(s) of forest products do local communities collect from each forest type?
11. How do local communities access the forest products from each forest and why?

12. What are the forest revenue/benefits sharing mechanism between village and the government?
13. Are they happy with this/ these system(s)?
14. Do you have any approaches for regulating forest resources use in this village? Please list them and explain how they work
15. How do you rank the effectiveness of the named approaches in terms of forest conservation and why?
16. What are the costs and benefits of initiating/ establishing of the mentioned forest management approaches to local people?
17. What is your opinion(s) with regard to the introduction of the mentioned approaches in this area?

Questionnaire for individual households

Region ---------- District ---------- Date ----------

18.Village name ----------19. Name of the interviewee -------

20. Name of enumerator ----------
21 Sex of respondent ----------
22 Marital status ----------
23 Age of respondent ----------
24 Education level of the respondent ----------
25 Family size ----------
26. Source of income ----------
27. Average income per month/ year ----------

Main activities in relation farming/crop production

28. Do you cultivate your own crops?
29. If yes, what type of crop(s) do you cultivate?
30. If no, where do you get food for your family?
31. What is the size of your farm?
32. Where is your farm located?
33. How do you acquire land for farming and settlement?
34. Is the land for farming and settlement adequate?
35. If no, why?

Information on forest products

36. Do you have accessibility to the forest?
37. If yes, how do you get access to the forest?
38. For how long have you been using this system and why"
39. Are you happy with this system? Please explain

What type of forest products do you collect from the forest and why?
Can you rate the frequency of collecting forest products?
Which parts of each forest product do you collect and why?
How do you harvest the forest products from each forest type and why?
Do you sell some of the collected forest products?
If yes, please give the average quantity sold per season and their respective prices
What are the legal and illegal activities in the forest?
What are the problems related to availability of the forest products?
Could life be possible without forest?

Are there any rules, policies, by-laws governing forest resources utilization in this village?
If yes what are they? Please list them and explain
When do these rules, policies, by-laws started into this village?
Who is involved in enforcement of the rules?
How do these new forest management approaches contribute to the income generation activities into your family?
With this new forest management approach, for how long do you think the forest will continue providing forest products?
Are the rules/laws governing forest management adequate?
How would you like the regulations be improved?
How would you like the new forest management approach improved?
Who are responsible with forests (NP) management?
Do you think they are adequately handling the management role?
What are the main achievements in forest management by the government? (Udzungwa National Park by TANAPA)
What are the failures in forest (NP) management by the government/TANAPA?
What should be done to improve management?
What are your needs to facilitate participation?

Appendix III: Description of variable included in the logistic regression models

From the above, the variables included in the models were: -

Yi = Response on new forest management approaches (A binary/Dichotomous

Variable with value of 1 if the response is positive and 0 if otherwise (i.e. negative response),

X1 = Age of the respondent in years. It was assumed that the increase in

Age of respondent reduces reserved forest encroachment because older persons are usually assumed to have accumulated enough resources to meet livelihood needs. They are also assumed to have much wisdom to conserve and use forest resources and hence positive response on new forest management approaches. Therefore, age has an expected positive sign of the estimate (β). May be meeting livelihoods from forest?

X2 = Education level of the respondent (years of schooling).

Increase in education level is assumed to increase knowledge on new forest management approaches and wise use of the same resources. Therefore, educated people have more knowledge on the benefits of the new forest management approaches but do they produce benefits? This is opening question, and hence expected positive response on these management approaches. They also have more options to meet their livelihood needs coupled with more chances of getting good paying jobs than non-educated people. Therefore, education is expected to have a positive sign of the estimate (β).

X3 = Tenure security to forest resources. People who have

security of tenure to forest resources more likely to manage and use these resources in a sustainable way than those without security of tenure. Therefore, people with user rights to forest resource are likely to respond positively on the new forest management approaches as compared to people with no security of tenure to this resource. Therefore, it has an expected positive sign for the estimate (β).

