

**SOCIO-ECONOMIC AND CULTURAL FACTORS INFLUENCING GENDER
ROLES IN JOINT FOREST MANAGEMENT AROUND MOUNT MERU
CATCHMENT FOREST RESERVE, TANZANIA**

BY

MUSSA MOHAMMED MUSSA

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ABSTRACT

The contribution of women and men in Joint Forest Management (JFM) is highly needed for effective forest management and its consequent boost of economic levels in villages surrounding Mt. Meru Catchment FR, Arumeru district. This study assessed gender roles and determined the extent of participation of men and women in JFM activities around Mt. Meru Catchment FR. The study also intended to identify socio-economic and cultural factors influencing gender roles in JFM in Ilkiding'a and Poli wards. Data collection involved primary and secondary data collection. Quantitative data were analysed using SPSS. Qualitative information collected from key informants was subjected to content and structural analysis whereas qualitative data from PRA were analysed in the field with the help of communities. Land ownership, household income and number of people available for farm work have been identified through logistic regression analysis as socio-economic factors that significantly influence gender roles in JFM around Mt. Meru Catchment FR. Land ownership has significant influence on male participation in JFM. This implies that males, who are traditional land owners in the study area, are more likely to participate in JFM since land ownership acts as an incentive in participation. Conversely people who have no ownership rights to land are less likely to invest time and other resources in JFM participation. Households with larger number of members are more likely to participate in JFM. Women participation in JFM is positively and significantly influenced by household income in the study area. Women, who are generally poorer than their men counterparts, get motivated when they earn extra income coming from sources other than their normal source i.e. cultivation. Household size means more family labour available in planting and other forest activities, holding other factors constant. This study has concluded that effective participation of both men and women in JFM projects design and implementation is important to secure sustainable management of forest resources.

DECLARATION

I, Mussa Mohammed Mussa, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and it has neither been submitted nor being concurrently submitted for degree award in any other University.

Mussa Mohammed Mussa

(MSc. Candidate)

Date

The above declaration is confirmed

Prof. E. J. Luoga

(Supervisor)

Date

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DEDICATION

This report is dedicated to my beloved late parents, MOHAMMED MUSSA KOMBA and LUHAWA ALLY GOMAGOMA who laid the foundation of my education. May God rest their souls in eternal peace Amen.

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ABBREVIATIONS

CBFM	- Community Based Forest Management
CFM	- Collective Forest Management
FAO	- Food and Agricultural Organization
FMP	- Forest Management Plan
FR	- Forest Reserve
FRMP	- Forest Resources Management Project
GoT	- Government of Tanzania
JFM	- Joint Forest Management
JMA	- Joint Management Agreement
MCP	- Mpingo Conservation Project
MNRT	- Ministry of Natural Resources and Tourism
PFM	- Participatory Forest Management
PMO-RALG	- Prime Minister's Office, Regional Administration and Local Government
PRP	- Policy Research Publications
PRSP	- Poverty Reduction Strategy Paper
SFM	- State Forest Management
SPSS	- Statistical Package for Social Sciences
SUA	- Sokoine University of Agriculture
UNFF	- United Nations Forum on Forests
URT	- United Republic of Tanzania
VFA	- Village Forest Area
VFMA	- Village Forest Management Area
VFMP	- Village Forest Management Plan
VNRC	- Village Natural Resources Committee
WHRC	- Woods Hole Research Centre
WMO	- World Meteorological Organization
WRM	- World Rainforest Management

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Tanzania covers an area of 94.5million ha out of which 33.5million ha are covered by forests and woodlands accounting for about 35% of the total land area (URT, 1998). In terms of ownership, Tanzania's forests are classified as government (central and local) forests, general land forests, community/village, and private forests. The forests provide for wildlife habitat, unique natural ecosystems and biological diversity and water catchments. Tanzania has about 540 central government forest reserves ranging from 3 ha to 870 000 ha in size and covering a total of 13 million ha (FRMP, 1996; URT, 1998). Table1 summarizes the distribution of forests in Tanzania based on forest type, use and legal status.

The forest reserves are very valuable for the country in terms of soil, water and biodiversity conservation, and for sustainable production of valuable timber, fuel wood and non-wood forest products (URT, 1998). The conservation in some of the forest reserves allows the collection of forest royalties, although the protection and management have more or less failed and many reserves are in advanced stages of degradation (URT, 1998). The degradation has brought the forest cover down to 38% in 1999 from 44% in 1971 (URT, 1998).

Table 1: Distribution of forest area by type, use and legal status in Tanzania

Distribution of forest	x1000 ha	Proportion in %
<i>Forest type</i>		
Forests (Other than mangrove forests)	1 141	3.4
Mangrove forests	115	0.3
Woodlands	32 299	96.3
Total	33 555	100.0
<i>Use of forest land</i>		
Production	23 810	71.0
Protection of forest area (mostly Catchment forests)	9 745	29.0
Total	33 555	100.0
<i>Legal status</i>		
Forest reserves	12 517	37.3
Forest/woodlands in national parks, etc.	2 000	6.0
Non-reserved forest land	19 038	56.7
Total	33 555	100.0

Source: URT (1998)

During colonial period many forests in Tanzania, like other countries in developing world were managed under state property regime. This type of property regime was formed by Tanzania despite pressing problems, like conflicts and economic problems. To solve these problems, government started shifting gradually from state to common and private property regimes (Bromley, 1992). Common property refers to a particular property rights arrangement in which a group of resource users share rights and duties towards the resources (Kihyo, 1998).

In implementing and facilitating the whole idea of common property ownership of forest resources, Tanzania government had to formulate a strategic programme known as Participatory Forest Management (PFM). This programme is a strategy to achieve sustainable forest management by encouraging the management or co-management of forest and woodland resources by the communities living closest to them, supported by a

range of other stakeholders drawn from local government, civil society and the private sector (Bromley,1992).

In the early 1990s a number of pilot PFM activities were started which collectively demonstrated the viability of PFM under a range of social and economic conditions. 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 (Bromley and Ramadhani, 2005).

In implementing PFM activities, gender balance concept was taken into account so as to be in line with the 1998 forest policy. Some of opportunities for promoting a more gender-balanced approach to PFM include:

- Empowerment of women in management. This can take place through women groups' involvement in decision making and access to resources;
- Gender sensitive training, which recognises the specific needs of both men and women in terms of timing, type and venue;
- Formation of forest management groups, in accordance with the 2002 Forest Act, by women, youths and minority ethnic or cultural groups. This will put these groups in a better position to articulate and defend their specific interests.
- Specifically, user groups or associations based on forest activities which traditionally mainly have involved women, such as collection of mushrooms; wild fruits and vegetables; material for thatching and basket/mat making; and horticultural activities could all be promoted (MNRT and PMO-RALG, 2000).

In Tanzania, PFM is implemented under two categories:-

- (i) Joint Forest Management (JFM) which is applicable under local or central government forest reserves. In this instance the forest adjacent communities enter into a joint management agreement with an appropriate authority to share management responsibility and benefits (MCP, 2001).
- (ii) Community-Based Forest Management (CBFM) refers to cases where communities simply decide to reserve a part of their village lands as Village Forest Areas (VFA). Upon provision of an acceptable Village Forest Management Plan (VFMP) control and ownership of all the forest resources therein is devolved to the village government (MCP, 2001).

1.2 Problem Statement and Justification

In 1998, Tanzanian government reviewed its 1953 forest policy and adopted a new policy which among other objectives includes enhancement of the national capacity to manage and develop the forest sector in collaboration with key stakeholders and to make the people living adjacent to the forests guardians of the resources. One of the strategies adopted was joining efforts between government and the communities on forest management, through JFM (MCP, 2001). To ensure success in JFM Tanzania government also considered gender aspect as an important strategy in development of rural forestry, this is because success of forest activities especially in rural areas greatly depends on cultural and economic relations between men and women in a given community. The focus on gender in rural forestry development has covered a number of aspects. These include firstly the differences in participation in the design and implementation of projects between men and women, secondly uneven access to benefits from these activities, and thirdly the strategies that can

be used to overcome the constraints faced by women in benefiting from such activities (Pelin and Cecilia, 2006).

Frequently men and women have very distinct rights and roles. They often control and have access to different resources, perform different activities for the household, earn income in different ways, allocate time differently, have different legal and traditional rights, and possess different information regarding the structure of their community and the natural resources that surround them. As a result of these far-reaching distinctions, women and men will frequently have different priorities and goals (FAO, 2001).

For effective participation in JFM, the contribution of both men and women is needed but there are socio-economic factors and cultural factors that constrain or enable men and women roles in JFM. However these factors are not clearly known. Therefore, this study intended to come up with information that will give knowledge on socio-economic and cultural factors that constrain gender roles in participating in JFM around Mt. Meru Catchment Forest Reserve where literature on the study is very limited.

1.3 Objectives

1.3.1 Overall objective

The overall objective of this study was to determine the socio-economic and cultural factors that influence gender roles in JFM around Mount Meru Catchment Forest Reserve.

1.3.2 Specific objectives

Specific objectives are to:

- 1) Assess gender roles of communities around Mount Meru Catchment Forest Reserve in relation to JFM

- 2) Determine the extent of participation of men and women in JFM activities
- 3) Identify socio-economic and cultural factors enabling or constraining gender roles in JFM.

1.4 Guiding Hypothesis

Ho: Socio-economic and cultural factors do not constrain or enable gender roles in JFM around Mount Meru Catchment Forest Reserve.

1.5 Research Questions

- a) What are the roles of men and women in JFM around Mount Meru Catchment Forest Reserve?
- b) What are the perceptions and extent of participation of men and women in JFM activities?
- c) What are socio-economic factors that enable or constrain gender roles in JFM?
- d) What are cultural factors that enable or constrain gender roles in JFM?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 World Forest Policy

The central question for the international community concerned with world forest resources is how to reach consensus on better use of the world's forests economically without compromising their ecological role. The Woods Hole Research Centre believes that such consensus can be developed by working with non-governmental organizations and the scientific and policy communities (WHRC, 2008).

The Centre's activities have led to the establishment of the World Commission on Forests and Sustainable Development which has in turn created an independent Science Council of leading global scientists and a Policy Advisory Group of leading global forest policy and environmental researchers. A global Forest Action Network of non governmental organizations is evolving (WHRC, 2008).

2.2 Current Global Status of Forest Management

Great efforts have been made in recent years to draft and implement forest management plans. Nevertheless, in only a few cases have management plans been implemented effectively and fully. In 1990, undisturbed natural tropical forests represented only about 155 million ha, or about 30% of world's tropical forest areas used for wood production. The other 70% are constantly being harvested and are thus in more urgent need of being managed in a sustainable manner (FAO, 1994).

Globally, there are approximately 330 million ha of logged-over tropical forests. In the tropics, more than 148 million m³/year of industrial round wood is extracted from a potential sustainable production of 134 million m³/year (FAO, 1994). However, only 18%

of total round wood production is for industrial purposes 18% of which ends up on international markets (FAO, 1994).

Forest resources and forest lands should be sustainably managed to meet the social, economic, cultural and spiritual human needs of present and future generations (UNCED 1992). These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products. Appropriate measures should be taken to protect forests against harmful effects of pollution, including air-borne pollution, fires, pests and diseases in order to maintain their full multiple values (UNCED, 1992).

Sustainable forest management is the process of managing forest to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment (UNCED, 1992).

2.3 State Forest Management

State Forest Management (SFM) is defined by Horn (2002) as a forestry practice that is characterized by a centralized, authoritarian structure, a top-down approach to management and decision-making that in most cases excludes local people. SFM is a traditional forest management which is based essentially on the concept that the forest is an ecosystem to be described, studied and situated in a specific context. Social data was rarely taken into account, except for human resources to carry out the work required, the social economic

role and above all the impact of and for the surrounding population were scarcely or too briefly considered (FAO, 1998).

In Tanzania this classical management system did not lead to proper protection as illegal harvesting continued in forest reserves and forests in general lands (formerly public lands). However in some few selected forests, people living around those forests are now being provided with opportunities to take responsibilities and direct control of the forests they use (Luoga *et al.*, 2005).

The organization of a forest property to provide an even flow of timber products forms the heart of traditional forest management for timber production. To understand why the idea of even flow is so firmly embedded in forestry thinking and literature we must trace the intellectual history of forestry in the US back to its roots in Europe (Davis and Johnson, 1987).

European foresters in 1800s (especially German Foresters), emphasized the notion of a forest organized to produce an even flow of timber as the way to deal with their particular situation. Their forests were largely publicly owned and had been continuously cut for hundreds of years. Wood product uses changed slowly. Self sufficiency in timber production was a primary goal in each country's wood products policies. Stability was the main overriding economic tenet of the day. All these factors helped create a psychological climate in which organizing a forest for even flow becomes ideal in Europe's forest management (Davis and Johnson, 1987).

2.4 Conventional Forest Management Plans and Collaborative Forest Management

The formats of the forest management plans in use in many countries today originate in earlier concepts of “forest working plans” where timber production was the main forest management objective. Such plans need relatively high levels of technical and financial inputs by forest managers to prepare and implement them (FAO, 2008).

There have been some modifications developed to Forest Management Plan (FMP) formats which recognize the increased importance of multiple-objective forest management for Collective Forest Management (CFMs) as well as their different capacities and needs. However, significant elements of conventional FMPs have usually been retained as the basis for the legal transfer of management responsibility. Often there has been no meaningful adaptation of FMPs to small-scale and/or non-timber operations and the capacities and needs of collective forest managers. In addition, government approval of FMPs often requires the legal acquisition of land title and formal registration as a forest management body - again creating a barrier which CFMs can struggle to overcome (FAO, 2008).

2.4.1 From state to people centred forest management

Many independent states have shown little interest in revitalizing local level systems of authority, which were purposely destroyed by past colonial regimes. The new independent governments, just like past colonial regimes did not prefer the idea of local political forces challenging its legitimacy. Thus, many forests became the property of the state, as in the case of Tanzania. This responsibility was assumed by Tanzania despite other pressing problems like: governance, economic development, self reliance and political stability. As

such meager resources were mostly directed towards these causes and managing forests was not accorded priority and they were left to deteriorate (WRM, 2002).

Much attention to reform management of natural resources like forests has focused on either increasing powers and responsibilities on the government or privatization. Rarely has attention focused on management of resources by communities or managing them as common property, been considered. Communities can achieve this aim with the help rather than control from the government. This is the idea being proposed in the new forest policy: making communities responsible for managing forest resources as common property, in Tanzania whenever possible (WRM, 2002).

In implementing and facilitating the whole idea of common property ownership of forest resources, Tanzanian government had to formulate strategic programme known as Participatory Forest Management (PFM). This programme is a strategy to achieve sustainable forest management by encouraging the management or co-management of forest and woodland resources by the communities living closest to them, supported by a range of other stakeholders drawn from local government, civil society and the private sector (Bromley,1992).

