

**THE ROLE OF COMMUNICATION, EDUCATION AND PUBLIC AWARENESS
RAISING ON COMMUNITY PARTICIPATION IN FOREST MANAGEMENT IN
MUFINDI DISTRICT, TANZANIA**

BY

MANYISYE KIBONA MPOKIGWA

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN
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ABSTRACT

A study was carried out to investigate the role of Communication, Education and Public Awareness raising (CEPA) on community participation in forest management in Mufindi District. The specific objectives were: To identify existing CEPA materials/channels and assess level of awareness on community participation in forest management, to determine the influence of CEPA and socio-economic factors on community participation in forest management, to compare community participation in forest management between government-facilitated villages and those facilitated by TFCG an NGO. A total of 120 households were randomly selected from four villages implementing CBFM namely Tambalang'ombe, Igombavanu, Ihanu and Mtwango. Primary data were collected using household questionnaires, checklist for key informants, participant observation, PRA techniques and field observations. Secondary data were collected through literature search. Data collected using PRA was analyzed by involving group discussion with local communities. Qualitative data and information from key informants was analysed using content and structural-functional techniques. The Statistical Package for Social Sciences (SPSS) software was used to analyze quantitative data. Multiple regression model was used to explore the relationship between community participation in forest management and CEPA and socio-economic factors. Results showed that existing CEPA materials/channels in the study villages were posters, meetings, seminars, video shows and radios. CEPA showed statistically significant ($P < 0.05$) and positive influence on community participation in forest management and socio-economic factors like education level of respondents had positive and statistically significant ($P < 0.001$) while household annual income was negatively statistically significant ($P < 0.01$). Socio-economic factors i.e. duration of residence, household land ownership and availability of extension agents were positive but statistically insignificant on community participation in forest management.

The study concluded that CEPA had positive significant role on promoting community participation in forest management and recommended that in order for any intervention on community participation to be successful, CEPA and socio-economic factors should be considered.

DECLARATION

I, Manyisye Kibona Mpokigwa do hereby declare to Senate of Sokoine University of Agriculture that the work presented here is my original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

Manyisye Kibona Mpokigwa

(MSc. Candidate)

Date

The above declaration confirmed

Prof. S. Iddi

(Supervisor)

Date

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DEDICATION

This work is dedicated to my beloved parents Mpokigwa Kibona and Talani Mbukwa who laid the foundation of my education, my beloved daughter Glory and son Elias who at their tender age missed my love during the period of study.

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As in many countries in Africa, for a long time forests and woodlands in Tanzania have been managed without full participation of the local communities that live near the resources (Iddi, 2002). Currently, there is growing recognition in many countries in Africa (and elsewhere) that forest management succeeds best where communities living close to the forest are involved in the management process (FBD, 2005). Currently, different countries e.g. Namibia, Mozambique, Malawi and Kenya involve communities in forestry management. They realize that without the participation of the communities living near and around the forests, no programme for sustainable management of forest can succeed (Njana, 1998).

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LIST OF ABBREVIATIONS AND SYMBOLS

CBFM	-	Community Based Forest Management
CBOs	-	Community Based Organizations
CEPA	-	Communication, Education and Public Awareness
Ext.	-	Extension
FAO	-	Food and Agriculture Organization of the United Nations
FBD	-	Forestry and Beekeeping Division
GDP	-	Gross Domestic Product
GEF	-	Global Environmental Facility
FGD	-	Focus Group Discussions
FM	-	Forest Management
For	-	Forestry
FRMP	-	Forest Resources Management Project
ha	-	hectare
HQ	-	Head quarter
IUCN	-	World Conservation Union
JFM	-	Joint Forest Management
LGA	-	Local Government Authority
MBEC	-	Ministry of Basic Education and Culture in Namibia
MNRSA	-	Management of Natural Resources for Sustainable Agriculture
MNRT	-	Ministry of Natural Resources and Tourism
MTC	-	Mufindi Tea Company
NBKP	-	National Beekeeping Programme
NGOs	-	Non –Governmental Organizations
NFP	-	National Forest Programme