X4 = Household size. The increase in household size has an

expected positive sign on the estimate (β). This is assumed to increase demand of forest resources from both the reserved and unreserved forests. This is due to facts that increase in household increases household demands for different timber and non-timber forest products. The increased household size increases people response to new forest management approaches as compared to small households and in most cases people with large household enjoy sharing of rights, revenue, responsibility and relationships with government officials

thereby increasing acceptability of the new forest management approaches to local communities.

X5 = Main occupation of respondent. The type of occupation of respondent assumed to influence respondent's response on the new forest management approaches. Crop producers and livestock keepers are likely to respond positively to the new forest management approaches due to the expected benefits from the approaches as compared to civil servants who rely of traditional management systems which put more emphasis of centralized law enforcement procedures rather than local community involvement in the management process.

X6 = Household income (Tshs). The increase in level of household income was assumed to reduce the incidences of resource use conflicts hence a zero sign on the parameter estimate (β). The higher the level of income the higher the level livelihood options to meet livelihood needs and thus the neutral the response to the new forest management approaches.

X7 = Sex (Dummy variable with value equals to 1 if the household head is a female and 0 if otherwise). Female-headed households are assumed to respond positively to the new forest management approaches as compared to male headed ones. This is due to the fact that females in most cases are denied access and ownership to land in most African societies and therefore have little or no options to meet their daily livelihood needs from their own homesteads. They tend to encroach protected forest reserves to meet their demands for fuel wood and other non-timber forest products like mushrooms.

X8 = Land size (acres). This is assumed to have a negative sign on the parameter estimates as the bigger the land an individual owns, the higher the freedom of allocating that land into different uses like cultivation, grazing, agroforestry for multipurpose trees to meet fuel wood demands.

X9 = Farm size (Acres). The larger the farm size, the lower the likelihood of the Respondents responding positively to the new forest management approaches as compared to farmers with small farm sizes. The smaller the farm size, the less is the available for planting own trees for different purposes, the higher the likelihood of positively responding to the new forest management approaches so as exploit different products from the jointly managed forest reserves

X10 = Access to forest reserves for different reasons. If the respondents do Access the reserved forest under the new forest management approaches, then it is likely that they will respond positively on these approaches, otherwise, not.

The hypotheses to be tested were: -

(Ho): $\beta=0$ implying that the regression coefficients are equal to zero and thus no correlations between dependent and independent variables against

(Ha): $\beta\neq0$, implying that the regression coefficients are not equal to zero and thus there is either a positive or negative correlation (**R**) between dependent and independent variables.

To test whether the regression coefficients are significantly different from zero, the Wald statistic that asymptotically (i.e. in large samples) follows a Chi-Squared distribution (Gujarati, 1995) was used. The Wald statistic is distributed as Chi-square with degree of freedom (df) equal to the number of constrained parameters (r). With single parameter, the Wald statistic is simply the square of the t-ratio. In order to assess the contribution of individual independent variables in the model, the **R** statistic was computed as described by Norusis (1990). The R statistic can range between –1 and +1. A positive value indicates that as the variable increase in value so does the likelihood of the event occurring while the negative value indicates the opposite. The closer the value to one, the more the contribution of that variable to the model. Also, for each model the log of likelihood (denoted by **–2LL**) was calculated. The **–2LL** measures how well the model fits the data. The smaller the estimated **–2LL** value, the better the estimated model fits the data (Norusis, 1990).

A two-tailed t-test was tested at alpha (∞) = 0.05 level of significance. *Ho:* above was rejected only where $P<0.05$. To Asses the goodness of fit of the regressions model, the coefficient of determination (R^2) was employed. Usually this acts as an index of assessing how much reliance should be placed on the regression estimates (Kajembe, 1996). It also explains the proportion of variation in the dependent variable that is explained by explanatory variables included in the regression model. High R^2 means high proportion of the variation in the dependent variable is explained by the variations in explanatory variables used in the model, and hence we can place high confidence in the regression estimates.

Both non-standardized and standardized equations using partial regression coefficients (b) and beta weights (b*) respectively were developed. Non-standardized figures are used in predictions of phenomena; where as standardized figures are used to assess the relative impact of each independent variable on the dependent variable. Thus standardized partial coefficients (b*) were used to explain the phenomena under study.