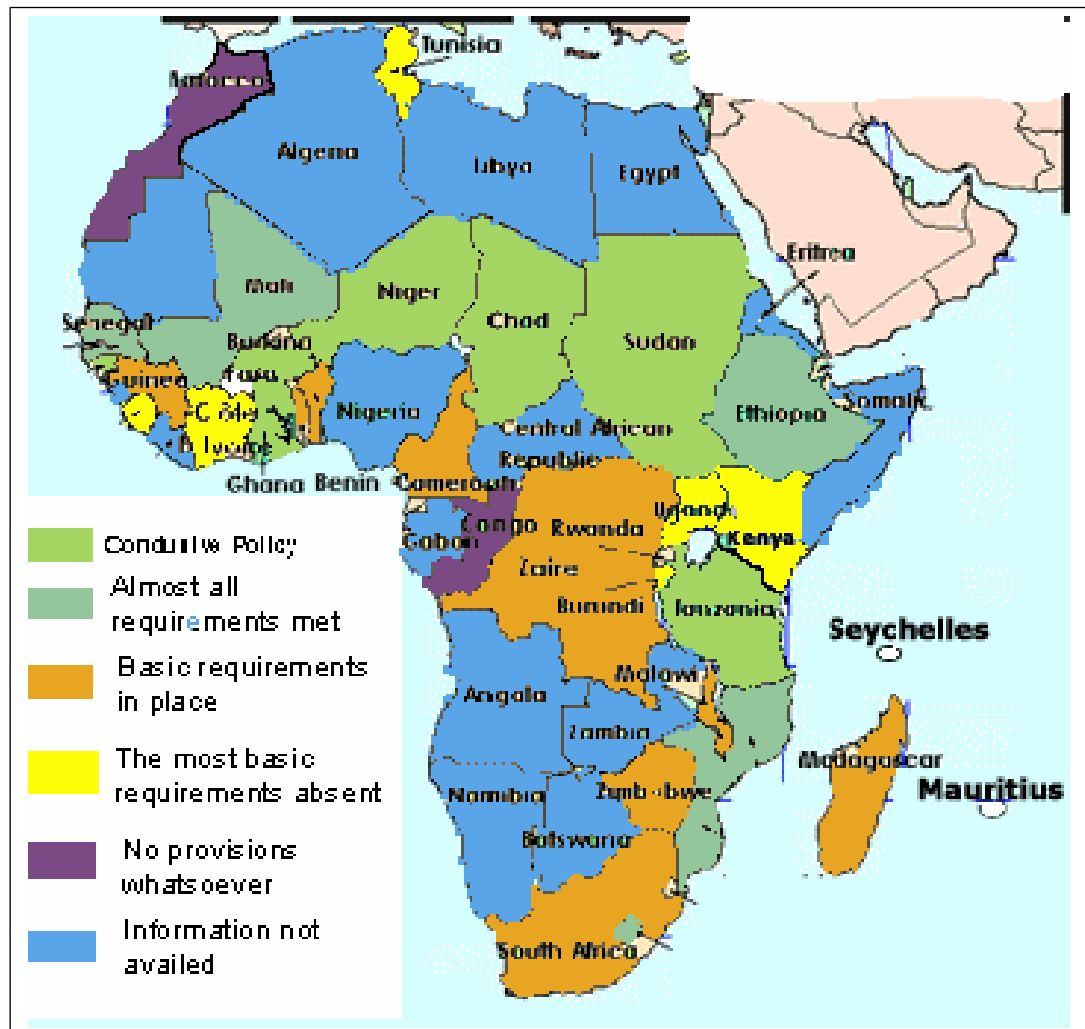
New thinking advocate joint management of resources between the government and communities, local bodies and decentralized concerns which in most cases have a stake in the resource. This is what is suggested in the forest policy to ensure sustainable management of forests. This shift from state to people centred management was caused by several reasons. Kajembe and Kessy (2000) outline some of the reasons as being: the failure of state agencies to manage effectively protected areas; the potential for cost

effective in managing the forests; the relevance of local knowledge of ecological dynamics to proper management; the increased motivation for local community to conserve forests following recognition of their critical role in the management of local forests; eventual increase in tangible benefits from the forests (economic incentives); and sense of ownership regained over their forest resources.

2.4.2 Participatory Forest Management in Africa

Local involvement occurs in diverse forms but is broadly encompassed by the term 'Participatory Forest Management' (PFM). The generic term 'forests' is used to encompass diverse types, from dry woodlands to moist tropical forests, coastal mangroves and plantations. 'Community' in the context of PFM refers to people living within or next to forests. PFM is sufficiently widespread and effective in Africa today to be recognized as a significant route towards securing and sustaining forests. Figure 1 shows a map of Africa showing the extent of adoption of one form of PFM known as CBFM by countries. Whilst each state is arriving at more participatory approaches to especially natural forest management, broad commonalities among processes and paradigms are notable.

Root causes of failures in 20th century forest management are relatively common, as are the forces now driving action (Wily, 2002). Prime among these is widening socio-political transformation on the continent towards more inclusive norms in the governance of society and its resources. PFM, more than any other new strategy in the forestry sector mostly embodies this emergent democratization. Recognition that forest management is itself primarily a matter of governance is crystallizing with technically driven functions reassuming their proper place as support functions to sound forest governance regimes (Wily, 2002).



Source: (Odera, 2004)

Figure 1: Map of Africa showing the extent of adoption of CBFM by countries.

The character of PFM is by no means fixed and insignificant transition at this early stage of its evolution on the continent and in frequently contested ways. Early developments tended to engage communities as local users whose cooperation was sought and bought through income generated from forest enterprises. Buffer zone developments also flourished with making some of their forest access legal and/or through sharing with them a portion of intention of helping communities turn their eyes from the forest (Wily, 2002).

Forestry administrations have begun to find however that local participation becomes a great deal more meaningful and effective where local populations are involved not as cooperating forest users but as forest managers and even owner-managers in their own right. So far this shift is seeing most delivery in respect of unreserved forests, those that have not been formally drawn under government jurisdiction and/or tenure. Empowerment of local communities as owner managers of emergent 'community forests' is gaining particular impetus from corollary land reform strategies that endow customary land interests with much improved status in state law (Wily, 2002).

2.4.3 Participatory forest management in Tanzania

The vision of the Government of Tanzania is to alleviate the widespread poverty in the Tanzanian civil society by improving socio-economic opportunities, decentralising the functions of government and improving the delivery of public services (MNRT and PO-MRALG, 2000). The Poverty Reduction Strategy Paper(2008) recognises the dependence of poor communities on natural resources both for income generation and for household consumption. Although forestry is not recognised as a priority sector by the GoT, there is a growing understanding of the important role forest and woodland resources play in supporting livelihoods, providing income for the rural poor and in sustaining important ecological services (MNRT and PMO-RALG, 2000).

Tanzania has one of the most advanced community forestry jurisdictions in Africa as reflected in policy, law and practice; where the National Forest Policy provides incentives for sustainable management of unreserved and unprotected forests by village governments. The National Forest Programme 2001-2010 unveils that, of the estimated 33 million hectares of forest land in Tanzania, 57 per cent, which is around 19 million hectares, is

largely unprotected and lies outside government forest reserves (MNRT and PMO-RALG, 2000).

In the mid 1990s a number of pilot activities were started in Northern and Western Tanzania, which for the first time allowed the transfer of forest ownership and management responsibility from central to village government. Notable examples of these include the East Usambara forests of Tanga Region, the highland forests of Iringa, miombo woodlands, and more recently, coastal forests in Tanga, Mtwara and Lindi regions (MNRT and PMO-MRALG, 2000). 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. This directly contributed to a favourable legal environment for advancing what is locally called Participatory Forest Management (MCP, 2001).

Two main approaches for implementing PFM are being promoted in Tanzania. These are Joint Forest Management (JFM) and Community Based Forest Management (CBFM). It is formalized through the signing of a Joint Management Agreement (JMA) between village representatives and government (either the District Council or Ministry of Natural Resources and Tourism). JMA is the output of the process in the creation of JFM or CBFM which spells out how the costs and benefits of forest management are shared between the forest owner and the managing partner (URT, 2007). In JFM situations where JMAs cover Catchment Forest Reserves, harvesting of most forest products is prohibited. For these situations the Participatory Forest Resources Assessment (PFRA) process can be much simplified (since resource assessment is not needed to determine sustainable utilization levels). In National and Local Authority Forestry Reserves under JFM, forest product

harvesting will benefit both the Village and the Government (according to the provisions of the JMA). In these situations the role of government stakeholders in resource assessment can be expected to be greater since they too will be direct beneficiaries of any harvesting. The PFRA process, as described here, can be followed, but government staff would be expected to take a more active role (URT, 2005).

CBFM takes place in forests on `village land`. Under CBFM, villagers take full ownership and management responsibility for an area of forest within their jurisdiction and it is `declared` by village and district government as a Village Land Forest Reserve (MCP, 2001). Kajembe and Kessy (2000), clarify that Participatory Forest Management (PFM) is a strategy to achieve sustainable forest Management through encouraging co-management of forests and woodlands. The concept of PFM has outgrown to form two concepts of Joint Forest Management (JFM) and Community Based Forest Management (CBFM), both of which are based on triadic social relations involving benefits streams, right holders and duty bearers. In most cases, under JFM arrangement the right holder is the government (Central or Local Government) and the communities are duty bearers. In CBFM on the other hand, local people are both owners and user managers.

2.4.3.1 Joint forest management experience in Tanzania

Following the revision of Tanzania forest policy in 1998, local communities have been encouraged to co-manage forest reserves with the government through joint forest management (JFM) agreements. Table 2 gives an overview of Joint Forest Management in mainland Tanzania showing extent of its implementation.

Table 2: Overview of joint forest management in mainland Tanzania

Overview of Joint Forest Management	
Area of forest covered by JFM plans	1 612 246 hectares
Percentage of total area reserved by National or Local Government under some form of Joint Management Agreement	11.6%
Primary forest types where JFM has been promoted	Montane and Mangrove
Number of National Forest Reserves with JFM	150
Number of Local Authority Forest Reserves with JFM	60
Primary Regions where JFM is implemented	Morogoro, Iringa, Pwani, Tanga, Kilimanjaro.
Number of villages with JFM has been established or in process	719
Number of villages that have signed JMAs	149

Source: MNRT, (2006)

Currently, there are a number of forests, e.g. Gologolo and Kipumbwi in Tanga Region, and Udzungwa in Iringa Region, that are at various stages of JFM development (Wily and Mbaya, 2001; Iddi, 2002). In addition, the National Forestry Programme is piloting state-people co-management in more than 30 national forest reserves. A national programme supporting JFM in all rural districts is getting under way and the government has issued formal guidelines for assisting communities in bringing either reserved or currently unreserved forests under community-based management (Wily, 2001).

Following the establishment of JFM systems at Udzungwa in Iringa region, Tanzania, the incidences of fires, illegal harvesting and forest clearing for short-term grain production have decreased (Odera, 2004). JFM is also being implemented in mangrove forest reserves near Kipumbwi village in Pangani district, Tanga Region, and in the Kipumbwi and Sange villages under co-management with the government, and in other forests in the country (Odera, 2004).

There is widespread recognition that forest dependent communities cannot be excluded from the care and control of forests that surround them regardless of the legal ownership of the forests which may rest with the government (Wily, 1998). The 1998 Tanzania forest policy recognizes that community participation is the key to the sustainable development of forest reserves through JFM (URT, 1998). However, very little has been done to quantify how much can be utilized by local communities as an incentive to conserve without compromising the functional component of the ecosystem. A review of the NORAD supported project in 1996 noted that encroachment and illegal harvesting continued unabated, and recommended the involvement of the local communities in the management of the forests (Luoga *et al.*, 2000; 2002).

2.4.3.2 Joint forest management experience in India

Joint Forest Management (JFM) is now a principal forest management strategy in India. The government views JFM as a pivotal strategy for addressing the national policy goal of achieving 33% forest cover by 2012. JFM represents one model of community based forestry in which the state engages with communities with forestry. Though the current JFM model is weighted in favour of State Forest Department control over planning, management, investment, harvesting and marketing (Gupta, 2006).

Over the past several decades, the focus in forestry has shifted towards forest protection and conservation and JFM represents a key policy thrusts in India. JFM continues to evolve as the experiences from different states across India are informing the process of JFM implementation so that policy and guidelines to improve the programme are revised by the Central and State Governments regularly. The process approach is being followed

so that forests are managed sustainably with people's involvement in forestry programmes to improve the livelihoods of forest dependent people and reduce poverty (Gupta, 2006).

2.5 Gender Roles in Society

Gender refers to the attributes and opportunities associated with being male and female or the socio-cultural relationships between women and men. These attributes, opportunities and relationships are socially constructed and are learned through socialization processes (Gomez, 2002). Since the beginning of time men have played the dominant role in nearly every culture around the world. If men were not dominant, then women and men in the culture would be equal. Never has a culture been found where women have dominated. The identification of gender division of labour is crucial because it defines men's and women's socio-economic opportunities, constraints and incentives.

If little or no information is readily available on gender division of labour within the target population, it is often useful to draw up an activity profile for men and women. Such a profile may be drawn up for the macro, meso, or micro level, as appropriate to the development activity under consideration (ILO, 2007).

2.6 Gender Roles in Forestry

Different societies have differences in responsibilities, user rights, legal status, division of labour, decision making between men and women etc. These differences mean that forest activities such as agro forestry technologies may differ for females and males. The first and perhaps most important difference across sex are in control over resources (Tengnas, 1994).

The practice of forestry has changed dramatically over the last 30 years. In addition to its traditional role in the protection and management of trees, forestry now takes a holistic approach to resource use. One of the most important new directions is community or social forestry, which addresses the human and social problems associated with forest and land use. Social forestry stresses the need for the participation and active involvement of local communities in all aspects of project design and implementation. Largely through this approach, the contribution of women, as a distinct social group in the forest sector, has been internationally recognized and the need for attention to gender equity addressed (FORESTRY ISSUES, 1992).

Far more women than men, in the developing world, are farmers, cutters and users of firewood, collectors and sellers of minor forest products, and tenders of livestock. Collecting and using the wide variety of forest products commonly found in the tropics demand a great deal of women's time and labour. When these products cannot be grown or collected, hard-earned cash must be used to buy them. Shortages caused by disappearing resources have a severe impact on the lives of women and their children (FORESTRY ISSUES, 1992).

In recent years, a growing number of households are headed by women. Adding to their roles as farmer and homemaker, women make up a growing proportion of the paid labour force serving the forest industry and informal sector enterprises (e.g., crafts, extracting fibre, making charcoal). To realize their full potential as agents of development, women need some control over the natural resources they use. They need access to better time- and labour-saving technologies that will improve their productivity. They need solutions that will lighten traditional burdens and ensure that women's vital cash income needs can be met (FORESTRY ISSUES, 1992).

Cultural and social norms exist in many communities in Africa that have not only created a division of labour on gender line but have institutionalized some prohibitions to ownership, access and management of some form resources and products among members of the household based on their sex. The division of labour in many societies places on women the responsibility of obtaining food, fuel wood and fodder, products that are obtained in part from trees (Hoskins, 1983; Celcelsiki, 1985). No matter who plant trees, women cooperation and labour are crucial for keeping them alive (Fortmann, 1986). According to Williams (1991), throughout Africa, women do much of the agricultural work as well as procuring firewood and water for household use and actively managing natural resources. Over the past two decades, the forestry development community has grown increasingly aware of the important roles played by women in forestry and natural resource management. Many community forestry, agroforestry and farm forestry activities have recognized women's major roles and have sought to promote their participation. NGOs have been particularly active in working with women.

2.7 Socio-economic Factors Influencing Gender Roles in Forestry

Socio economic factors refer to economic, social and their linkage that compose the context of development. These factors at various levels of social systems form an environment where people interact through roles and relationship defined by gender, age, ethnicity and other social variables. Examples of economic factors include; education, gender, income, labour requirements, land characteristics and institutional characteristic (Huising, 1997). Taken together, socio-economic forest issues can be viewed as forest equity issues, because they highlight the fact that many forest problems share a common link to unbalanced power or control over forests. This does not automatically imply, however, that all forest-related resources should necessarily be equally redistributed among

all stakeholders. Socio-economic issues are by their very nature often extremely complex and interlinked. They must therefore be viewed in whole-system terms, as an entire package, rather than individually before a qualitative judgment can be made of overall equitability (Karl, 1995).

2.7.1 Education

Farmers' educational background is an important factor in determining the readiness to accept and properly accept a technology. If women (or men) are illiterate or uneducated, it will be difficult for them to boost their role in the forestry profession. Education for women is a keystone to establishing women's participation on equal ground with men (Gurung and Lama, 2003). Education broadens horizons beyond habits and traditions of individuals in development activities. Therefore through education, an individual becomes more critically aware of the need and scope for social change. More years of formal education is associated with high level of comprehension of new technologies, for example a farmer can be more willing to use high yielding variety insecticides and pesticides thus education attainment increases the rate of adoption in agroforestry etc. (Machumu, 1995).

2.7.2 Income

Men and women often play different roles in planting, protecting or caring for seedlings and small trees, as well as in planting and maintaining homestead woodlots and plantations on public lands. Men tend to play a greater role than women in extracting timber and non-wood forest products for commercial purposes. Women typically gather forest products for fuel, fencing, food for the family, fodder for livestock and raw materials to produce natural medicines, which help to increase family income. In Lao People's Democratic Republic, a study showed that women collected: 18 different animal species, 37 different types of food, and 68 different medicinal products (Martin, 2008).

Men and women use forest products in different ways. Women typically gather these products for fuel, fencing, food for the family, fodder for livestock, and medicine, and raw materials for income-generating activities. (Women are often the chief sources of information on the use and management of trees and other forest plants.) Nonwood forest products gathered by women frequently hold a significant place in the household, local, and regional economy (World Bank, 2008).

In India rural women are major caretakers and users of forests. They are the main gatherers of fodder and fuelwood, and they seek out fruits and nuts to provide food for their families. In addition, they use bark, roots and herbs for medicines. Women's gathering activities are important for household income and nutrition. The products women collect are important supplements to the family diet. Much of what they gather is processed or marketed, bringing in supplementary cash income (WMO, 2008).

2.7.3 Labour requirement

Forests often represent an important source of employment for women. From nurseries to plantations and from logging to wood processing, women make up a significant proportion of the labour force in forest industries throughout the developing world (WMO, 2008). In Saskatchewan's primary forestry sector, women make up 17.3 percent of the labour force and in forestry manufacturing, women make up 17.8 percent of the labour force, slightly higher than the Canadian average. This slightly better representation in the forest industries is due to the recent growth of the industry in Saskatchewan at a time when barriers are dropping and women are being encouraged to work in the forestry sector. The occupational patterns of Saskatchewan women in the forest industries are both traditional and non-traditional with women predominately working as labourers (PRP, 2004). Occupational

segregation remains strong in both forestry and agri-food industries, with forestry demonstrating greater inequality in both primary and secondary sector (PRP, 2004).