NEMC	-	National Environmental Management Council of Tanzania
NR	-	Natural Resources
NTN	-	National Theatre of Namibia
NR	-	Natural Resources
PFM	-	Participatory Forest Management
PMO-RALG	-	Prime Minister Office-Regional Administration and Local Government
PORECO	-	Poverty Reduction and Environmental Conservation
PRA	-	Participatory Rural Appraisal
SFM	-	Sustainable Forest Management
SNAL	-	Sokoine National Agriculture Library
SUA	-	Sokoine University of Agriculture
TAF	-	Tanzania Association of Foresters
TAFORI	-	Tanzania Forestry Research Institute
TBC	-	Tanzania Broadcasting Cooperation
TFCG	-	Tanzania Forest Conservation Group
TZS	-	Tanzanian Shilling
TV	-	Television
USD	-	United State of America Dollar
VEOs	-	Village Executive Officers
VNRC	-	Village Natural Resources Committee
VLFR	-	Village Land Forest Reserve
WWF	-	World Wide Fund for Nature

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

It was estimated that in 2005, Tanzania mainland had 35.3 million hectares (ha) of forests representing about 40% of total land area (FAO, 2009). The total forest area includes natural forests, plantations and woodlands.

The forest sector provides significant contribution to the economy. According to MNRT (2008a), the combined annual value of forest goods and services is estimated to be USD 2.2 billion, which is equivalent to 20.1% of Gross Domestic Product (GDP) based on 2006 prices. The sector's contribution to the economy is increasing at a very fast rate due to increasing demand for forest goods and services and persistent reliance on wood fuel. Wood fuel is the main source of energy in rural and urban areas. More than 90% of the total energy consumption in the country is from wood (MNRT, 2009). The per capita consumption of wood fuel is estimated to be one cubic meter of round wood per annum. Moreover, the sector provides about 3 million person-years of employment (MNRT, 2008a). Employment is provided through forest industries, forest plantations, government forest administration and self-employment in forest related activities.

The contribution of the forest sector to the economy is however underestimated because of unrecorded consumption of other forest products e.g. wild fruits and vegetables, herbal medicine, thatch grasses, and services such as catchments and biodiversity values (MNRT, 2008a). The National Forest Policy of 1998 acknowledges that there is poor understanding of the tangible and intangible values of forest ecosystem products and services (URT, 1998).

Natural forests and woodlands play an important role in supplying different products to meet the livelihoods of local communities. Monela *et al.* (2000) found that households living in miombo woodlands of Tanzania derive more than 50% of their cash incomes from selling forest products such as honey, wild fruits, charcoal and firewood. Moreover, MNRT (2008a) reported that while agriculture provides the most important source of income to households, in communities implementing CBFM, forests and woodlands generate between 10 – 25% of annual income.

Despite the importance of the forest sector to the national economy and livelihood of rural and urban communities, most of reserved forests and those in general lands have experienced unsustainable use leading to deforestation estimated at 412 000 ha per annum between 1990 and 2005. This is equivalent to 1.1% of the country's total forest area (FAO, 2009). The main direct causes of deforestation are clearing for agriculture, wildfires, charcoal making, persistent reliance on wood fuel for energy and lack of efficient production and marketing, over-exploitation of wood resources and lack of land use plans and non-adherence to existing ones. However, the underlying causes of deforestation are rapid population growth, poverty, policy and market failures (URT, 2009).

1.2 Forest Resources Management in Tanzania

In terms of ownership, Tanzania's forests are classified as government (national and local) forest reserves, general land forests, community/village land forest reserves, and private forests. National forest reserves that consist of productive and protective forests are owned and managed by the central government through the FBD under the MNRT. Local government forests consist of productive and protective forests managed by Local Government Authorities (LGAs), which are under the Prime Minister's Office, Regional

Administration and Local Government (PMO-RALG). Most of them are highly degraded due to poor control, shortage of workers, corruption and financial constraints (Kajembe and Kessy, 2000).