Appendix IV(a):Rules, Village by-laws governing management of New Dabaga- Ulongambi Forest Reserve under JFM scheme.

LOCAL GOVERNMENT LAWS (DISTRICT COUNCIL)
NO.7 OF 1982
RULES (VILLAGE GOVERNMENT)

BY-LAW

Formed under act number 163 and 167 and amendment in act number 36 of year 1998.

Title

1 These by- laws are known as village by- laws of Isele, Lulanzi, Lusinga, Ilamba,
Kidabaga and Magome**,**villages made by Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and
Magome**,**village governments for the aim of conserving its supervision area in NDU
forest reserve.

Interpretation

2 Meaning of areas/group of words, which will be appearing frequently in these by- laws.

Participatory plan

Means management plan prepared by zonal committee formed by members from Isele,
Lulanzi, Lusinga, Ilamba, Kidabaga and Magome**,**villages for New Dabaga Ulongambi
(NDU) forest reserve with the intention to protect, conserve and supervising NDU forest
reserve which was discussed and get approved by village government and was agreed by
District Council, forest reserve officer.

Use zone

Means NDU forest reserve management area that has been allowed for the use of Non
Timber Forest Products as it was agreed the in participatory plan.

Village general assembly

Means, is an open meeting for all villagers of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga
and Magome**.**

Forest coordination committee

Means a committee for coordinating, and coordinate all conservations and development
issues of NDU forest, formed from Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and
Magome**,**villages bordering this forest.

Patrol guards

Means people appointed by security and defence and Natural resources committees of
Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and Magome**,**villages for protecting and

develop NDU forest management area.

Village government

Means village governments of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and Magome**,**of
not less than 25 members.

Court

Means primary court or District court.

Conservation area, Use area in NDU forest reserve

Means part of NDU forest reserve that is under the supervision of Natural resources
committee of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and Magome villages.

Aims/objectives

3(1) These by- laws expose the rules agreed and approved by Isele, Lulanzi, Lusinga,
Ilamba, Kidabaga and Magome**,**village governments with advice from a team of NDU
forest experts with the aim of protecting and conserve forest reserve area found in Isele,
Lulanzi, Lusinga, Ilamba, Kidabaga and Magome villages.

3(2) These rules have been discussed, agreed and approved by Isele, Lulanzi, Lusinga,
Ilamba, Kidabaga and Magome**,**village governments and then get endorsed by Director of
and Forestry and Beekeeping Division, MNRT.

Appointed Manager

3(3) Director of Forestry and Beekeeping Division has appointed Isele, Lulanzi, Lusinga,
Ilamba, Kidabaga and Magome**,**village s government to be the main caretaker of the
management area in the NDU forest reserve

3(4) Forest coordination committee have been elected from Isele, Lulanzi, Lusinga,
Ilamba, Kidabaga and Magome villages to be the coordinator of management plan to
simplify implementation of the plan in conservation of that forest on its behalf and
villagers of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and Magome**.**.

3(5) The management area of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and Magome
villages in NDU forest reserve is related to part of the forest in the Eastern Arc Mountains.

3(6) Any forester of Division of forestry and beekeeping at anytime is allowed to inspect
NDU forest reserve area and to give suggestions or offer other advice to the forest
coordination committee and of the village and committee shall have regard to that advice
or suggestions.

Forest committee

4(1) Natural resource committee of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and
Magome villages will be elected by following village government election procedures.
Committee shall have members not less than seven (7) and will include representative
from every sub villages.
4(2) This committee after being elected, the members will elect Chairperson, Secretary
and treasurer among their members, and may delegate any functions to any other member
of the committee as appropriate.
4(4) While the committee is still in power on receipt of complaints from any
member of the concerning committee including the Chairperson, Treasurer or Secretary
the village chairperson will be obliged to investigate a complaint and act accordingly.
4(5) The secretary shall write committee meeting reports and shall be responsible in
keeping minutes of these meetings. For the meeting to be conducted the quorum shall be
not less than half members.
4(6) Regarding their position in the village Chairman and Secretary of Isele, Lulanzi,
Lusinga, Ilamba, Kidabaga and Magome**,**villages can attend NDU forest coordination
committee meetings.