Labour is often a major limiting resource for many farmers, so that they will only change their traditional practices where the alternatives represent a more rational use of their labour time. All agroforestry technologies require labour input from households, they are intended to make better use of resources such as labour, and their initial adoption will most likely entail greater total labour effort from the household. Labour constraints are critical in farmers use of agro forestry technologies. Labour requirements are widely regarded as critical element in influencing adoption of agroforestry practices because applications are sometimes labour intensive (Dvorak, 1996; Franzel, 1999).

Confronted with a choice of land use options of differing labour intensity, subsistence oriented farmers will first choose the least labour intensive methods of meeting their production needs and will be reluctant to adopt more labour intensive practices until population pressure compels them to do so (MacDicken and Vergara, 1990). It was reported by Dvorak (1993) that alley farming is a labour intensive technology and high labour requirements can discourage farmers from using the technology and they further expected that the larger the family size, the greater will be the availability of labour for alley farming.

2.7.4 Institutional characteristics

According to Brinkerhoff and Goldsmith (1992) institutions are referred to as stable, valued, recurring patterns of behaviour and include rules and procedures that shape how people act, status or legitimacy. Umas (1993) identifies two categories of institutions as,

institutions with cultural background and institutions with political background. It was reported by Kajembe (1994) that politically defined institutions are based on general consensus and are normally few whereas cultural based institutions depend on cultural norms to regulate behaviours. Tengnas (1994) found that secure and clear tree, land tenure and a relative freedom to harvest trees and sell tree products have provided incentive, and rural people have responded with intensive tree growing on farms in many areas in Kenya, thus policy and legislation's as part of institutions can have a great impact on tree growing. Clearly lack of appropriate institutional support, appropriate research focus and the project format can cause difficulties in the development and dissemination of new technologies.

Considering agrobiodiversity loss as an institutional failure, it is necessary to analyze the Institutions – in the sense of rules and regulations - under which men and women accomplish agrobiodiversity management and which hinder reasonable decisions for the maintenance of it (Wolff, 2004). Research in natural resource management from an institutional perspective has been pioneered in the field of forest management, taking into account the evidence of local-level case studies on the social and economic factors that mediate the relation between population and the environment. It became evident that local communities both filter and ignore government rules, add their own rules and generate diverging informal local institutions – i.e. rules in use - and patterns of activity. Regarding the complex interaction between local communities and their environment, Gibson *et al.*, (2000) identify the relationship between ecosystem conditions, individuals and institutions at local level as the important dimension. Institutions generate behaviour and incentives and filter factors like the governance structures through local institutions. The approach is interesting in the case of agrobiodiversity, since agriculture and forestry alike create multiple products and are generated by multiple users groups (Padmanabhan and Aruna 2004).

2.7.5 Land characteristics

Land as a factor or resource is the most important asset influencing adoption of modern agricultural technology (Shivley, 1999). Under all systems of law in many African countries, land ownership is anchored in patriarchy. Law can be used to reinforce or make permanent social injustices, and, in the realm of women's rights, legal rules may give rise to or exacerbate gender inequality (Karimeri-Mbote, 2005).

Land and land tenure constitute a critical subject not only in modern Africa but also in other parts of the world. Land tenure refers to the way in which individuals or groups in society hold or are in access to land including the conditions under which such land is held and disposed of. In line with this World Bank (2008) reports that even where women have ownership rights to land, their access to forest products may not be ensured. This is because land ownership does not automatically imply ownership and control of the trees and different forest products. Moreover, different members of the community may have established usufructory rights to different parts of the forest or even of a tree.

2.8 Cultural Factors Influencing Gender Roles in Forestry

Throughout the world, both men and women are heavily involved in forest resource management and use. Their influence on the forest activities can differ greatly because their roles differ. Men are often more involved in logging activities, patrol work while women frequently do most of the fuel collecting or nursery work. By virtue of their tasks, their influence on and role in forest management varies (FAO, 2001). Culture is one of the factors that influence gender roles in forestry. Culture refers to accumulative deposit of knowledge, experiences, beliefs, values, attitudes spatial relations, meanings, hierarchies, religious notions of time, roles, concepts of the universe and material objects and

possessions acquired by a group of people in the course generations through individual and group striving (Steel, 1995). Peoples' knowledge and understanding of things are influenced by their culture, that is cultural rules and norms are important as parts of institutions which are a framework essential for a society to function well (Steel, 1995). Collins and Chippendale (1991) clarify that common rules, norms and sanctions are mutually agreed behaviour that place group interests above those of individuals. They give the individuals the confidence to invest in collective or group activities, knowing that others will do so too. Individuals can take responsibility and ensure that their rights are not infringed. Mutually agreed sanctions ensure that those who break the rules know they will be punished. These are sometimes called the basic values that shape beliefs and reflect the degree to which individuals agree to mediate or control their own behaviour.

2.8.1 Attitudes

Forestry has traditionally been a predominantly masculine profession in most countries. A strategy for changing attitudes and behaviour to integrate concepts of gender equality into the institutional culture of forestry organizations is inevitable. Today almost all development projects supported by international donor agencies include a gender component. Yet very few include, as an objective, changing the attitudes and behaviour of the implementing organizations so they will promote gender equality themselves (FAO, 2003). Local perceptions or attitudes to trees can significantly affect tree growing, and knowledge about such intangible values is important for successful extension work (Tengnas, 1994). Fortman and Antori (1997) reported that tribal attitudes towards trees vary, the Sukuma for example, are hostile to forests because of the beliefs that trees harbour birds that destroy crops. The Haya and the Chagga hold completely opposite views.

2.8.2 Cultural beliefs

Cultural beliefs have a role to play in the management of forests as far as gender is concerned. In some cultures women do not plant trees having the belief that, if they do they will become barren or the husband might die as observed by Chavangi and Zimmermann (1987).

Some agroforestry practices are not compatible with certain community's culture and traditions. Trees are more likely to be appreciated by farmers if there are no negative taboos or beliefs associated with the particular species. Traditionally, the failure by farmers to adopt innovation has been blamed on farmers' socio-cultural milieu of beliefs, attitudes, values and traditional practices (Mvena and Mattee, 1988).

Cultural beliefs play a profound role in people's sense of ownership of resources which also affects their management. In some communities it is unthinkable that an individual might be considered the owner of a tree or forest since people believe that those resources are only in the temporary stewardship of the current generation, which manages them on behalf of the ancestors and future generations. This creates incentives that are very different from those in another culture where people believe that trees can be property like anything else, and that the owner has absolute rights to decide what should be done with that property (FAO, 2006).

Cultural beliefs are useful in many areas, for example the community adheres to traditional norms and regulations governing the management of sacred forests, which prohibit harvesting forest products. Entry is allowed only on specific days or periods for the performance of rituals. Most such groves are believed to contain the "earth god" or

spiritual beings that promote peace and prosperity and check antisocial behaviour, and have resulted in remnant patches of primordial forest even in densely populated areas (WRM, 2000).

However, modernisation, urbanisation and the spread of Christianity and Islam have weakened once revered traditional religions and cultures, changing belief systems in most communities. Many of these sacred groves are being encroached upon and destroyed leading to a loss of livelihood for local communities that depended on forest resources for survival.

2.8.3 Local knowledge

Women's role in nurturing local knowledge about farming and forests is an important aspect in the management of forests. Women are known to be the main actors forestry and natural resources utilization and management (Jewitt, 2000). Local knowledge is an important aspect in the forest management. Usually farmers understand suitable trees in a given locality. Trees may have social or spiritual roles that will decide whether they will be planted and protected or not irrespective of their economic values. Elsewhere in the country there are reports of farmers planting indigenous trees on their farms and being reluctant to plant exotic trees in fear of depletion of soil nutrients and water (O'king'ati and Mvena, 1992). Shifting cultivation, a traditional but a sustainable version of agroforestry if allowed a sufficiently long fallow, is familiar to and widely practiced by subsistence societies.

This cuts off many ethnic groups from their basic farming practice and principal source of livelihood (MacDicken and Vergara, 1990). Cernea (1991) reported that the evidence from

sociological work suggests that not only does a failure to consider the social and cultural context of a project invite inappropriate design at best (and user hostility at worst), but it also leads to projects that are ultimately ineffective, wanted neither by their supposed beneficiaries nor the investing public agencies and further added if an appreciation of how a society has developed is lacking the result will be poor project design.

2.8.4 Religion

Many cultural factors affect the incentives people face in protecting and exploiting their tree and forest resources. Some of them are related to religion. People sometimes believe in the power of a religious item such as a fetish or the Quran or other holy book to seek out and punish transgressors of local rules regarding tree use or activities in forests. Such beliefs may reduce the need to monitor the behaviour of local people although there may still be a need to use other means to control access by people who do not accept these beliefs (FAO, 2006).

The gender ideologies of lowland South Asia have a very large influence on organizations operating in Nepal, affecting both the programmes and the individual work experiences of women within these organizations. By and large, this is a patriarchal society, based on Hindu ideologies and practices that exert a strong degree of control over all aspects of women's lives. In addition to these cultural influences, the gendered aspects of global paradigms of modernism and professionalism are also evident, reinforcing the dominant gender ideologies of the region (FAO, 2003).

Religion, ethnicity, culture, law, tradition, history and social attitudes place severe limits on women's participation in public life including forestry activities. These factors have

shaped the individual self image of women, resulting in the fact that a negligible number of Nepali women are involved in professional, management or decision making positions (FAO, 2003).

2.8.5 Tenure

Of all the constraints, problems of access and tenure are by far the most important in many countries in Africa, recently titling programmes have allocated land that was traditionally managed by women to male heads of households effectively removing women from the decision making process. In Burkinafaso for example women lost valuable source of shea nuts, traditionally collected for food and source of income, when village lands were cleared of shrubs in order to establish fast growing pole plantation. In one region of Kenya women were discouraged from raising trees because tree planting traditionally establishes tenurial rights to land and the men were afraid of losing control (William,1991).

2.8.6 Decision making

Various studies in Nepal revealed that women are still behind men and they have been mostly confined within the boundaries of the household. Participation in implementation of plan without any stake in decision- making has been making women more vulnerable in Community Forestry. So the aspiration and the interest of women should be taken into account during the formulation of rules and regulations and women's voice should be heard in every decision-making forum. Though it is not possible to change the inherited social norms and structure at once, the issue of women's basic needs and power relation should be addressed simultaneously. Since the support of men is the prime factor in improving the gender relation, ongoing gender sensitization programme targeting to both

men and women is beneficial to change the social norms and perceptions towards women. (Kalpana and Rishi, 2000).

The exclusion of women as a whole from decision-making and benefit-sharing practices will almost certainly adversely affect them, but it is complacent to think that gender issues will be properly addressed if token women participate in some of these activities. Some sections of women may still be completely excluded, possibly those who especially need the programme to address their needs. Nevertheless, even granting this, the inclusion of some women is surely a first tentative step in the right direction. We must recognise the efforts of Forest Department and NGOs who have encouraged women to participate in forest management and try to learn from their experiences (Patricia *et al.*, 1998).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Description of the Study Area

3.1.1 Location

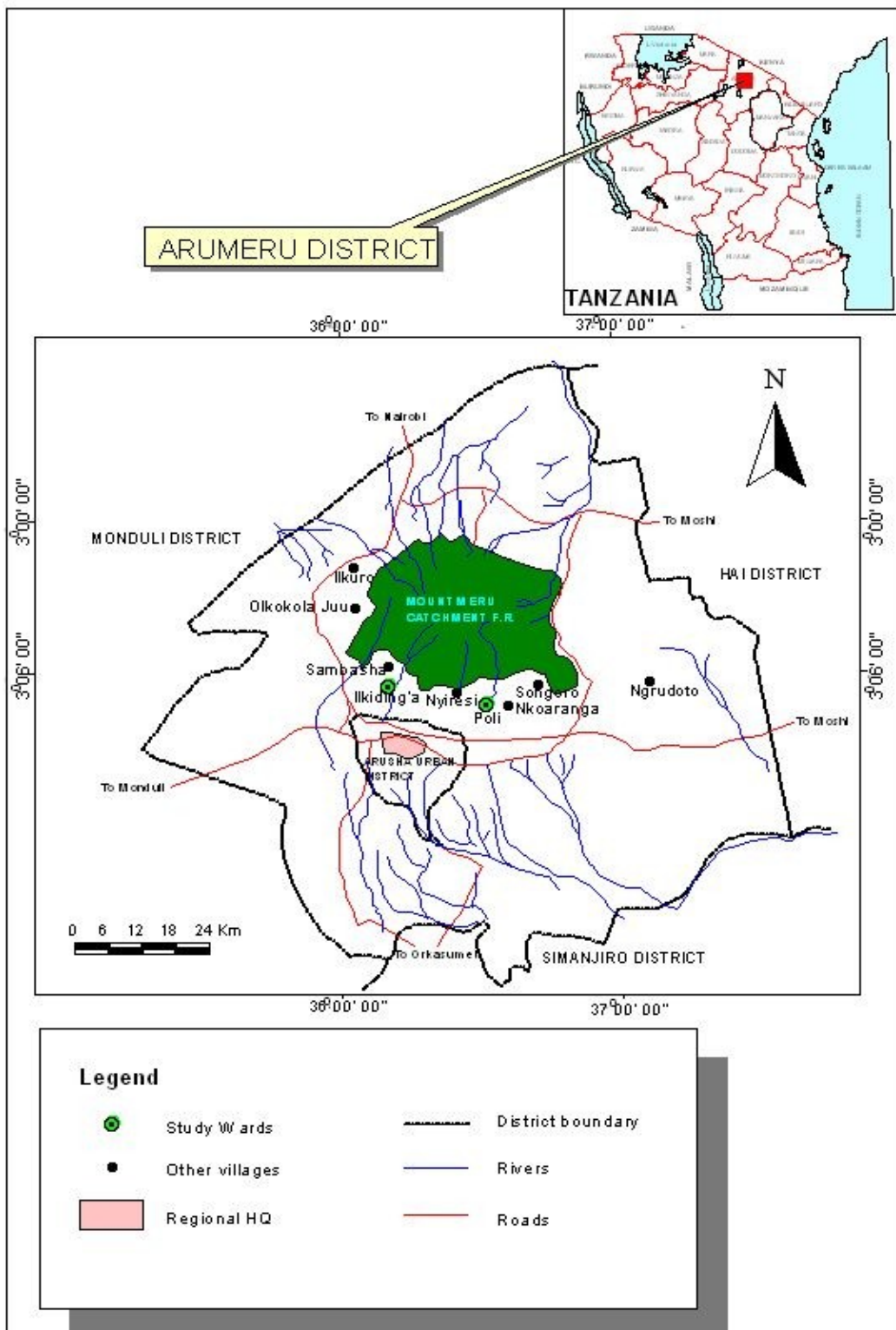
Mount Meru Catchment Forest Reserve is located in Arumeru district, Arusha Region (Fig.2). It covers an area of 26 433 hectares and lies within latitudes 3°00'S to 3°06'S and longitudes 36°04'E to 37°00'E respectively. It is located 20 km north of Arusha, 5 km from Olmotonyi. Access is from Olmotonyi. The reserve covers the outer slopes of Mount Meru in a U-shape, open to the east, from approximately 1500-1800 to 3000m (Lovett and Pocs, 1993).

3.1.2 Climate

Mt. Meru catchment forest reserve experiences oceanic rainfall with continental temperatures. Mean temperature of the area is 20°C to 17°C at lower altitudes while the average annual rainfall is 2000mm in the South-western slopes and 500-600mm in the northern slopes. Dry season is from June to October (Lovett and Pocs, 1993).

3.1.3 Vegetation

The steep slopes of Mt Meru are surrounded by both indigenous and planted Forest. The southern side of the steep slopes of Mt Meru has a well developed montane forest belt, while some indigenous forests are protected as national, district or village reserves state owned forests have replaced some indigenous forests. Despite the existing legal or community protection, forests reserves are being depleted through encroachment for agriculture, indiscriminate burning and lumbering (SCAPA, 1998).



Source: Modified from URT (1987)

Figure 2: A map of Arumeru district showing study area.

According to Kimbi *et al.* (1998), the dominant indigenous tree species include, *Cordia africana*, *Olea capensis*, *Albizia* species., *Combretum* spp., *Croton* spp., *Acacia* spp. Grass species include *Tripsacum laxum*, *Pennisetum purperium*, and *Desmodium* spp.