Forests on general lands are protected under the Forest Act CAP 323 [R.E of 2002] only as far as nobody is allowed to harvest trees for commercial purposes without a license. Felling by local people for home consumption and clearing for agriculture or other purposes is allowed. Practically, the management of forests on general lands is almost non-existent. Due to lack of proper management, the forests on general lands can be considered to be under open access regime as they are easily accessible for various uses. Resources under open access regimes are available to everybody and therefore unlikely to draw out investment in maintenance or protection (Bromley, 1992).

For many decades, Tanzania's forest resources have been controlled by the state with management policies being characterized by centralized decision-making processes. State ownership of forests in which the people were kept out of the resources has been a dominant feature of the Tanzania forestry programmes. This management system did not lead to proper protection of the forests as illegal harvesting continued (Luoga *et al.*, 2005). The reason behind is that, the government faced weak financial and human resources capabilities to manage forests resources to meet the increasing demand for forest products and services (FBD, 2003).

The National Forest Policy (URT, 1998) clearly recognises the role of government, private, and local communities as stakeholders in forest resources conservation. Therefore, Tanzania is now engaged in a new paradigm where participation of stakeholders at local and national level is a central strategy in forest management through Participatory Forest

Management (PFM) (MNRT, 2001). According to Blomley and Ramadhani (2005), PFM is taking place around the country as a strategy to improve management of forest resources, local livelihoods and governance.

There are two approaches to PFM. These are Community Based Forest Management (CBFM) and Joint Forest Management (JFM). It is estimated that 1 780 000 ha of forests (mostly montane and mangrove forests) which represents 12.8% of the forest area under Central and Local Governments are covered by JFM (MNRT, 2008b). A total of 2 345 000 ha of forests that represent 11.6% of unreserved forests are under CBFM (MNRT, 2008b). They were reported that PFM has led to improvements in forest condition including regeneration, increased water flow and reduced illegal activities such as encroachment and illegal harvesting in various places (Ibrahim, Mustalahti, 2007; Raphael and Swai, 2009). However, to enhance local communities to participate fully in sustainable forest management (SFM), Communication, Education and Public Awareness (CEPA) are crucial.

1.3 Communication, Education and Public Awareness

CEPA are important tools in motivating and mobilizing individuals to build interest in and adopt any innovations (Hesselink, 2007). They comprise a range of social instruments including information exchange, dialogue and education. Moreover, CEPA are one of the major techniques available to forest management that play a significant role in bettering understanding among the people living adjacent to forests about the importance of SFM. It has been suggested that the greatest and most depressing problem in forest conservation is not habitat loss or overexploitation but human lack of concern to these problems (Balmford, 1999).

In Tanzania, the National Forest Programme (NFP) emphasizes on the need for awareness creation in forest management among all stakeholders to ensure effective involvement in the implementation of the National Forest Policy and Forest Act. The FBD is responsible for preparing guidelines to help improve the communication and coordination system in implementing the National Forest Policy to ensure that communities are well informed and therefore participate fully.

The National Communication Strategy to support the implementation of NFP indicates that, building capacity for implementation at local level must go hand in hand with communication efforts and education to increase acceptance and demand (FBD, 2004).

1.4 Problem Statement and Justification

Over the past decade, there have been considerable efforts made by FBD, civil societies and NGOs to implement the National Forest Policy of 1998, NFP of 2001 and enforcing the Forest Act CAP 323 [R.E of 2002], Forest Regulations of 2004 and PFM guidelines of 2006. One of the main objectives of these instruments concerning forest management is to encourage local communities to manage forests within their villages, general lands and government forest reserves through PFM. Robinson and Maganga (2006) identified improved communication as a critical element of the national PFM process to create demand at the local level and improve efficiency of forest management. However, communication only is not enough; education and public awareness are needed too. Paulo *et al.* (2007) revealed that, community involvement in forest management needs to be enhanced through increasing awareness, education and empowerment.