Duties of New Dabaga Ulongambi forest coordination committee

5(1). The committee shall be accountable to Divisional forestry office and will give its
reports to the village natural resources committees of the concerned villages.
5(2). To give advice in villages natural resources committees on forests management and
will not be involved in implementations.
(3). Will be meeting four (4) times annually.
5(4) The committee has the power to stop or not to remit dividend for a while to
the village or villages if the working efficiency of the village concerned is poor.

Reports

6(1) The natural resources committees of every village will report progress monthly to
the village council and forward copies to the village Executive officer, Divisional
Secretary, Division catchments officer and Zonal coordination committee.

Records

7(1) The natural resources committees will keep the following records:
- Minutes of the all meetings in a minutes book
- Date/days of patrols carried out in a patrol book

- Offender apprehended, fines levied, and paid, in offences and fines books
- Permit issued in a permit book.
- Income and expenditure in account book

8(1) Zonal coordination committee will establish a Bank account and all income deriving from NDU forest management will be deposited promptly in that account.

8(2) The signatories of that account shall be three (3) and no withdrawals from that account shall be made without the signatures of two (2) of those three persons, and the record decision of the committee.

8(3) The expenditure report will be presented in village general assembly.

Use of incomes from natural resources

9(1) All incomes from fines and fees its report will be presented in a village general assembly.

9(2) Expenditure of income shall be for strengthening NDU forest reserve activities and village development. The expenditure may include the following:

9(2), (1) First priority:

- Purchase of stationeries and books for record keeping
- Purchasing of gumboots for guards (walinzi)
- Transport costs for committee and other member who will be participated.
- Development of NDU forest reserve activities.
- Payment to the guards (walinzi) as motivation for their job.
- Production of brochures concerning NDU for visitors.

9(2), (2) Second priority

- Various village development activities

NB. All expenditures should obtain a permit from village council and approved by village general assemblies bearing in mind the necessity o f the activities themselves.

All emergence activities, the village council may approve and present report to the village general assembly. Reports for various events event s shall be forwarded to the Division catchme nts forest officer and a copy to the village.

Uses rules

10(1) A villager or anybody sent officially by government may freely enter any part of management area of NDU forest reserve of Isele, Lulanzi, Lusinga, Ilamba, Kidabaga and Magome**.**

10(2) No a villager, other than guards (walinzi) or committee members, may enter the protected area without special permission from VNRC chairperson or secretary. He/she will carry a written permit to enter that forest.

10(3) All permitted uses products will be taken from allowed zones only.

Forest protection

11(1) Selection of patrols guards (walinzi)

11(1), (1) The village security and defence committee in collaboration with Village
natural resources committee will select four (4) patrol guards(walinzi) and patrol
commander and will be accountable to village natural resources committee.

11(1),(2) The walinzi will be selected by considering the following

- Work efficiency and trust worth
- Age no less than 18 years old
- Should no to read and write

11(2) The duties of patrols guards

11(2),(1) Trust worth to all activities concerning guarding inside and outside the forest.

11(2),(2) The commander will prepare a timetable for patrols and will attend all natural
resources committee meetings to report on the forest conditions, and will be accountable
to village natural resources committee.

11(2),(3) The patrol will be done once a week and any time a commander will see there is
necessity of doing so. Those four guards (walinzi) may patrol all together or in groups of
two people.

Events prohibited and totally banned

12(1) The following activities are totally banned to be done inside the NDU forest:

- To start fire inside the forest
- To cut/fell down any kind of tree
- Hunting
- To destroy natural vegetation in any area inside the forest
- Grazing

Events need permit and payments

13(1) All resources will be taken with permits of which will be of two types.

13(1),(1) For Non Timber Products(NTFPs) of which are not for commercial purposes
such as mushrooms, vegetables, traditional medicine and grasses will be harvested
without payment with special timetable.

13(1),(2) All products for commercial purposes will be harvested by paying as shown in
the plan procedures.