3.1.4 Soils

The soils are mainly andosols on young volcanic stone (basalt lava) rich in nutrients and alkaline (soda). At higher altitudes the soil is leached forming acidic lithosols. Soils are well drained dark sandy loams and loams developed on volcanic ash and pumice. They are of moderate to high natural fertility and favourable moisture holding properties. The soils are, however, highly susceptible to both water and wind erosion even on gentle slopes and require careful management. Low production and declining productivity is seen as a major problem (Lovett and Pocs, 1986).

3.1.5 Ethnicity

Two main ethnic groups inhabit the area around Mt. Meru Catchment Forest reserve, the Waarusha on the West of mount Meru and associated plains and Wameru on the Eastern slopes of the mountain and the adjacent areas in the low land. Waarusha are an offshoot of the Maasai who adopt a more settled pattern of family, unlike the Maasai who are migrant pastoralist (SUA, 1980).

3.1.6 Population

According to the 2002 Tanzania National Census, Arumeru district, within which Mt. Meru catchment is located, has a population of 516 814, Out of which 263 671 are females and 253 143 are males. There are a total of 113 002 households with the average size of 4.6 (URT, 2003).

3.2 Research Design and Sampling Procedure

A cross-sectional research design was used in which data was collected at a single point at a time. Sampling unit was household in which both male and female headed households were interviewed. The sample wards were Poli and Ilkiding'a. The target population consisted of household members, women and men in the study area. Purposive sampling technique was used to select the 2 wards out of 9 that practice JFM. From the 2 sample wards one was from areas inhabited by the Wameru (Poli) and another one was from areas predominantly inhabited by Waarusha (Ilkiding'a). Both open and closed-ended questions were administered to 112 households from a total of 2 240 households in the study area. Simple random sampling was used to select household. Sample size for household was determined by the following formula: $n = c/100 \times N$ (Boyd *et al.*, 1981). Where: n = sample size, N = population, c = any number greater or equal to 5 and less or equal to 100 ($5 \leq c \leq 100$). 5% of the total number of households in each ward was randomly sampled to represent the population.

3.3 Data Collection

3.3.1 Primary data collection

Primary data collection involved physical acquisition of data in the field. This involved Participatory Rural Appraisal (PRA) techniques, structured questionnaires with closed and open-ended questions (Appendix 1), checklists (Appendix 2) and participant's observation.

3.3.1.1 Participatory Rural Appraisal (PRA)

PRA techniques used in this research included: wealth ranking and focused group discussion. A checklist was employed to guide focused group discussion with key informants who are knowledgeable on the issue to be discussed. PRA was used to collect

information such as: Socio-economic factors constraining or enabling women and men to participate in JFM, current situation of JFM in the study area, existing forest management problems and success, general trend of women and men participation in forest activities, weakness and strength of JFM and their impact in sustainability of forests.

3.3.1.2 Questionnaires

Structured questionnaires with closed and open-ended questions (Appendix 1) was used to seek information regarding various aspects e.g. information on institutional characteristics and general characteristics of house holds.

3.3.1.3 Participant observation

In this exercise keen field observation was made to determine the authenticity of the information that was given orally by villagers. Questions were asked randomly to get general information about the study area before starting official interview. This information supplemented the information that was collected from questionnaires and PRA.

3.3.2 Secondary data

Secondary data was collected through literature search from libraries and offices. These included textbooks, journals, pamphlets and various reports e.g. monthly and annual progress reports. Data were also collected from previous studies and internet.

3.4 Data Analysis

3.4.1 Quantitative data analysis

Quantitatively data from household surveys were analyzed by using Statistical Package for Social Science (SPSS). Preparation of variables through coding was done to suit research questions and method of analysis used. Then the data were explored for distribution of responses, central tendency and dispersion. Frequencies, percentages, histograms and pie charts were used to summarise the data. Logistic regression model was employed to show relationship between independent variables and dependent variables. General logistic regression model used is as shown below:

$$Y_i = \frac{1}{1 + e^{-z}} \text{ [Prance } et al., 1987]$$

where;

- z = $a + b_1x_{1i} + b_2x_{2i} + \dots + b_nx_{ni} + e_i$,
- a = intercept,
- e_i = Random error (natural logarithm base (2.718)
- and i = 1, 2, n ; where n is the number of variables.
- $Y_{i's}$ = dependent (response) variables:
 - Y_1 = males participation,
 - Y_2 = females participation,

- $x_{i's}$ = independent (explanatory) variables: i.e.
 - x_1 = age (A younger population is more active than an older one, however elderly people are more influential)
 - x_2 = Number of people available for farm work (Households with larger number of members are more likely to participate in other activities e.g. JFM activities).
 - x_3 = household income (Poorer households tend to participate more than economically better households since they have more alternatives of generating income).
 - x_4 = farm size (generally households with bigger farms are less active in JFM participation),
 - x_5 = Labour requirement (households that can afford hired labour for

	farm work are likely to participate more actively in JFM),
x ₆	= education (level of education is an important factor in determining the readiness to accept and properly apply new technology).
x ₇	= decision making (it was assumed that decision making is a key factor in women involvement in JFM activities).
x ₈	= Land ownership (it was assumed that land ownership is limiting factor for women to invest in a given piece of land).
x ₉	= Forest/tree ownership (it was assumed that Forest/tree ownership is an incentive for stakeholder to participate in JFM activities)
x ₁₀	= cultural beliefs on tree planting (the assumption is that cultural beliefs on tree planting will discourage villagers to plant trees).
b _{i's}	= regression coefficient (gradient)of independent variable showing marginal effect (positive or negative) of the unit change in the independent variables on dependent variables.

A two-tailed t-test at 5% level of significance was used and H₀ was rejected where P<0.05.

3.4.2 Qualitative data analysis

Findings from PRA exercises were analysed in the field with the help of the communities and results were communicated back to them for verification. Qualitative information collected from key informants were subjected to content and structural analysis. Content and Structural-Functional analyses were used to handle the qualitative data (Kajembe and Luoga, 1996). The components of verbal discussion held with key informants were analysed in detail with the help of content analysis whereby recorded dialogue with respondents was broken down into smallest meaningful units of information and tendencies. This helped the researcher in ascertaining values and attitudes of respondents. Structural-functional analysis sought to explain social facts by the way in which they were related to each other within the social system and by the manner in which they related to the physical surroundings. This type of analysis helped the researcher to distinguish

between manifest and latent functions. Manifest functions are those consequences, which are” intended and recognized by the actors in a system”. Latent functions are”those consequences which are neither intended nor recognized” (Kajembe, 1994).

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

This chapter provides and discusses results of research after data collection and data analysis. It provides a suitable ground for subsequent conclusion and recommendations of the study.

4.1 Assessment of Gender Roles in JFM Around Mount Meru Catchment Forest Reserve

Results from focused group discussion show that the following activities were conducted under JFM in the study area: tree nursery management (Plate 1), tree planting, attending forest meetings (Plate 2), conducting forest patrolling, forest boundary clearing, planting, and weeding, gap restoration, forest fire fighting, forest boundary resurveying, formulation of village bylaws (Appendix3) and preparation of JFM agreements, demarcation of village forest management areas and preparation of village forest management area plans. However group discussion revealed that some activities were gender specific. Activities mostly performed by men only include; forest patrols, forest boundary cleaning, forest fire fighting. Other activities like planting, weeding, formulation of by laws, preparation of JFM agreements were done by both women and men. According to field observations, VNRC, were found to be fully involved in most of JFM activities.



Plate 1: Community members working at a village tree nursery in one of JFM villages.



Plate 2: Villagers attending one of village meetings on JFM

4.1.1 Involvement in JFM meeting

Overall results from household interviews revealed that nearly 76% of people involved in JFM meetings were men as opposed to only 24% for women. Women and men representation in Ilkiding'a account for 19% and 81% respectively. Results also show that women and men representation is 29% and 70% respectively in Poli (Fig. 3). The foregoing results depict gross women under representation in JFM meetings. However the difference in attendance is not so pronounced between wards. Culture could be a possible reason for women not to attend village meetings. Group discussions have revealed that the Meru and especially the Arusha cultures deny women the right to speak in public. It is considered indecent of women to speak in meetings in the presence of men.

However these cultures are gradually disappearing with the increase of educated population and interaction with other people. Another reason for this situation could be that women are too busy to attend meetings because of their responsibilities which include daily domestic chores and caring for children. For example women in Poli and Ilkiding'a wards walk long distances in search of fodder and fire wood daily a situation that makes attending village meetings be an additional activity. These results concur with studies carried by Tapati *et al.* (2006), who clarified that due to family and other chores, women find it extremely difficult to find time for attending meetings which are often organized at times and venues which happen to be inconvenient for them. One of the main responsibilities of women is food production for their families. A global survey conducted by FAO shows that women account for 50 percent of overall forest production in Asia (FAO, 2000). Tapati *et al.* (2006), further clarify giving an example on women attendance in group discussions that formed part of participatory planning process for JFM where about 87% of the women respondents did not attend any JFM meeting, 6% attended

meetings for part of the time and only 7% sat throughout the meeting. Of those women who attended the meetings, only a little more than half took part in the discussion and the others were silent spectators. The participation of women in group discussions was thus minimal.

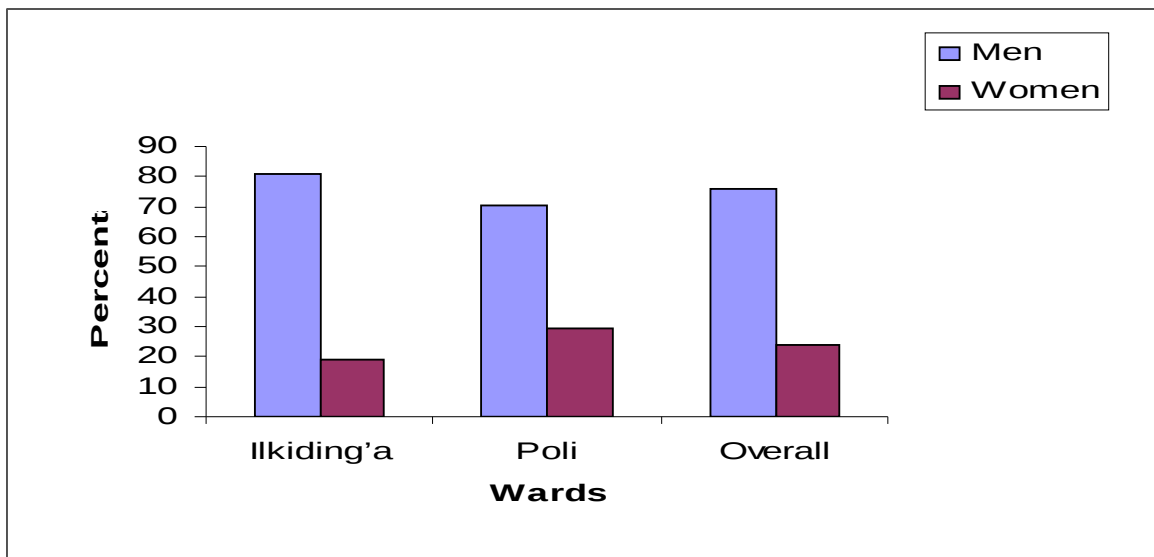


Figure 3: Involvement in Joint Forest Management meetings in communities surrounding Meru forest reserve, Arumeru, Tanzania.

4.1.2 Preparation of Joint Management Agreement

Overall results in the study area revealed that nearly 61 % of men were involved in preparation of Joint Management Agreements as compared to only 39% of women. Figure 4 shows that there is more or less the same women and men representation in preparation of JMA in Ilkiding'a and Poli wards where in both wards women are less represented than men. Study results show comparatively low women representation in JMA preparations. Preparation of agreements involves people of secondary education and above. Group

discussions have revealed that education and culture are the main reasons that contribute to low women representation in preparation of agreements in both wards.

These results are in line with studies carried out by (Jeffery *et al.*, 1998) which concluded that women as a whole have been marginal in the establishment of Joint Forest Management agreements and village level forest protection committees. The rare exceptions suggest that women were not equally well placed to voice their priorities in relation to planning forest protection. Nevertheless, in some areas, some women have subsequently participated in Joint Forest Management activities. And even where women have not been directly involved, they have been affected in various ways by the implementation of Joint Forest Management agreements in their villages (Jeffery *et al.*, 1998).

As a long term solution to arrest the existing situation, village leadership encourages people to enroll more girls and boys in schools and start adult education for both women and men. As a short term solution however, village leaders encourage the few educated women to be confident enough to involve themselves in various village development committees.

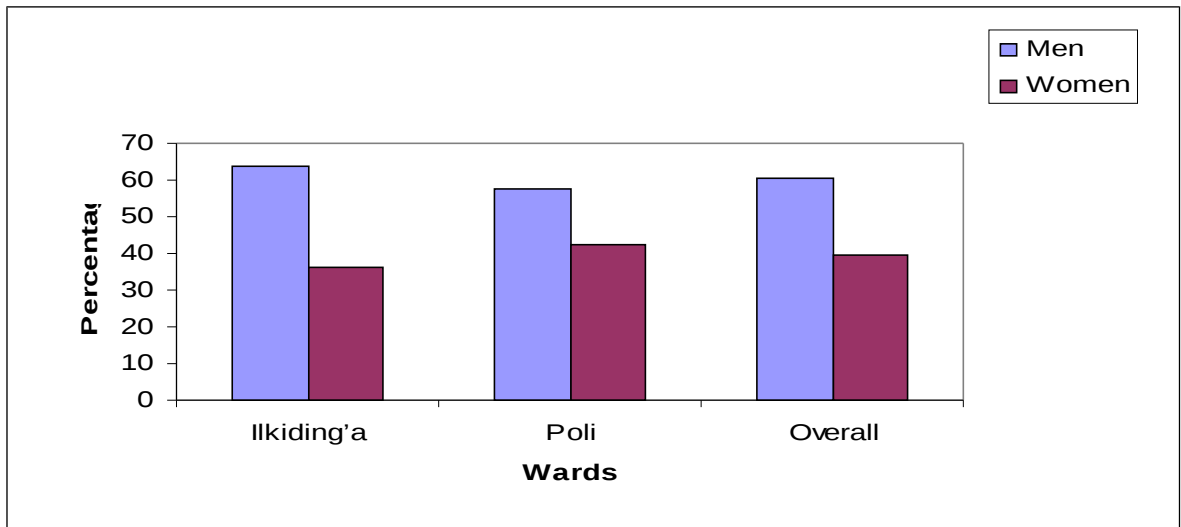


Figure 4: Preparation of Joint Management Agreement in communities surrounding Meru forest reserve, Arumeru, Tanzania.

4.1.3 Fire fighting responsibility

Overall results show that 73% and 1% of people involved in fire fighting under JFM in the study area are men and women respectively. Involvement of Both men and women account for 26% of people involved in fire fighting (Fig. 5).

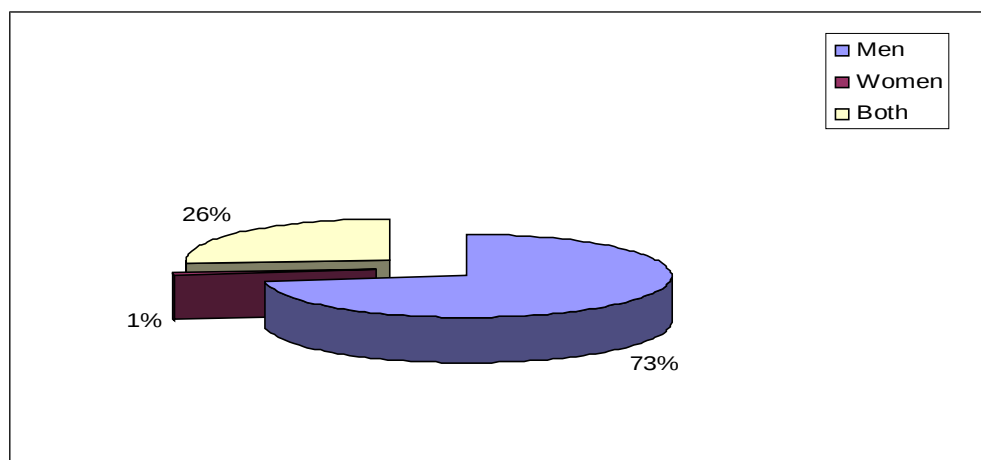


Figure 5: Fire fighting responsibility in communities surrounding Meru forest reserve, Arumeru, Tanzania.

Fire fighting, like patrol work, is considered a man's work as perceived by many people all over the world, particularly in African countries.. However with introduction of JFM the trend is gradually changing. Now, occasionally women participate in protection work which includes fire fighting and patrol work. Prior to introduction of JFM in the study area, involvement of women in fire fighting was a rare exercise unless fire occurred very close to their homesteads. Bahuguna and Upadhyay (2002) report that, the National Forest Policy of 1988 envisages community involvement in development and protection of forests and accords the highest priority to ecological balance and sustainable utilization of forest resources. It aims at creating a massive peoples' movement, with the involvement of women, for achieving the aims and objectives of the policy (which includes prevention and control of forest fires).