CEPA efforts in Tanzania started in the 1980s through several extensive campaigns with slogans such as “*MISITU NI MALI*” (Forests are wealth) “*MOTO NA MAZINGIRA*” (Take precaution against forest fires) and “*MISITU NI UHAI*” (Forests are life) in community

forestry projects. Others were “*HIFADHI ARDHI SHINYANGA*” (HASHI) (Soil Conservation in Shinyanga) “*HIFADHI ARDHI DODOMA*” (HADO) (Soil Conservation in Dodoma) and “*HIFADHI YA MAZINGIRA*” (HIMA) (Environment Conservation in Iringa region). In Mufindi district, as in other areas in Tanzania, provision of CEPA through various media to promote community participation for SFM started in the 1980s (Mufindi District Council, 2006). However, to what extent CEPA have played a role on adoption of community participation in forestry in the district is not known. Therefore, this study aimed to fill this gap. Findings from this study will contribute to the understanding of the role of CEPA on community participation in forest management and use that understanding in planning, implementing and scaling up of PFM in the district and in the country at large.

1.5 Objectives of the Study

1.5.1 Overall objective

The overall objective was to assess the role of communication, education and public awareness raising on community participation in forest management in Mufindi district, Iringa region.

1.5.2 Specific objectives

The specific objectives of the study were:

- i. To identify existing CEPA materials/channels and assess the level of awareness in the community on participating in forest management in Mufindi district
- ii. To determine the influence of CEPA and socio-economic factors on community participation in forest management in Mufindi district
- iii. To compare community participation in forest management in villages where Government through PFM implements CEPA and in those areas where CEPA is implemented by an NGO.

1.6 Research Questions

- i. What are the CEPA materials/channels on community participation in forest management used in Mufindi district?
- ii. To what extent are communities in Mufindi district aware of community participation in forest management as a result of CEPA?
- iii. To what extent do CEPA and socio-economic factors influence community participation in forest management in the district?

1.7 Limitations of the study

- i. Inaccurate farm sizes

It was difficult to obtain information on the actual sizes of farms. The respondents' farms have never been measured. In such cases, the sizes of the farms were determined by estimation.

- ii. Difficulties in memory re-call by respondents

Some socio-economic data was based on memory (recalling) of the respondents. It was difficult for them to remember some issues such as household's annual income. This problem was resolved through triangulation such as asking the same question more than once in different ways. Manyika (2000) stresses that, information based on memory cannot be reliable but if no records exist, it may be the only way to get at least an idea of change.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Communication, education and public awareness

Danicom (2002) defined Communication, Education and Public Awareness as follows:

- (a) Communication is an exchange of information and ideas among all stakeholders. It promotes dialogue and feedback and increases understanding between the various actors.
- (b) Education is a process of facilitating learning to enable audiences to make rational and informed decisions and to influence behaviour over a long term.
- (c) Awareness is an agenda setting and advocacy exercise that helps people to know technical information and facts.

CEPA are tools that make the concept of forest management and its importance to be well understood. Good communication, education and public awareness are believed to be important for conveying appropriate messages to various stakeholders and allow them make informed decisions on forest management and the use of forest resources in ensuring SFM in a participatory manner (FBD, 2005).

According to Sutherland (2000), there are five common objectives of a CEPA programme.

These are:

- Encouraging a general interest in forest management;
- Generating greater awareness of forest management issues;
- Bringing about a specific change in opinion;
- Disseminating specific information; and
- Building capacity.

In this way, these tools are a valuable asset for the realization of sustainable forest management.

2.1.1 Effective Communication

Effective communication means tailor-made programming designed for the situation, time, place and audience. Effective communication is key to effective forest extension services.

According to Rutatora (1995), communication has the following main purposes:

- To bring about interpersonal understanding (avoid mis-information);
- To motivate people, to reduce ill –feelings and tension;
- To reduce communication breakdown, to facilitate personal and group evaluation;
- To implement new concepts and technologies ;
- To accomplish organizational tasks or goals;
- To create conducive interactions;
- To build trust, to understand human and group behaviour; and
- To facilitate creation of awareness.

Moreover, the author indicated that in order to ensure effective communication one has to have a careful understanding of the communication process and the methods used that consist of four fundamental elements:

- Communicator;
- Message to be communicated;
- Means of communication (channel); and
- Receiver of message.