13(2) Forest services

All services inside the forest of NDU will not be free of charge as stipulated in the plan

Procedures of dealing with offenders

14(1) Procedure:

14(2) Offences against forest will be dealt as follow:

14(2), (1) When Guards (Walinzi) apprehend an offender, they will send him/her directly
to the chairperson, secretary of Village Natural Resources Committee (VNRC). Should
the offender agreed his/her crime in writings the offender may be fined on the spot by the
chair or secretary, with at least one other member of the VNRC to witness.
14(2), (2) Should the offender refuse to acknowledge his/her offence in writings, will be
sent before the VNRC where the time for hearing will be arranged. If an offender will
still denying, the VNRC will report the matter to Village chair/Executive secretary. If
these also fail to compromise, The VNRC chairperson and village chairperson will send a
case to court.
14(2),(3) The guard (Mlinzi) is not allowed to levy a fine upon an offender. If a guard/s is
reasonably suspected of having done so, he will be summoned to appear before the
VNRC and if found guilty, may be dismissed or fined.
14(2),(4) Offenders will be ordered to pay a fine in cash for each offence in accordance
with the rates set out.
1.Forest products caught will be confiscated and brought to the village council office in the village for further measures/steps.
2.Should offender agree having committed the crime the fine will be paid to the
treasurer, who will record the amount paid, date, issue a receipt to the offender.
A copy of the receipt will be kept in a receipt book. A receipt's number will be recorded in the Offences and Fines Books. The money will be send to the Treasurer of the NDU forest coordination Committee.
3. Together with the fine **section 167 (3) of local Government Act [No 7 of 1982],** gives rights to the VNRC to charge compensation.

Fines Rates

15(1) Fines rates:
Fines rates for various offences are as follow:
15(2) Charcoaling, Pit sawing (lumbering).
Fine will be Tshs.15, 000/= and a resource is confiscated.

15(3) Setting Fire
1. Use of fire in farms preparations without following the agreeable procedures by
village Government and without bringing destruction to public resources fine is
Tshs.15, 000/=
2. Setting fires and cause destructions to the public resources fine is from Tshs.50,

000/= to 300,000/= according to the seriousness of the offence and effects of that fire.

15(4) Not having a permit for the levied activities

15(5) Cutting Poles or withies without a permit, Tshs.5, 000/= and the property will be confiscated by the village.

15(6) For non – Tanzanian citizen will be sent to relevant authorities and The charges will be opened against him/her.

15(7) For citizens visitors to enter the forest without a permit fine is Tshs.30, 000/=

15(8) Any person who will enter the forest without permit for Camera, Match Box, an axe, Bush knife (Panga) or any tool of which may cause damage/destruction in the forest Tshs.30, 000/= and a tool found will be confiscated by a village and become a village property.

15(9) Any person can pass through the forest using natural paths without trespassing.

15(10) For failing to have a permit for free of charge activities. The fine is Tsh.5, 000/= and the products confiscated and sold in the Village.

15(11) In addition to the agreed fine rates the rate of a responsibility fine will be Tshs.5, 000/= for each offence done or dismissed.

NB: This fine will not exclude him/her from carrying out community responsibilities.

Taking a case to court

16(1) Should the offender refuse to acknowledge his/her offence before VNRC and village chairperson or village Executive officer; these authorities will send a case to court for more decisions.

16(2) When an offender fails/refuses to pay a fine on that offence.

16(3) In conducting a case a court shall have right of refer to the village by-laws and sometimes to judge and punish an offender in accordance to those laws. This includes fines, disturbance costs, and compensation for the destructions made and will be paid to the VNRC of the village concerned.

Appendix IV(b):Rules and by-laws of North Nyang'oro Forest Reserve

NORTH NYANG'ORO WOODLANDS FOREST RESERVE
AGREEMENTS
BETWEEN
THE DIRECTOR OF FOREST AND BEEKEEPING DIVISION
AND
MAKATAPORA, MIGOLI, IZAZI AND MAKUKA VILLAGE GOVERNMENTS, IZAZI YARD, ISIMANI DIVISION,
IRINGA DISTRICT, IRINGA REGION.
December 2001

5.2 Procedures and laws

5.2.1 Permits

Village natural resource committee will be responsible for issuing the permit for using forest resources or any other services. Village government will review all the permits given out in a village following agreed procedures in this plan.