4.1.4 Formulation of bylaws

Results in the study area show that about 60% of people involved in formulation of JFM bylaws were men and 40% of them were women (Table 3). Further results showed that there was no significant difference in involvement of formulation of bylaws between men and women ($P > 0.05$) across the two wards.

Table 3: Involvement in formulation of bylaws in communities surrounding Meru forest reserve, Arumeru, Tanzania

Sex	Wards		All (N=112)	Chi-square (χ^2)	P-value
	Ilkiding'a (n = 58)	Poli (n = 54)			
Men	32(55.2)	35(64.8)	67(59.8)	1.082	0.298
Women	26(44.8)	19(35.2)	45(40.2)		
Total	58 (100)	54 (100)	112 (100)		

Note: Numbers in brackets indicate response in percentage with corresponding response frequency outside the brackets.

The main reason for comparatively low women representation could be attributed to cultural background of villagers around Mt Meru that discourage involvement of women in

many aspects of development. However although there is no significant difference ($P= 0.772$) in education between women and men in the study area (Fig. 6) women education must be emphasized to improve their representation in various village organs and development activities including bylaw formulation. A focused group discussion revealed that Ilkiding'a village had 20 VNRC members. Out of those 20 members only 5 were women. Poli village had 15 VNRC members with only 3 as women representatives. Other villages had VNRC representations as follows: Songoro and Nkoanekoli villages (Poli ward) had 6 and 4 women VNRC members out of 16 and 15 total members respectively. Sambasha and Enaboishu villages (Ilkiding'a ward) had 7 and 6 women VNRC members out of 18 and 20 respectively. This is a reflection of women under representation compared to men.

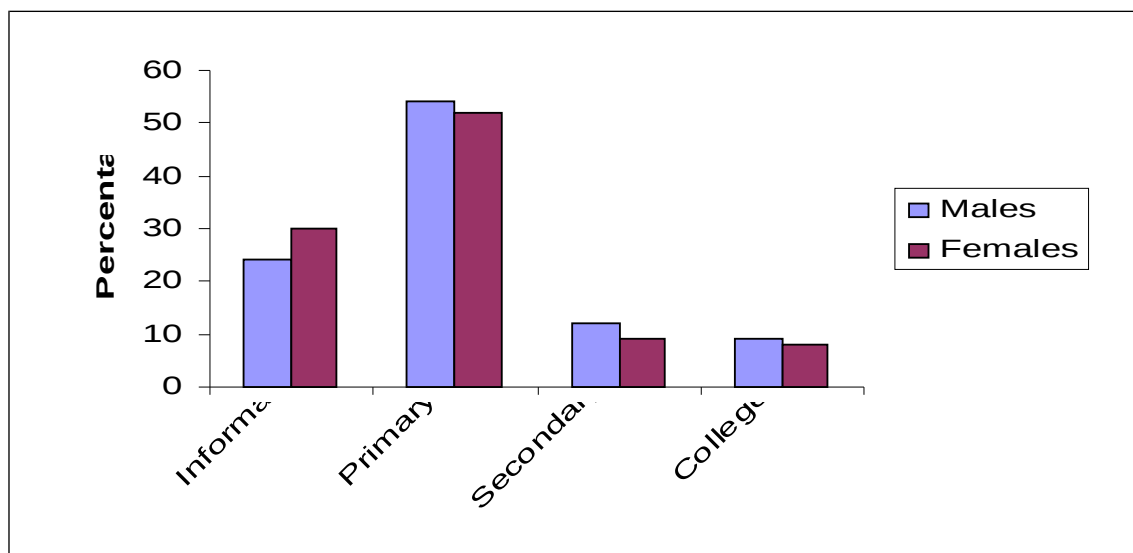


Figure 6: Level of education in communities surrounding Meru forest reserve, Arumeru, Tanzania.

Formulation of bylaws is an important exercise to effectively implement JFM programmes. This calls for cooperation and involvement of prominent and educated stakeholders in the

village. It is also important to consider gender balance from initial stages of bylaw formulation by increasing women representation in committees to come up with a good workable document. UNFF (1990) reports show that Micro-plans are important for the management of JFM areas. The views and aspirations of the villagers both women and men are incorporated in the preparation of these plans. Works related to forest management are conducted according to the micro-plan.

The State Government has approved a JFM manual, which includes detailed instructions on constitution of committees, preparation of micro plan and account keeping. In support of the foregoing Willy (2002) further clarifies that government holds both executive and legislative powers to act on behalf of the community, including the authority to make by-laws on any issue affecting the community or its local resources.

4.1.5 Forest patrol

Overall results show that 77% and 2% of people involved in patrol work under JFM in the study area are men and women respectively. Involvement of Both men and women account for 21% of people involved in patrol work (Fig. 7).

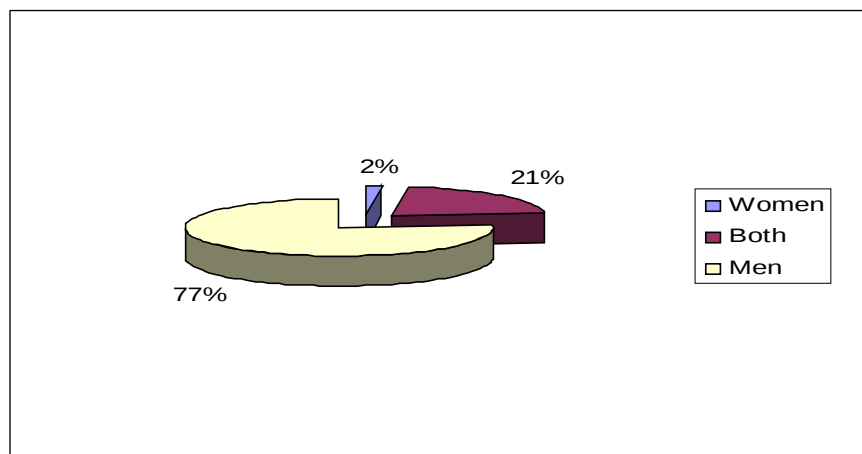


Figure 7: Involvement in patrol work in communities surrounding Meru forest reserve, Arumeru, Tanzania.

Patrol work is seemingly a man's work as perceived by many people all over the world. Study results in Fig. 7 confirm what is expected in gender involvement in patrol work. However with introduction of JFM and in the wake of spirit of collaboration women have been encouraged to participate in protection work which includes involvement in patrol work despite their commitments in traditional chores. As a strategy to improve patrol work among women in Poli village , men were mixed with women. This created a more effective joint patrol work. Women-only patrol work however is done passively whereby during their regular forest related activities e.g. when collecting fuel wood women may report any suspected culprit for action to be taken by men.

Protection of forest patches under Joint Forest Management is achieved by patrols formed by representatives from the whole community. Each household must take turns to send one member to patrol the forest and anyone from the household can go. Thus, the number and composition of people going on patrols varies from village to village. In some villages, women do not go to the forest for protection work as the forest patch is somewhat distant and women feel it is unsafe to go alone. Other villages have appointed a watchman to patrol. However in some villages women occasionally participated in protection work because some people felt it was safe and appropriate for them to patrol as the forests are quite nearby (Jeffery *et al.*, 1998).

4.1.6 Tree planting

Overall results show that there is a significant difference in number of trees planted by men headed households and women headed ones in the study areas. The trend is the same in

Poli and Ilkiding’wards were men headed households have proved to have planted more trees than women headed households in the period of five years (Table 4). This is a common tendency almost all over Africa which is attributed to traditional land ownership and user rights among other factors. Women are not ready to invest in a land over which they don’t have right to inherit. In line with this World Bank (2008) reports that even where women have ownership rights to land, their access to forest products may not be ensured. This is because land ownership does not automatically imply ownership and control of the trees and different forest products. Moreover, different members of the community may have established usufructory rights to different parts of the forest or even of a tree. Arnold (1995), clarifies that well-defined property rights give users incentives to work on common property. 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, determining the equality in the accessibility of the resources.

Table 4: Number of trees planted by men and women headed households in the study area over the period of five years (2000/2001-2004/2005)

Ward	Men	Women	All households	Chi square	P-value
	Mean± SE(n=85)	Mean± SE(n=27)	Mean± SE(N=112)		
Poli	100±2.36(3,995)	57±2.61 (742)	89± 3.19(4,737)	0.242	0.000
Ilkiding’ a	153±5.37 (6,888)	86±4.77 (1,116)	138±5.67 (8,004)		
All	128±4.91 (10,883)	71±3.92 (1,858)	114±4.04 (12,741)		

SE = Standard Error of the mean

NB: Figures in the brackets are the total number of trees planted by both male and female headed households in each ward.

4.2 Determination of the Extent to Which Men and Women Participate in JFM Activities in Study Area

Study results in Figure 8 revealed moderate extent of participation in JFM by men (62.5%) and women (55%). Overall results in the study area depict moderate participation. Moderate women participation in JFM has various reasons, one of which being domestic responsibilities by women. More time is devoted to their responsibilities e.g. caring for children and food preparation. Lack of decision making is another possible reason that retards extent of participation by women in JFM.

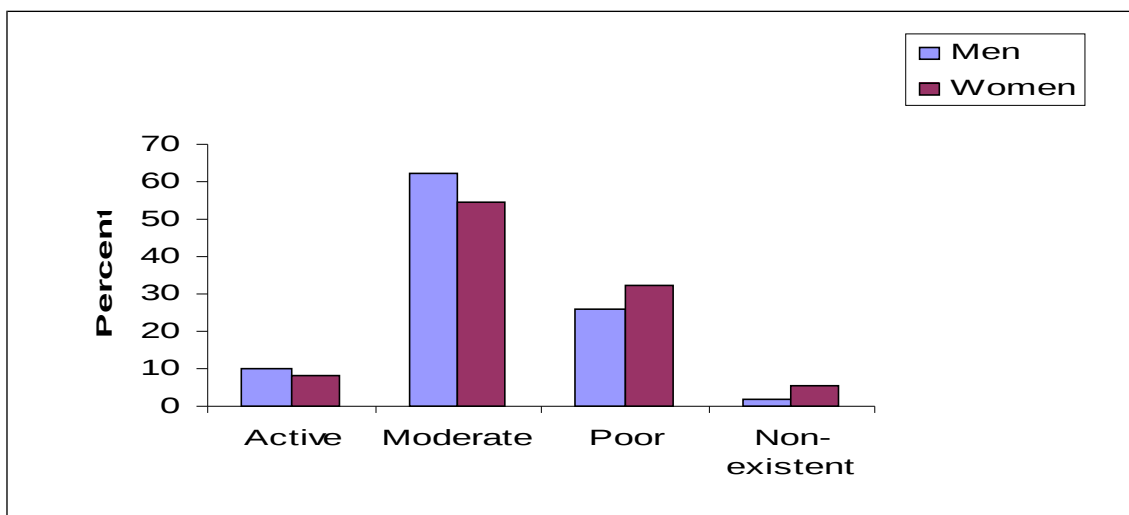


Figure 8: Extent of men and women participation in Joint Forest Management in the communities surrounding Meru Forest Reserve, Arumeru, Tanzania.

Similar reasons have been observed by Sarin (1995) where she emphasised that the least addressed but potentially the most critical dimension of Joint Forest Management is that of gender equity. Neither the official frameworks nor the traditional community decision-making in the independently organized forest protection groups provide any institutional mechanism for addressing women's forest-related needs and priorities.

But also another important reason for women moderate participation in JFM is that women in the study area do not by tradition inherit land which is also the case in many African countries. On this one it is clarified in (World Bank, 2008) that even where women have ownership rights to land, their access to forest products may not be ensured. This is because land ownership does not automatically imply ownership and control of the trees and different forest products. Moreover, different members of the community may have established usufructory rights to different parts of the forest or even of a tree. Effective participation of both men and women in the community in project design and implementation of forestry development activities is, therefore, necessary to secure sustainable and equitable management of forest resources.

4.3 Socio-economic and Cultural Factors that Influence Participation in JFM

Education, decision making, , age, labour requirements, , income, farm size and number of household members available for farm work were the main socio-economic variables that described sample characteristics as shown in Appendix 4 and Table 6.

4.3.1 Regression results on socio-economic and cultural factors that influence male participation in JFM

The logistic regression results are presented in Table 5. The overall percentage of correct predictions was 90.2%, which shows better goodness of fit. Observed results of -2 log likelihood was equal to 66 indicating high likelihood. The Model Chi-square was 88.6 and with P-value of 0.000 which indicated that a model fitted well the data. Also a constant was statistically significant at 0.05 % indicating goodness of fit of the model to the data ($p = 0.021$). Average household income and land ownership indicate significant influence in socio-economic and cultural factors that influence male participation in JFM at ($p=0.000$ and 0.027 respectively) level of significance. Other socio-economic factors were not significant but exhibited either positive or negative effect.

4.3.1.1 Average household income of men

The positive regression coefficient ($\beta=0.00$) of average household income implies that an increase in one unit change of Average household income increases odds ratio of level of male participation on JFM by a factor of 1.000 ($P<0.01$). This means an increase in income increases level of male participation in JFM. It was further revealed that average monthly income of men from crop production was Tsh. 119 709/= as against Tsh. 83 900/= that of women for the same (Table 6).

Table 5: Regression results on socio-economic and cultural factors that influence male participation in JFM

Variables	β	S.E.	Wald	df	Sig.	EXP (β)	95.0% C.I. for EXP (β)	
							Lower	Upper
Age	-0.036	0.023	2.455	1	0.117	0.965	0.922	1.009
Number of	-0.068	0.188	0.132	1	0.717	0.934	0.646	1.350

people available								
for farmwork								
Income(Tsh.)	0.000	0.000	23.679	1	0.000*	1.000	1.000	1.000
Farm								
size(hectare)	0.097	0.304	0.101	1	0.751	1.101	0.607	1.997
Labour								
requirement	0.483	0.883	0.299	1	0.584	1.621	0.287	9.150
Education	0.234	0.668	0.122	1	0.726	1.263	0.341	4.682
Decision								
making	0.103	0.799	0.017	1	0.897	1.109	0.232	5.308
Land ownership	1.661	0.750	4.910	1	0.027*	0.190	.044	.825
Forest/tree								
ownership	-0.523	0.913	0.328	1	0.567	0.593	0.099	3.546
Cultural belief	1.268	0.679	3.490	1	0.062	3.554	0.940	13.439
Constant	-4.728	2.043	5.353	1	0.021*			

Model summary

Y_1 = male participation, Coefficient of determination (R^2) = 73%, Log likelihood (-2LL)

= 66, Overall percentage = 90.2%, Model chi-square = 88.6, Number of cases = 112

Key:

β	Estimated regression coefficients (log odds)
S.E.	Standard error of the estimate
Wald	Wald statistics i.e. $[B/S.E.]^2$
Sig.	Level of significance
*	Statistically significant at 0.05 level of significance
ns	Statistically not significant at 0.05 level of significance
EXP (β)	e^β Where $e = 2.718$ and β regression coefficients (Table 5) EXP (β) is the odds ratio, which is the ratio of probability of success to the probability of failure

Table 6: Comparison between men headed house holds and women headed house holds on socio-economic characteristics in the study area

Variable	Men (n=86)		Women (n=26)	
	Range (Min-Max)	Mean±SE	Range (Min-Max)	Mean±SE
Age (years)	26-80	51.9±1.64	24-76	45±2
Total land area (hectares)	0.25-7.00	1.78±0.13	0.25-6.00	1.22±0.24
Monthly income (crop production) (Tsh)	34 000-215 000	119 709±5238	35 000.00-210 000	83923±9796
Distance from residence to farm (km)	0.50-4.5	2.00±0.12	0.5-5	2.13±0.25
Number of people available for farm work	2-8	4.69±0.17	2-8	4.30±0.28
Number of farm plots	1-5	3.1±0.11	1-4	2.81±0.20
Years of formal education	0-16	6.59±0.44	0-13	5.53±0.80

Generally male income in the study area is higher than that of females a situation which is basically similar to many other places. Being favoured by waarusha and Meru cultures in terms of land ownership, user rights, men have found themselves in a comparatively better economic position than women. This situation has created an environment conducive for men to participate in village development projects which include JFM. Men's participation in various projects in turn enhances their economic abilities as opposed to women. Men's access to various institutions makes them more informed on various development related issues. This increases their knowledge on various farm and forest related activities. Ryoba, (1996) has similar thinking where he says farmers with high income are more likely to be adopters of new practices than farmers with low income, as income increases the farmer's ability to hire labour and meet costs associated with technology requiring increased demand for labour or other inputs.