It is not enough for the extension worker to be well informed of the latest improvements and new interventions in forest management, but the important step is the communication of this information to various stakeholders (Kauzeni, 1988). Furthermore, the author indicated the following major means and methods of communication:

- (a) Personal or individual contact (face to face contacts (visits) and telephone call);
- (b) Group methods (meetings, seminars, demonstrations, video shows and field study tours); and
- (c) Mass media methods (radio broadcasts, TV, posters, newspapers, newsletters, leaflets/brochures and letters).

Effective communication is a complicated process involving many social and economic factors. It has been a challenge for many countries. The communicators need to consider not only what to communicate but especially how to communicate it, choice of media and effective presentation (Hesselink, 2007). According to Rutatora (1995), there are four major sets of factors that influence the communication of information/ideas/practices:

- (a) Communicators- the ranges of communication methods/techniques and how well each method is used;
- (b) The type of the receiver of the message (individual knowledge, attitudes, beliefs and occupation status);
- (c) The situation realities (land, labour, capital and services facilities); and
- (d) Institutional realities (human resources, technology, rules, markets and media).

There is need for a clear and effective communication between FBD and all stakeholders so that the stakeholders are well informed about the strategies to be employed in implementing the National Forest Policy through NFP. Clear and effective communication

between FBD and all stakeholders is crucial for the successful implementation of NFP and NBKP (Iddi, 2003).

Danicom (2002) pointed out that communications should flow in different directions – up, down and horizontally as follows:

- (a) Upwards communications include all forms of consultations and demands from the involved participants;
- (b) Downwards communications include provision of needed facts and information related to PFM, enabling the stakeholders to act; and
- (c) Horizontal communications involve people talking to peers: farmer-to-farmer methodologies, community meetings, networks, etc.

Communications can be facilitated through a range of media such as meetings, networking, person-to-person contacts, interactive radio, video, drama, posters, leaflets etc, and most effectively when using a combination of the various media (Juma, 2003).

This depends on what should be achieved by the messages to be channeled, who the receivers are, the number of participants involved, what the available and most appropriate means of communications are at the various levels and which can most effectively channel the communications upwards, downwards and horizontally, and finally the available resources (Juma, 2003).

FBD (2004) identified several important communication challenges with respect to implementation of NFP. The challenges include:

- (a) Low demand for PFM at local level;
- (b) Low level of knowledge of the framework for PFM; and

- (c) Weakness in the capacity for implementation within districts due to lack of ability to communicate effectively with local communities the radical change in National Forest policy.

A study by Robinson and Maganga (2009) indicated that effective communication among different stakeholder groups could help reduce mismatches in perceptions that can cause problems in the long-term implementation of PFM. Effective communication is extremely difficult to achieve without feedback about how the receiver interprets the sources of message. Pre-testing mass communication message can give useful information on which to base message changes if necessary. An extension agent must pay close attention to audience reaction during group discussions and lectures, as one way communication usually has little effect.

2.1.1.1 Communication strategies

A strategy can be defined as a systematic, well-planned series of actions, combining different methods, techniques and tools, to achieve an intended change or objective utilizing the available resources within a specific period. Similarly, a communication strategy is a well-planned series of actions aimed at achieving certain objectives using communication methods, techniques and approaches (FBD, 2006).

A communication strategy used to address the communication related problems that deal with issues regarding people's participation, perceptions, adoption of innovation and change of behaviour. These kinds of problems are generally concerned with change in awareness, knowledge, attitudes and practices or with factors concerning participation (FBD, 2004).

The aim of communication strategies is to provide appropriate messages to various stakeholders that allow them to make informed decisions on the management and utilization of forest resources. It provides guidance on how practitioners can engage strategically in conserving forests through communication, education and the sharing of information (FBD, 2005).

The National Forestry Communication Strategy to support the implementation of NFP indicated that capacity building for implementation at local level must go hand in hand with communication efforts to increase acceptance. Furthermore, the communication strategy must address the fact that communication activities should lead to a uniformly high level of awareness of NFP at local level.