5.2.2 Offences, which deserve punishment.

Anything done by any person against rules and procedures agreed in this plan.

5.2.3 Proposals for amount of fine.

(a) Things allowed without permit/by permits

1. Entering the forest to collect resources allowed on unauthorized day- fine Shs.2000/=
2. Taking firewood for business without permit – fine for residents Shs.15, 000/= for visitors fine Shs.25, 000/= and holding the firewood.
3. Cutting of new firewood for any use without permit fine for resident Shs.25, 000/= fine for visitors Shs.30, 000/= and taking hold of firewood.
4. Cutting of trees for lumbering, building of canoes and stools, the fine is Shs.50, 000/= and taking hold of resources.
5. Fine for picking mushrooms for business without permit for residents Shs.500/=, for visitors Shs.1000/= and taking hold of resources.
6. Digging of medicine by witch doctors without permit fine for residents Shs.2000/= visitors Shs.5000/=
7. Fine for tourism without permit Shs.50, 000/=.
8. Fine for scientific research without permit Shs.50, 000/=.
9. Cutting of poles, rocks and yoke harness without permit fine for residents Shs.5, 000/= for visitors Shs.15, 000/=
10. Charcoal burning without a permit fine for residents Shs.50, 000/=, visitors Shs.50,000/= and taking hold of resources.
11. Cutting of grasses for business without a permit fine for residents Shs.1000/= for visitors Shs.3, 000/=
12. Fine for feeding livestock without a permit Shs.50, 000/= and removal of livestock from that area.

13. Fine for hunting without a permit Shs.50, 000/= and taking hold of meat.
14. Fine for conducting rituals without a permit Shs.5, 000/=.
15. Fine for collection of Arabic gum and tree fluids without a permit Shs.50, 000/= and taking hold of resources.
16. Fine for hanging beehives without a permit Shs.15, 000/= and get forces to remove the beehives.
17. Fine for picking of ropes for business Shs.5, 000/= and taking hold of the property.

(b) Doing things that are totally prohibited.

1. Fine for farming inside the forest Shs.50, 000/= and getting shifted from an area.
2. Fine for new residence inside the forest Shs.50, 000/= and getting shifted from the area.
3. Hunting animals prohibited nationwide – send to court.
4. Fine for honey harvesting in stone and tree caves Shs.50, 000/= and taking hold of honey and comb.
5. Fine for changing or removing forest mark Shs.50, 000/= and paying back the cost.
6. Fine for starting of fire Shs.50, 000/=.
7. Fine for destruction of catchments areas Shs.50, 000/=.

Any property caught will be taken hold by the concerned authority and get sold in an
auction.

5.2.4 Sending trials to court

A trial will be send to the court incase;

1. Suspect refuses to acknowledge his mistakes.
2. Suspect refuses to agree the given punishment.
3. Incase the suspect's trial can not be judged at this level for example hunting an animal reserved by the nation.

Appendix V: Royalties for forest products and services

ROYALTIES FOR PRODUCTS, RESOURCES AND FOREST SERVICES

NO	SERVICES/RESOURCES	UNIT/NUMBERS/AMOUNT	PRICE
1.	Charcoal	1 bag	500/=
2.	Poles	1 one	50/=
3.	Dry firewood for business	- Lorry	12,000/=
		- Cart	1000/=
4.	Mushroom for business	1 Tin	50/=
5.	Fruits	1 Baobab bag	500/=
		1 Tamarinds fruits bag	2000/=
		Other fruits a tin	100/=
6.	Witch Doctors	In a year	1000/=
7.	Tourism	Per day	20,000/=
8.	Visitors (Tour)	Per day	10,000/=
9.	Scientific research – own benefit		
	Cutting of grasses for business	Per day	10,000/=
10			
	Firewood for brick burning/raw firewood		50/=
11.		- Lorry	10,000/=
		- Cart	2000/=
		- Tractor	7000/=
	Sand, Stones	- $(Meter)^3$	3500/=
12		- Lorry	3000/=
		- Cart	200/=
		- Tractor	2000/=