4.3.1.2 Land ownership

Table 4 shows Land ownership having positive coefficient regression of ($\beta = 1.661$) and odds ratio of 0.190. This indicates that for every unit change in land ownership, there is an increase in the odds ratio of male participation in JFM by a factor of 0.190. At P-value of 0.027, Land ownership has significant influence on male participation in JFM. This implies that people who own land are more likely to participate in JFM since land ownership acts as an incentive in participation. Conversely people who have no ownership rights to land are less likely to invest time and other resources in JFM participation. These findings are in line with those of Mehra (1995) who reported that insecurity in land tenure influence how different groups of people use natural resources. The author argued further that women, the poor and other marginalized groups are less likely to invest time and other resources or adopt environmentally sustainable farming practices on land they do not own.

By Arusha and Meru cultures, only men acquire land by inheritance which means most of land in the study area is owned by men. However these days capable women are free to acquire land through purchase. Land ownership is a problem among women and it is common in most of African cultures especially where patriarchy is a social setting. Land ownership is a motivating factor which attracts men in participating in various village projects including JFM.

Jeffery (2005) emphasizes that in Africa, under most systems of customary law, women do not own or inherit land, partly because of the perception that women are part of the wealth of the community and that they therefore cannot be the locus of land rights grants. In this kind of situation one does not expect women to fully participate in village projects e.g. JFM. For most women, access to land is via a system of vicarious ownership through men: as husbands, fathers, uncles, brothers, and sons. Customary rules therefore have the effect of excluding females from the clan or communal entity.

Jeffery (2005) also attributes women's lack of land rights to their poverty where she explains that rights of women to economic resources cannot be ignored. Women worldwide play a central role in ensuring family food security. They also produce goods and provide services to earn income for the family, as both primary and secondary income earners. Yet, the majority of the world's women are resource poor. Hunger is chronic among women and children in many women headed households as they lack access and control over land including village common lands and forests.

Access to resources and ownership rights are assumed to be the paramount factors in bringing equity and conservation and sustainable use of bio-resources. The prevailing system of land ownership has an implication on women's position, power and status within

the household and community. Land ownership is one of the most important criteria that influence the negotiating and decision-making capacity of women within the household (FAO, 2000).

4.3.2 Regression results on socio-economic and cultural factors that influence female participation in JFM

The logistic regression results are presented in Table 7. The overall percentage of correct predictions was 88.4%, which shows better goodness of fit. Observed results of -2 log likelihood was equal to 79.1% indicating high likelihood.

Table 7: Regression results on socio-economic and cultural factors that influence female participation in JFM

Variables	β	S.E.	Wald	df	Sig.	EXP (β)	95.0% C.I. for EXP (β)	
							Lower	Upper
Age	0.013	0.021	0.415	1	0.520	1.013	.973	1.056
Number of people available for farmwork	0.666	0.201	10.982	1	0.001*	0.514	0.346	0.762
Income(Tsh.)	0.000	0.000	10.734	1	0.001*	1.000	1.000	1.000
Farm size(hectare)	-0.607	0.313	3.761	1	0.052	0.545	0.295	1.006
Labour requirement	0.604	0.877	0.474	1	0.491	1.829	0.328	10.195
Education	-0.057	0.579	0.010	1	0.921	0.944	0.304	2.937
Decision making	-0.234	0.724	0.105	1	0.746	0.791	0.192	3.270
Land ownership	-0.039	0.817	0.002	1	0.962	0.962	0.194	4.771
Forest/tree ownership	-0.200	0.598	0.112	1	0.738	0.819	0.254	2.643
Cultural belief	-0.347	0.588	0.349	1	0.554	1.415	0.447	4.479
Constant	4.834	1.995	5.870	1	0.015*			

Model summary

Y_2 = female participation, Coefficient of determination (R^2) = 62.7%, Log likelihood (-2LL) = 79.1, Overall percentage = 88.4%, Model chi-square = 69.0, Number of cases = 112

Key:

β	Estimated regression coefficients (log odds)
S.E.	Standard error of the estimate
Wald	Wald statistics i.e. $[B/S.E.]^2$
Sig.	Level of significance
*	Statistically significant at 0.05 level of significance
ns	Statistically not significant at 0.05 level of significance
EXP (β)	e^β Where $e = 2.718$ and β regression coefficients (Table 7) EXP (β) is the odds ratio, which is the ratio of probability of success to the probability of failure

The Model Chi-square was 69.0 with a P-value of 0.000. Also a constant was statistically significant at 0.05 % indicating goodness of fit of the model to the data ($p = 0.015$). In this analysis “number of people available for farm work” and “average household income” indicated significant influence in socio-economic and cultural factors that influence female participation in JFM at ($p < 0.001$ for each factor). Other socio-economic factors were not significant but exhibited either positive or negative regression coefficient.

4.3.2.1 Number of people available for work

Table 6 shows that number of people available for farm work indicated a positive regression coefficient ($\beta = 0.51$), odd ratio of 1.67 and it was significant at ($p = 0.001$). This means that an increase in one household member in farm work increases the odds ratio of female participation in JFM by a factor of 1.67. The logical interpretation could be that labour has significant influence in female participation in forest activities. Therefore any increase in number of household members who are able to work in the farm will positively

affect JFM participation. Households with larger number of members are more likely to participate in JFM. Similar results were reported by Kessy and O’Ktin’gati (1994) who found that participating in tree planting is influenced by size of household, i.e. household size means more family labour available in planting and other forest activities, holding other factors constant. From observations women are more responsible in farming activities and family responsibilities, so having a large number of family members can influence them to participate in other activities like forest activities.

Subba (2001) adds in support of the foregoing that when situations allow women were found to participate more in forestry work than men. Women were found to do forest watching, with the argument that they had to visit the forest more, to collect fuel wood and fodder. Women also do pruning and thinning of trees and are involved in raising fodder species. The reasons for women’s work in the tree nursery could be that nursery work is labour intensive, as nursery requires constant weeding and watering.

Dvorak (1993) further emphasized that alley farming is a labour intensive technology and high labour requirements can discourage farmers from using the technology and they further expected that the larger the family size, the greater will be the availability of labour for alley farming.

4.3.2.2 Household Income

The results in Table 7 show household income has a positive regression coefficients ($\beta=0.86$), odds ratio of 2.36 and its non- significance at ($p>0.05$). This means that change of one unit of household income, increase the odds ratio of female participation in JFM by a factor of 2.36. The plausible explanation for positive regression coefficients is that

female participation in JFM is positively and significantly affected by household income in the study area. Females, who are generally poorer than their male counterparts, get motivated when they earn a little more income coming from sources other than cultivation. This difference in income between these two groups of households can be attributed to a number of reasons based on cultural or traditional and economic factors: lack of decision making in the Meru and the Arusha societies is a serious hurdle to women development. For example according to Arusha and Maasai traditions women headed households can not make decisions on the sale of their livestock e.g. cattle without prior permission from a clan leader or from a man of family who has been appointed by the clan to take care of the family.

Lack or poor attendance of women in village meetings due to domestic responsibilities and other cultural factors deny them opportunities to get right information. This information could be on good appropriate agricultural methods or even information on how to access bank credits. In general this is a challenge to gender equality and particularly to participation in development projects e.g. forest activities. This is in contrast with males who have comparatively more sources of income.

In this particular regression analysis results, number of people available for farm work and household income have been identified to be key factors. In line with this, Atmis (2007) says age, marital status, the rate of population increase and income are important variables for explaining variation in levels of participation. The estimated game theoretic model on women's participation indicates that the sharing of forest benefits among women in Turkey is considerably harmonious, while there is scope for improving the Forest Organization, namely by stimulating participation towards a more effective management of the Turkish forests.

4.3.3 Decisions on land use

The overall response as shown in Figure 9 shows that husbands and wives are relatively the most responsible group in decision making on land use (50%). This implies that decision making being a socio-economic aspect is an important factor in influencing gender roles in JFM in communities around Mt Meru.

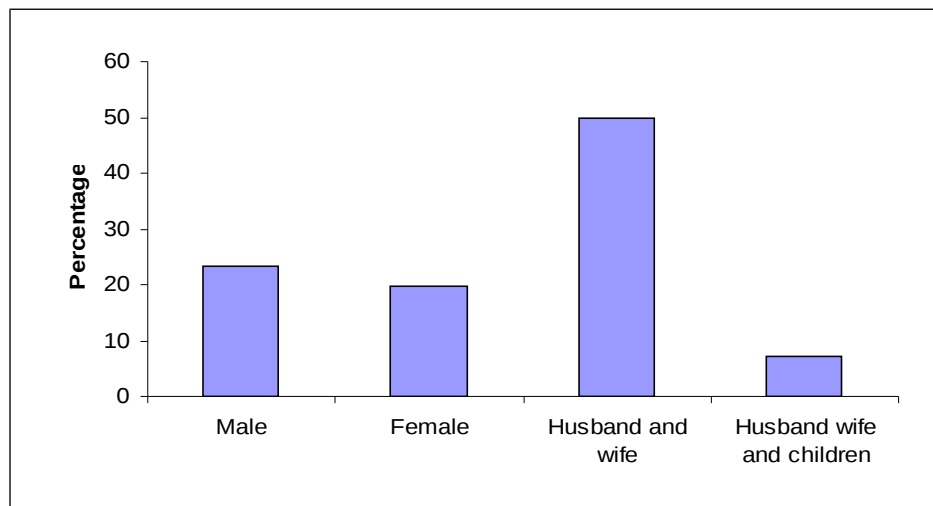


Figure 9: Decisions on land use in the communities surrounding Meru forest reserve, Arumeru, Tanzania.

Traditionally men have been decision makers of most of important issues pertaining to household matters. This has been a constraint to women participating in different activities. Observations made from informal discussions showed that women have no or have little decision making in important matters pertaining to forestry activities. To reverse the situation villagers and particularly village leadership should introduce progressive changes in traditional attitudes, practices and organizational norms by ensuring that priority is given to gender and equity concerning all aspects of land use.

Jeanette and Kanchan (2003) give an example of Nepal where decision making is an important function in forest user groups and requires the participation of the whole community. But, in practice, disadvantaged groups are frequently marginalized. Women must work in the home and poor people must work for wages. These obligations interfered with their ability to attend meetings, and so they were less aware of the decisions being made.

4.3.4 Education

Regression analysis results ($\beta=0.234$, $P=0.726$) indicated that education level has no significant influence in male participation in JFM. However, positive regression coefficient shows that an increase in one unit change in education level increases odds ratio of female participation in JFM by a factor of 1.263 (Table 5). This means with increase in education men participation will be improved. Farmers' educational background is an important factor in determining the readiness to accept and properly accept a technology. If women (or men) are illiterate or uneducated, it will be difficult for them to boost their role in the forestry activities affect their participation negatively. Further results from this study revealed that most of respondents have primary education (54%), in the study area (Appendix 4).

Results also show that Poli and Ilkiding'a wards have about 63% and 46% of their people having primary education respectively (Appendix 4). Results further indicated that Poli and Ilkiding'a wards account for almost 15% and around 3% respectively in college education. These results reveal that generally Poli ward has higher education level than Ilkidinga'a although the latter has a higher percentage of secondary education (12%). Possible reason for Ilkiding'as lower level of education compared to Poli ward is attributed to its poor enrolment in primary school by parents who use their children in household responsibilities including fuel wood collection and livestock grazing. However realising

this situation, village leadership is trying to sensitise people to value education including taking their children to school and join various development projects so as to boost their economic status. These results compare well with findings by Nanai (1993) who reported that educated respondents can easily understand technical information pertaining to the improvement of crop production, agroforestry and marketing. This in turn can enhance community involvement in development projects. On the same lines Kajembe and Luoga, (1996) comment that increase in education level tends to increase people's awareness on the importance of natural resources conservation for sustainable development.

Education broadens horizons beyond habits and traditions of individuals in development activities. Therefore through education, an individual becomes more critically aware of the need and scope for social change. More years of formal education is associated with high level of comprehension of new technologies, for example a farmer can be more willing to use high yielding variety, insecticides and pesticides thus education attainment increases the rate of adoption in agroforestry etc. (Machumu, 1995).

4.3.5 Age

Ages of respondents in the study area were examined and analysis showed that women range from 24 to 76 years, with an average of 45 years (Table 6). The average age of respondents reflects high level of maturity with long experience in various activities and patience which is necessary in gender roles and participation in forest activities. Science Direct (2009) reports that Older executive committee members (the principal decision-making body), especially older women, perform well in the management of community forests in Nepal. The beneficial impact of women's presence on conservation outcomes is attributable especially to women's contributions to improved forest protection and rule compliance. More opportunity for women to use their knowledge of plant species and

methods of product extraction, as well as greater cooperation among women, are also likely contributory factors.

The regression analysis results ($\beta = -0.013$, $p = 0.520$) in Table 6 means that age has no much significant influence in gender participation in JFM, but the negative coefficient indicates that participation of older people in forest activities is less than that of younger people. This could be attributed by the fact that aged people, who are likely to have large family size, will demand more land for growing both food and cash crops. As such aged people allocate less land for planting trees (Mbeyale, 1998). Younger people on the other hand receive and adopt new technology faster (early adopters) than older people.

4.3.6 Farm size

Regression results show that farm size has no much influence in gender participation in forest activities and it is negatively correlated to it ($\beta = -0.607$, $p = 0.052$) (Table 7). The negative correlation implies that an increase in farm size decreases women participation in forest activities. The possible explanation for this is that an increase in farm size means that women devote more time in their farms than in joint development projects.

4.3.7 Cultural beliefs on tree planting

Regression analysis results (Table 7), indicated that cultural beliefs on tree planting has no significant influence in both male and female participation in JFM ($\beta = -0.347$, $p = 0.552$). Having a negative regression coefficient implies that participation in JFM decreases with corresponding increase in beliefs on tree planting. These cultural beliefs have demoralizing effect on tree planting activities. Mvena and Matee (1988) have relating opinions on the foregoing where they comment that some agroforestry practices are not compatible with

certain community's culture and traditions. Trees are more likely to be appreciated by farmers if there are no negative taboos or beliefs associated with the particular species. Traditionally, the failure by farmers to adopt innovation has been blamed on farmers' socio-cultural milieu of beliefs, attitudes, values and traditional practices. Fortman and Antori (1997) also reported that tribal attitudes towards trees vary, the Sukuma for example, are hostile to forests because of the beliefs that trees harbour birds that destroy crops. The Haya and the Chagga hold completely opposite views.

4.4 Extension Services

Results of the study showed that 88.4% of respondents in the study area accepted knowledge of existence of extension services and that 74.3% said visits by extension workers were few (Appendix 4). However 24.8% reported that most visits by extension workers were made during growing/planting season. Further results have indicated that 99% of respondents admitted understanding of advices given by extension workers (Appendix 4).

Group discussions revealed that women usually fail to participate in most of extension programmes due to their domestic responsibilities. Similar observations made by Mwaipopo-Ako (1994) showed that it is often difficult for women to be available for training on new technologies due their responsibilities. Poor access in extension programmes is a constraint to women since only men will benefit from extension services and hence play a better participatory role in forest activities.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study has identified various roles or activities performed by local communities. These activities include tree nursery management, tree planting, forest patrols, boundary clearing, weeding, forest fire fighting and boundary resurveying. Some of activities are gender sensitive and others are not as has been discussed. For example women roles mainly include tree nursery activities and weeding. Men roles in JFM mainly include forest patrols and fire fighting.

Generally results in the study area depict moderate participation. Moderate women participation in JFM has various reasons, one of them being domestic responsibilities by women. More time is devoted to these responsibilities e.g. caring for children and food preparation. Lack of decision making is another possible hurdle that retards participation by women in JFM.

This study has also revealed that socio-economic factors enabling or constraining gender roles in JFM include land ownership, household income and number of people available for work. Land ownership has significant influence in gender roles and participation and participation of gender in JFM. Study results show more active participation by men than women in communities surrounding Mt Meru Catchment Forest Reserve. This is because men get more motivated than women because of land ownership. Conversely women are demoralized in participating fully in JFM because they feel they cannot invest in the land they do not own.

5.2 Recommendations

1. Village leadership should develop women's awareness of their rights to participate in the JFM programme and they should also be educated so that they may have the power to demand their rights especially rights concerning ownership and use of land. This is one of problems that discourage women from participating in forest activities. The government, through Meru Catchment Forest Reserve should give communities more information on their rights to ownership and use of land resources so that their sustainability can be enhanced.
2. Women representation in VNRCs and other fora should be increased so that their concerns are taken into account at all levels. The individual should be the unit of participation rather than the household.
3. Village leadership, in collaboration with the government should encourage women to initiate income generating activities such as establishing of tree nurseries and traditional stoves with a view to raising their economic abilities.
4. Women themselves should be aggressive and voice their concerns and form part of decision-making bodies and processes rather than depending on their interests to be presented by men.
5. School enrollment of children, especially females, who have traditionally been neglected should be emphasized. Premature marriages among school going children should strictly be discouraged to ensure that all children complete their education successfully. All these measures can be successfully be accomplished by involving village elders.

6. Studies on gender in forestry should periodically be upgraded and widely disseminated to the relevant authorities e.g. Forestry stations and villages to ensure that right information reaches where it is most needed at the right time. Forest division and other relevant institutions e.g. universities can possibly assist in implementing this exercise.
7. Exposure tours should be organized by the Government in collaboration with village leadership so that women can learn from other people/areas.
8. Gender sensitive training, which recognises the specific needs of both men and women in terms of timing, type and venue should be organised by the Government to improve gender participation in forest activities.
9. Village leadership, assisted by the Government should define its strategies and workplans, identify human and financial needs so that gender issues can be addressed incorporated at all levels of implementation.

REFERENCE

- Arnold, J. E. M. (1995). *Managing Forests as Common Property, Community Forestry*.
FAO, State of the World's Forest, 1999. Paper136.
- Atmis, E., Dasdemir I., Yildiran, O. (2007). Factors Affecting Women's Participation in Forestry in Turkey. University of Zonguldak Karaelmas, Bartin in Faculty of Forestry, Bartin Turkey. *Science Direct- Ecological Economics*: 60(4): 787-796.
- Bahuguna, V.K. and Uadhyay A. (2000). Forest Fires in India: Policy Initiatives for Community Participation. Ministry of Environment and Forests, Paryavaran Bhawan. *International Forestry Review Journal* 53(2):145 – 163.
- Boyd, H.K., Westfall, R. and Starch, S.F. (1981). *Marketing Research; Texts and Cases*. Richard D. Publisher, Illinois. 813 pp.
- Brinkerhoff, D. W. and Goldsmith, A. A. (1992). Promoting the Sustainability of Development Institutions: *Framework for Strategy World Development* 20 (23): 369-383.
- Bromley, D.W. (1992). Property Rights as Authority Systems: The Role of Rules in Resource Management. *Journal of Business Administration* 20(2): 453-470.
- Bromley, T. and Ramadhani, H. (2005) Participatory Forest Management (PFM) in Tanzania-an overview of status, progress and challenges ahead. *Arc Journal* 21:3-5.
- Celcelsiki, E. (1985). *The rural Energy Crisis, Women's Works and Basic Needs: Perspectives and Approaches to Action*. Norton Publishers, New York. 74pp.

- Cernea, M. (1991). *Putting People First: Sociological Variables in Rural Development*. Oxford University Press, New York. 430pp.
- Chavangi, A. H. and Zimmermann, R. (1987). *A Guide to Farm Forestry in Kenya*, Ministry of Environment and Natural Resources, Rural Afforestation Extension Services 93pp.
- Collins, C. J. and Chippendale, P. J. (1991). *New Wisdom, The Nature of Socio Realty*. Acorn publications, Queens land. 539pp.
- Davis, L. S and Johnson K.N.(1987). *Forest Management*, Third Edition, John Wiley and Sons Publication, New York. 146pp.
- Dvorak, K. A. (Eds.) (1993). *Characterizing system dynamics for soil fertility management research in the humid tropics: Studies in Southern Nigeria*. In: *Social Science Research for Agricultural Temporal Dimensions*. CAB International Wallingford, UK .199pp.
- Dvorak, K. A (1996). *Adotion Potential of Alley Cropping*. Final Project Report IITA, Ibadan, Nigeria. 70pp.
- FAO (1994). *State of Tropical Forest Management; Management for Sustainable Wood Production*. [<http://www.fao.org/DOCREP/003/x4110e.htm>] site visited on 8/3/2007.
- FAO (1998). *Guidelines for the Management of Tropical Forests. The Production of Wood*. (ed.) Armitage, Ian, FAO Forestry paper 135, Rome.42pp.

- FAO (2000). Gender Issues and Concerns in Local Agrobiodiversity. [<http://www.fao/docrep/005/AC546e04.htm>] site visited on 4/4/ 2009.
- FAO (2000). Rural and Tribal Women in Agrobiodiversity Conservation; an Indian Case Study. [<http://www.fao.org/docrep/005/AC546E/ac546e00.htm>] site visited on 28/1/2008.
- FAO (2001). Gender Issues in Rural Pakistan. [[http://www.fao/DOCREP/T1855e/t1855e02,htm](http://www.fao/DOCREP/T1855e/t1855e02.htm)] site visited on 12/ 6/ 2008.
- FAO (2003). Incorporating Gender into a Male Domain: *A Strategy for Foresters. Paper Presented at the XII World Forestry Congress at Quebec City, Canada. November, 2003. 28pp.*
- FAO (2006). Crafting Institutional Arrangement for Community Forestry. [<http://www.fao.org/docrep/w7483E/w7483e05htm>] site visited on 8/11/2009.
- FAO (2008). Simpler Forest Management Plans for Participatory Forestry. [<http://www.org/docrep/008/j4817e05htm>] site visited on 3/ 5/2008.
- FORESTRY ISSUES, (1992). Community Participation in Forest Conservation. [<http://www.inf@rcfa-cfan.org>] site visited on 15/ 6/ 2008.
- Fortman, D. (1985). The Tree Tenure Factor in Agroforestry with Particular Interest to Africa. *Agroforestry System* 2: 229-251.
- Fortimann, L. and Antinori, C. (1997). Fruits of Their Labours: Gender, Poverty Rights and Tree Planting in a Zimbabwe Village. *Rural Sociology* 62 (3): 295.

- Franzel, S. (1999). Socio-economic Factors Affecting the Adoption Potential Improved Tree Fallow in Africa. *Agroforestry Systems* 47:305-321.
- Forest Resources Management Project (FRMP) (1996). *Identification of Best Practices for Forest Activities*. Forest and Beekeeping Division, Ministry of Natural Resources and Tourism, Tanzania. 98pp.
- Gibson, C., M. Mckean and E. Ostrom. (2000). *People and Forests: Communities, Institutions, and Governance*. MIT Press, Cambridge. 345pp.
- Gomez, S.M. (2002). Forest Management in Africa. [http://www.iucn.org/themes/spg/themes_genderhtml] site visited on 26/6/2007.
- Gupta, H.K. (2006). *Joint Forest Management: Policy, Participation and Practice in India*/Hemant Kumar Gupta. Dehradun, International Book Distributors. 400 pp.
- Horn, J. (2002). *An Evaluation of Participatory Forest Management in the Southern Cape. Report for Chief Directorate: Forestry in South Africa*: Department of Water Affairs and Forestry. 61 pp.
- Hoskins, M. W. (1983). Rural women, Forest Outputs and Forestry Projects. [http://www.iucn.org/themes/spg/themes_genderhtml] site visited on 26/6/2007.
- Huising, H.K. (1997). Household Strategies and Rural Livelihood Diversification. *Development Studies* 35 (1): 1-36.

Iddi, S. (2002). *Community Participation in Forest Management in the United Republic of Tanzania*. Proceedings of the Second International Workshop on Participatory Forestry in Africa, Defining the Way Forward: Sustainable Livelihoods and Sustainable Forest Management through Participatory Forestry, Arusha, Tanzania. 18-22 February 2002. 67pp.

ILO (2007). What is Gender Analysis. [<http://www.ilo.org/public/english/region/asro/manila/gender/modwga.htm>] site visited on 12/ 6/2007.

Jeffery, P., Misha, A. and Singh, M. (1998). *Gender Stereotypes and Joint Forest Management*: School of Social and Political Studies, University of Edinburgh Press. 263pp.

Kalpana, G.B. and Rishi, R.M. (2000). Social Inclusion in Community Forestry: Why Women are Frequently Excluded from Decision-making and Leadership- Nepal. *Journal of Environment, Development and Sustainability* 31: 161-198.

Kajembe, G.C. and Kessy, J.F. (2000). Joint Forest Management in Urumwa Forest Reserve, Tabora, Tanzania. A Process in the Making. In: Virtanen, P. and Nummelin, M. (Eds). *Forests, Chiefs and Peasants in Africa: Local Management of Natural Resources in Tanzania, Zimbabwe and Mozambique*. *Silva Carelica* 34: 141-158.

Kajembe, G.C. and Luoga, E.J. (1996). *Socio-economic Aspects of Tree Farming in Njombe District*. Consultancy Report to the Natural Resource Conservation and Land Use Management Project (HIMA-Njombe). Faculty of Forestry, Sokoine University of Agriculture, Morogoro, Tanzania. 126 pp.

- Kajembe, G.C. (1994). *Indigenous Management Systems as a Basis of Community Forestry in Tanzania: A case Study for Dodoma Urban and Lushoto Districts*. Tropical Resource Management Paper 6. Wageningen Agricultural University, The Netherlands. 194pp.
- Karimeri-Mbote, P. (2005). *Gender Issues in Land Tenure Under Customary Law: The Predominance of Patriarchy in Law, Policy, and Practice*. International Environmental Law Research Centre, University of Nairobi. 223pp.
- Karl, H. (1995). *Socio-economic Issues in the International Forest Policy Dialogue: The Orphan of the International Forest Policy Dialogue*. International Institute for Sustainable Development. IISD Working Paper in [<http://www.iisd.org/forests/default.htm>] site visited on 11/7/2007.
- Kashenge, S.S. (1986). *Management Plan for Catchment Forests, Arusha Region*. *Mimeograph, Forest Division*. Annual Report, November, 1986. 13pp.
- Kessy, J.F. and O'ktin'gati. A. (1994). *An Analysis of Some Socio-economic Factors Affecting Farmers Involvement in Agroforestry Extension Projects in Tanzania*. Consultancy report submitted to the Ministry of Natural Resources and Tourism in July 1994. 32pp.
- Kihiyo, V.B.M.S (1998). *Forest Policy Changes in Tanzania: Towards Community Participation in Forest Management*. Annual Report Submitted to Sokoine University of Agriculture. 22pp.

- Kimbi, E. C., Mmbaga, S. J., Mwakatobe, A., Debessu, T. and Mbede, A.(1998). *Potentials and Problems of Small Holder Bee Keeper. A Case of Nkoamangasha Sub Village in Arumeru District*. Report Presented as a Requirement for Completing a Course on Management of Natural Resources for Sustainable Agriculture. Institute of Continuing Education, SUA, Morogoro Tanzania. 24 pp.
- Lovett, J. C. and Pocs, T. (1993). *Assessment of the Condition of the Catchment Forest Reserves, a Botanical Appraisal*. [<http://www.allafrica.com/stories/200610290126.html>] site visited on 8/ 4/ 2009.
- Luoga, E.J. (2000). Different Utilization and Ethnobotany of Trees in Kitulangalo Forest Reserve and Surrounding Communal Lands, Eastern Tanzania *Economic Botany* 54:328-343.
- Luoga, E.J., Witkowski, E.T.F. and Balkwill, K. (2000). Subsistence Use of Wood Products and Shifting Cultivation Within Miombo Woodland of Eastern Tanzania, with Some Notes on Commercial Uses. *South African Journal of Botany* 66: 72 - 85.
- Luoga, E.J., Witkowski E.T.F. and Balkwill, K. (2002). Harvested and Standing Wood Stocks in Protected and Communal Miombo Woodlands of Eastern Tanzania. *Journal of Forest Ecology and Management* 164: 15 - 30.
- Luoga, E.J., Witkowski E.T.F. and Balkwill, K. (2005). Land Cover and Use Changes in Relation to the Institutional Framework and Tenure of Land and Resources in Eastern Tanzania Miombo Woodlands. *Journal of Environment, Development and Sustainability* 164: 15 - 30.

- MacDicken, K. G. and Vergara, N. T. (1990). *Agroforestry: Classification and Management*. John Wiley and Sons Publication. New York. 382pp.
- Machumu, F.B.N. (1995). Factors Associated with the Adoption of Agricultural Technologies: A Case of Sasakawa Global 2000 Project in Dodoma Rural District Tanzania. Master Dissertation (unpublished) Sokoine University of Agriculture, Morogoro, Tanzania, 115pp.
- Martin, A. (2008) Forestry: Gender Makes the Difference. [http://www.genderandenvironment.org/admin/admin_biblioteca/documentos/Forestry.pdf.] site visited on 5/2/ 2007.
- Mbeyale, G. E., (1999). Socio-economic Assessment of the Factors Influencing Building Poles Consumption, Conservation and Management of Amani Forest Nature Reserve. Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science (Forestry) of Sokoine University of Agriculture, Morogoro, Tanzania 129pp.
- MCP. (2001). Participatory Forest Management in Tanzania. [<http://www.Mpingoconservation.org/index.html>] site visited on 26/ 5/ 2007.
- Mehra, R. (1995). Women, Land and Sustainable Development, International Center for Research on Women (ICRW) Working Paper, Vol. I. Washington, DC. [http://www.genderandenvironment.org/admin/admin_biblioteca/documentos/Forestry.pdf.] site visited on 16/6/ 2007.

- MNRT (2000). *Management of Natural Resources Programme: Arusha Catchment Forestry*. Annual Progress Report. 20pp.
- MNRT (2006). *Participatory Forest Management; Facts and Figures*. Government Printer, Dar-es-Salaam. 43pp.
- MNRT and PMO-RALG (2000). *Participatory Forest Management*. Government Printer, Dar-es-Salaam. 62pp.
- Mvena, Z. S. K. and Matee, A.Z. (1988). The Adoption of Modern Agricultural Technology by Farmers in Tanzania. In the proceeding of Science and Farmers in Tanzania. (Edited by Teri, J. M.and Matee, A. Z.), 23 – 26 August, 1988, Sokoine University of Agriculture, Morogoro Tanzania. 136-145pp.
- Mwaipopo-Ako, R. (1994). Gender Issue in Tanzania Agriculture. In: *Gender and Development in Tanzania Past, Present and Future. Proceedings of the Women Research and Documentation Project*, Dar es Salaam, Tanzania. 22 November, 1994.231- 243pp.
- Nanai, N. A. K. (1993), Peasant Participation in Community Development Project: Its Implication in Laying a Strategy for Participatory Extensions. A Dissertation for Award in Master of Science Degree in Agricultural Education and Extension at Sokoine University of Agriculture, Morogoro Tanzania. 86pp.
- Odera J. (2004). *Lessons Learnt on Community Forest Management in Africa*. A Report Prepared for the Project; Lessons Learnt on Sustainable Forest Management in Africa. National Museums of Kenya, Nairobi. 46pp.

- O'king'ati, A. and Mvena, Z.S.K. (1992). Forestry Extension Research Needs in Tanzania. In: *Proceedings of Joint Workshop in Forestry Research in Tanzania under SUA (Faculty of Forestry and Nature Conservation Record) and AUN Co-operation, Morogoro, Tanzania*. 116-124.
- Padmanabhan and Aruna M. (2004). *Governing the Use and Conservation of Agricultural Biodiversity Institutional and Gender Analysis of Transition in South India*. Conference on International Agricultural Research for Development Berlin, 5-7 October, 2004. 120pp.
- Pelin, Z. and Cecilia, L. (2006). More than Woods and Women: the Gender Debate in Rural Development Forestry. [<http://www.odi.org.uk/fpeg/publications/greyliterature/Gender/Gender>] site visited on 12/ 6/ 2007.
- Prance, G. S., Ballew, W., Boom, B. M and Camaria, R. J. (1987). Quantitative Ethnobotany and the Case for Conservation in Amazonia. *Conservation Biology* 1: 296-310 pp.
- PRP, (2004). *Hidden Actors, Muted Voices: The Employment of Rural Women in Saskatchewan Forestry and Agri-Food Industries*. [<http://www.swc-cfc.gc.ca/qfsearch/searchserlet?lang>] site visited on 17/ 10/ 2008.
- PRSP, (2008). Annual Implementation Report 2006/2007. Government of Tanzania January 2008. [<http://www.inf.org/external/pubs/cat/longres.cfm?>] site visited on 12/ 8/2008.

- Ryoba, Z. M. (1996). *An Assessment on the Use of Indigenous Soil and Water Management Technologies in Semi Arid Areas: The Case of Mwanga District in Tanzania*. A Dissertation for the Award of Master of Science at Sokoine University of Agriculture, Morogoro, Tanzania, 102pp.
- Sarah, J. (2000). *Environment, Knowledge and Gender*. School of Geography. The University of Nottingham, UK. [<http://www.ashgate.com>] site visited on 8/ 11/ 2009.
- Sarin, M. (1995). *Joint Forest Management in India: Achievements and Unaddressed Challenges*. National Support Group for Joint Forest Management of the Society for Wasteland Development. Chandigarh, India. 288pp.
- SCAPA (1998). *Programme Action Plan and Budget, July 1998 to June 1999*. Ministry of Agriculture and Cooperatives. 87pp.
- SUA (1980). *Management Plan for University Training Forest*. Narok-Laikipoi, July 1980- June 1984. Faculty of Agriculture and Veterinary Science, Morogoro, Tanzania. 45 pp.
- Science Direct (2009). *Gender and Forest Conservation: The Impact of Women's Participation in Community Forest Governance*. *Ecological Economics*: 60(4): 787-796.

- Shivley, G.E. (1999). Consumption Risk, Farm Characteristics and Soil Conservation Among Low Income Farmers in the Philipines. *Agricultural Economics* 17: 165- 177.
- Steel, A. C. (1995). Socio Factors Constraining the Uptake of Technology in Agriculture. A Thesis for Award of Doctor of Philosophy Degree at the University of Newcastle, United Kingdom. 340pp.
- Subba, S. and Babar, A. Z. (2001). *Strengthening Gender Initiative in IFAD Projects: Case Study of Hills Leasehold Forest and Forage Development Project in Nepal (Draft)*. Report submitted to IFAD, Rome, Italy. 112pp.
- Tapati, D. (2006). Gender Justice in the Frame of Joint Forest Management in Indian Context: A Case Study From Nayagram Lock of West Midnapore, West Bengal: Rural Planning and Management Unit, Department of Architecture and Regional Planning, IIT Kharagpur, West Bengal, India.115pp.
- Tengnas, B. (1994). *Agroforestry Extension Manual of Kenya*. International Centre for Research in Agroforestry. English Press, Nairobi Kenya. 68pp.
- Umas, L. (1993). *Analysis and Typology of Indigenous Forest Management in Humid Tropics of Asia*, Wageningen University, The Netherlands. 100pp.
- UNCED (1992). Earth Summit - Rio Declaration & Forest Principles.) [<http://www.fao.org/docrep/W8212E/w8212e00.htm>] site visited on 9/8/2007

United Nations Forum on Forests - UNFF (1990). National Report of India to UNFF-5th session. [<http://www.unff.org/undp/W8212E/w8212e00.html>] site visited on 9/8/2007.

URT (1987). *Village Map of Arusha Region*. Digitized, Edited, Compiled and Printed by Survey and Mapping Division (SMD).smd@intafrica.com. [<http://www.tanzania.go.tz/landuse/paterntanzania1990/district/arumeru.html>] site visited on 20/ 3/ 2008.

URT (1998). *The National Forest Policy*. Ministry of Natural Resources and Tourism, Forest and Beekeeping Division, Government Press, Dar es salaam, Tanzania. 59 pp.

URT (2003). *Population and Housing Census General Report*. Commission of Population Census, Dar es Salaam, Tanzania. [<http://www.tanzania.go.tz/census/census2002/district/arumeru.html>.] site visited on 16/05/2008.

URT (2005). *Guidelines for Participatory Forest Resources Assessment and Management Plan*. Ministry of Natural Resources and Tourism, Forest and Beekeeping Division, Government Press, Dar es salaam, Tanzania. 118pp.

URT (2007). *Community-based Forest Management Guidelines*. [<http://www.nfp.co.tz>] site visited on 4/ 4/2009.

WHRC (2008). World Forest Policy. [http://www.whrc.org/policy/world_forests.htm-fm6] site visited on 20/ 3/ 2008.

Williams, P. J. (1991). NGOs, Women and Forestry Activities in Africa. [<http://www.fao.org/docrep/u7760E>] site visited on 12/ 6/ 2007.

Wily, L. A. (1998). *Devolution: The Critical Institutional Change in Future Resource Management – A Case from the Forestry Sector of Tanzania*. Report submitted to The World Bank/WBI's CBNRM Initiative. 102pp.

Wily, L. A. (2002). *Participatory Forest Management in Africa*. An Overview of Progress and Issues. CBNRM Net Series. [<http://www.forestmanagement.org/cbnrm.html>] site visited on 20/ 3/ 2008.

Wily, L. and Mbaya, S. (2001). *Land, People and Forests in Eastern and Southern Africa at the Beginning of the 21st Century*. In: Forests in the Changing Landscapes, 16 Commonwealth Forestry Conference; Nairobi, Kenya. January 2001. pp 429 – 440.

WMO (2008). The Role of Women in Agricultural Development: How Agricultural Deficiencies Created Social Problems. Meteo World Editor-WMO, Geneva Switzerland. [<http://www.womenanddevelopment.org.html>] site visited on 20/ 3/ 2008.

World Bank (2008). *Gender and Development* [<http://go.worldbank.org/6BPFSQGH10>] site visited on 7/5/ 2008.

Wolff, Franziska (2004). *Legal Factors Driving Agrobiodiversity Loss*. Environmental Law Network International. Richard D. Publisher, Illinois. 213pp.

WRM (2002). Ghana: Ancient Tradition on Community Forest Management. Bulletin No. 60, November 2002. [<http://www.wrm.org.uy/bulletin/60/viewpoint.html>.] site visited on 5/2/ 2007.

WRM (2002). Tanzania: Improving Forest Management Through Joint Management with Communities. Bulletin No 64, November 2002. [<http://www.wrm.orguy/bulletin/64/viewpoint.html>] site visited on 5/ 2/ 2007.

APPENDICES

Appendix 1: Household questionnaire

SECTION ONE: General characteristics information of the households

1. Date of interview.....
 2. Name of enumerator.....
 3. Name of Division.....
 4. Name of village.....
1. Sex of respondent (Head of household)
 - a) Male b) Female
 2. Age of respondent (Head of household).....
 3. Marital status of respondent
 - a) Married b) Not married c) Widow d) Separate
 4. Education level:
 - a) Primary education b) Informal education c) Secondary education d) College education
 - e) Others (specify)
 5. How many people are available for farm work in your house hold plus yourself?
 - a) < 2 b) 2-5 c) 6-8 d) >8
 6. Which trees have the household planted or retained?
 7. Who planted these trees? a) men b)women c) both
 8. Who tends the trees? a) men b)women c) both
 9. Which products do you obtain from trees?
 10. Who owns the products? a) men b)women c) both
 11. Do you sell forest products? (Yes/No). If Yes who gets the money?

a) men b) women c) both

12. Do you experience farm labour shortage in your household?

a) Yes b) No

13. What other activities are you having than crop farming? a) Livestock keeping b) casual labour c) small scale business d) Other, specify.

14. If you keep livestock, what is the number?.....

15. How is land owned in your village?

a) Private b) Communal c) Inheritance d) Other, specify

16. Who makes most of the decisions on land use in your household?

a) Male b) Female c) Husband and wife d) Husband wife and children

17. How many farm plots do you have? a) <2 b) 2-4 c) >4 d)

18. What is your total land area (hectares)... a) <0.25 b) 0.25-0.5 c) 1-2 d) >2

19. Which crops are mostly grown in your fields?

20. Do you get extra farm produce and forest product to the market?

a) Yes b) No

21. What is your monthly income from forest products?

Tshs.....

22. What is your monthly income from crop production?

Tshs.....

SECTION TWO: INSTITUTIONAL CHARACTERISTICS

23. Is there any extension officer serving your village/area on JFM ?

a) Yes b) No c) I don't know

24. If Yes how often does he visit you?

a) Rarely b) Very often c) Most during growing/planting season d) Other specify

25. Has she/he ever advised you on forest activities/practices.

- a) Yes b) No

26. Were the advices given by the extension workers understood?

- a) Yes b) No

27. Does the village government have any by laws about deforestation?

- a) Yes b) No

28. How do you rate the performance of the bylaws?

- a) Effective b) Not effective

29. Is there any cultural belief on tree planting or afforestation in the village?

- a) Yes b) No

30. If yes, what does it state?

.....
.....

31. Are there any socio-economic factors which enable or constrain women participation in JFM in your area?

- a) Yes b) No

32. If yes, please state them

.....
.....

33. Are there any social activities, which interfere with women involvement in JFM?

- a) Yes b) No

34. If Yes state them

.....
.....

35. Are there any social activities, which interfere with men involvement in JFM?

- a) Yes
- b) No

36. If Yes, please state them.

.....

.....

37. Are there any taboos or beliefs about females involvement in JFM activities like tree planting?

- a) Yes
- b) No

38. If yes, please state them.

.....

.....

39. Are there any taboos or beliefs about males involvement in JFM activities like tree planting?

- a) Yes
- b) No

40. If Yes, please state them.

.....

.....

41. What remedial recommendations do you prescribe to improve women involvement participation in JFM in the area?

.....

42. What is the extent of women participation in JFM in this ward? a) active b) moderate c) poor d) non-existent

43. What is the extent of men participation in JFM in this ward? a) active b) moderate c) poor d) non-existent

44. What are your suggestions as regards gender role improvement?

Appendix 2: Checklist for key informants

Regional catchment forest office

- Strategies to improve women involvement in conservation and management of forest resources.
- The general trend of women and men participation in forest activities
- Socio-economic factors constraining or enabling women and men to participate in forest activities
- Cultural factors constraining or enabling women and men to participate in forest activities
- Existing forest management problems and success
- Weakness and strength of JFM and its impact to sustainability of forests
- . Cost and benefit sharing mechanism between government and communities
- General comments on JFM and women involvement

Village leaders

- Importance of involving women and men in JFM
- Village strategies for women and men involvement in JFM
- Socio-economic factors constraining or enabling women and men to participate in JFM
- cultural factors constraining or enabling women and men to participate in JFM
- Suggestions and recommendations.

Village governments and Village Natural Resources Committees (VNRC)

- Current situation of JFM around Mt. Meru Forest Reserve.
- Initiatives and activities of JFM around Mt. Meru Forest Reserve.
- Extent of women involvement in the management of the reserve
- Cost and benefit of JFM
- Extent of women involvement in decision making
- Income generating activities as one of the component of JFM
- Land availability for agriculture and livestock

Appendix 3: Village bylaw draft under JFM strategy

COVER PAGE

LOCAL GOVERNMENT BYLAWS (VILLAGE GOVERNMENTS) NO. 7 OF 1982.

Village government bylaws formulated according to Local Government bylaw No. 7 of 1982, under section 120 (1) and 163

VILLAGE BYLAW ON INVOLVEMENT OF ADJACENT COMMUNITIES IN THE
MANAGEMENT OF CATCHMENT FOREST RESERVES
YEAR.....

*Formulated by villagers ofunder facilitation of District Catchment Forest
Office*

SECTION ONE

1. INTRODUCTION

2. NAME OF THE BYLAW

3 DEFINITIONS

(3.1) National Forest Reserve means...

(3.2) Catchment Forest Reserve means...

(3.3) Village chairperson means...

(3.4) Village executive officer means....

(3.5) Village natural resources committee means...

- (3.6) Chairman of village natural resources committee means...
- (3.7) Secretary of village natural resources committee means.
- (3.8) Members of village natural resources committee means ...
- (3.9) Ward executive officer means...
- (3.10) Forest officer means....
- (3.11) Fishery officer means...
- (3.12) Wildlife officer means...
- (3.13) Agricultural officer means....
- (3.14) Beekeeping officer means...
- (3.15) Patrol crew means...
- (3.16) Forest products means...
- (3.17) Trees means...
- (3.18) Livestock means...
- (3.19) Forest permits means ...

4.0 VILLAGE BOUNDARIES

5.0 SUPERVISORS AND IMPLEMENTERS OF THE BYLAW

SECTION TWO

6.0 SETUP AND RESPONSIBILITIES OF FBD, VILLAGE GOVERNMENTS, VARIOUS VILLAGE COMMITTEES AND VILLAGE LEADERS.

SECTION THREE

(7.0) FINES, FEES, AND THEIR USES

(7.1) Fines, various income sources from the forest and uses of fines and other income sources

(7.1.1) Fines

(7.1.2) Various income sources

(7.1.3) Uses of fines and other income from various sources

8.0 PERMITTED FOREST PRODUCTS USES WITHIN AND OUTSIDE THE FOREST RESERVE

9.0 NON-PERMITTED USES OF FOREST PRODUCTS FROM THE FOREST RESERVE

10. FOREST PRODUCTS USES THAT REQUIRE PERMIT AND FEE FROM THE FOREST RESERVE

11. FOREST PRODUCTS USES THAT REQUIRE PERMIT AND FEE FROM OUTSIDE THE FOREST RESERVE

12.0 FINES. Fines for doing the following activities inside the forest reserve

12.1 Cattle grazing

12.2 Goat grazing

12.3 Donkey grazing

12.4 Sheep grazing

12.5 Collection of stones, gravels, soil, mines

12.6 Farming

12.7 Debarking standing trees

12.8 Collection of roots

12.9 Burning

12.10 Smoking

12.11 Collection/harvesting of honey using fire

12.12 Degradation of rivers banks and destroying of water sources

12.13 Charcoal harvesting

12.14 Felling of standing trees for: timber, building poles, withies, and collection of traditional medicines.

12.15 Felling sacred trees and destroying ritual sites

12.16 Settlement establishment

13.FEE FROM ECOTOURISM, EDUCATION, RESEARCH AND RECREATIONAL

14. FINES. Fines for doing the following activities outside the forest reserve without permit

14.1 Deforestation for settlement and agriculture

14.2 Felling of standing trees or harvesting of dead tree for timber

14.3 Debarking standing trees

14.4 Burning the forest

14.5 Cultivating along or nearby river banks and water sources

15. USES FOR DEAD TREES – There will be given priorities for harvesting dead or fallen trees. The priorities will go for:

15.1 Village developmental activities

15.2 Community developmental activities

15.3 Religious and government institutions

15.4 Disabled among villagers

SECTION FOUR

16. DATES AND STATEMENT OF APPROVAL BY VILLAGE ASSEMBLY

17. APPROVAL BY VILLAGE CHAIRMAN AND VILLAGE EXECUTIVE OFFICER

18. SIGNATORIES, APPROVAL AND DATE FOR USE OF THE BYLAW

Appendix 4: Socio-economic characteristics of respondents in the study area

Socio-economic attributes		Ilkiding'a	Poli	Overall
Sex	Male	45 (77.6)	41(75.9)	86 (76.8)
	Female	13 (22.4)	13(24.1)	26 (23.2)
Age	<30	7 (12.1)	0 (0.0)	7 (6.3)
	30-40	10 (17.2)	17(31.5)	27(24.1)
	41-50	13 (22.4)	16(29.6)	29(25.9)
	51-60	14 (24.1)	10(18.5)	24(21.4)
	>60	14 (24.1)	11(20.4)	25(22.3)
Marital status	Married	46 (79.3)	41(75.9)	87(77.7)
	Not married	0 (0.0)	1 (1.9)	1(0.9)
	Widow	11 (19.0)	10(18.5)	21(18.8)
	separate	1 (1.7)	2(3.7)	3(2.7)
Education	primary	27(46.6)	34(63.0)	61(54.5)
	informal	22(37.9)	7(13.0)	29(25.9)
	secondary	7(12.1)	5(9.3)	12(10.7)
	college	2(3.4)	8(14.8)	10(8.9)
Products obtained	Fuel wood	56(96.6)	50(92.6)	106(94.6)
	Poles	2(3.4)	4(7.4)	6(5.4)
Number of farm plots	<2	0 (0.0)	3 (5.6)	3 (2.7)
	2-4	53 (91.4)	48(88.9)	101(90.2)
	>4	5 (8.6)	3(5.6)	8 (7.1)
Total land area (hectares)	<1	18(31.0)	13(24.1)	31(27.7)
	1-3	33(56.9)	37(68.5)	70(62.5)
	3.1-5	6 (10.3)	3 (5.6)	9 (8.0)
	>5	1 (1.7)	1(1.9)	2 (1.8)
Availability of extension services	Yes	52(89.7)	47(87.0)	99(88.4)
	No	5 (8.6)	6 (11.1)	11(9.8)
	Not sure	1 (1.7)	1 (1.9)	2 (1.8)
Frequency of visit by extension workers	Rarely			
	Very often	41(73.2)	37(75.5)	78(74.3)
	Mostly during	0 (0.0)	1 (2.0)	1(1.0)
	growing/planting season	15 (26.8)	11(22.4)	26(24.8)
Advices on JFM	Yes	55(98.2)	46(93.9)	101(96.2)
	No	1(1.8)	3(61.1)	4(3.8)
Presence of bylaws on deforestation	Yes	58(100)	53(98.1)	111(99.1)
	Not sure	0(0.0)	1(1.9)	1 (0.9)
Effectiveness of the bylaws	Effective	54 (93.4)	46(85.2)	100(89.3)
	Not effective	4 (6.9)	8 (14.8)	12(10.7)
Labour shortage	Yes	7(12.1)	17(31.5)	24(21.4)
	No	51(87.9)	37(68.5)	88(78.6)
Understanding of advices given by extension workers	Yes	56(100)	47(97.9)	103(99.0)
	No	0(0.0)	1(2.1)	1(1.0)

Figures in parentheses are percentages and those out of parentheses are frequencies.