2.1.1.2 Communication and adoption of innovations

Communication of new ideas/innovations is referred to as diffusion of innovations. In order to communicate effectively, there must be common understanding of the message /information between the sender and the receiver. According to Ruheza (2003), adoption is a decision to make full use of a specific innovation as the best course of action available at that particular time. Individuals seldom engage themselves in a message about an innovation unless they feel a need for the innovation and the relevance of that innovation in addressing the perceived needs based on their attitudes and beliefs (Roger, 1995).

Communication methods using different channels are vitally involved in many aspects of the individual's decision-making process. Some innovations such as forest management are adopted so slowly or rejected outright, in spite of their obvious advantages, such as contribution of forests to supply wood products, water, food, fodder, medicine, fuel, shelter, employment, and recreation, these advantages are not enough to contribute to its

adoption (Ruheza, 2003). The author suggested that there are several socio-economic, communication and technical factors that influence people's adoption of innovations such as education level, age, communication channels and complexity of the technology to mention few.

It should also be noted that, farmers respond differently to different channels of information. Communication channels also have different influence to the receiver either to adopt or reject the innovation. For example, a study by Hamad (1996) revealed that rural people in most of the developing countries believe in messages that are written in press or broadcasted through radios or TV. The concept here is that, they think the message is important and credible and this aids the adoption of the message.

Receivers of innovations also respond differently to different sources of information that determine their decision on whether to adopt or reject an innovation (Ruheza, 2003). This suggests that, change agents should use appropriate media, at appropriate times to a specific target audience to deliver well-organized information, in order to maximize the adoption of the intended innovation.

A study by Roger (1995) suggested that there is several socio-economic, communication and technical factors that influence people's adoption of innovation and that in order for communication to take place, there must be common understanding of the message /information between the sender and the receiver.

2.1.2 Education

Education is tools that can make people manage resources properly including forestry. According to Rutatora (1993), through education the community may know the rationale

for taking care of their environment. There are at least three types of roles that forestry education could play in promoting community participation in forest management. These are advocacy, information/ knowledge generation, and capability building (FAO, 2003). Forestry education should include the development of social skills necessary for foresters as advisers to forest users and as participants in dialogue with various stakeholders. According to Mustalahti (2007), participating communities need to have access to required technical information on forest management and conservation such as land tenure as well as market information and market access so as to manage forest resources sustainably.

Education should help the people to attain the immediate objectives that they consider as most important. One of the schools of thought on forestry projects states with some justification that “people will not take effective action on projects that are forced upon them by interested outsiders”. The people appreciate the projects and see clearly that they are going to reap some tangible benefit from the efforts they put into them (FAO, 2003).

For effective channeling of information and education dissemination in Tanzania, FBD should produce popular versions of NFP/NBKP documents and accompanying extension and publicity materials such as newsletters, brochures, posters, and video shows and employ them to raise awareness (Juma, 2003).

The importance of printed materials has generally been recognized in many developed and developing countries; they were found to be useful sources of information and used for communication (Mbwana, 1995). These publications such as environmental extension leaflets, pamphlets, bulletins, magazines, newspapers and some books are useful media for information dissemination. Nevertheless, their effectiveness is affected by financial constraints that lead inadequate production of materials. Moreover, the contents of some

materials are not relevant to farmers while some are written in English that is not understood by farmers (Mbwana, 1995).

2.1.3 Public Awareness

According to MNRT (2002), HASHI Project has carried out awareness raising on forest management among stakeholders as a process of creating a sense of concern for the people to become proactive on issues pertaining to environmental management. NFP shows that there is a need for strengthening extension services to all stakeholders to ensure effective involvement in terms of creating awareness on the national forest policy and Forest Act for SFM (MNRT, 2003). This is done by preparing and disseminating information packages for stakeholders and politicians on the role of forestry (MNRT, 2001). Moreover, the author indicated that awareness is also poor in communities that have not had exposure to PFM, which in turn means weak demand for and slow uptake of PFM interventions. Thus, in most cases the initial stages of PFM interventions need to be supply driven in order to generate awareness in and appreciation by the community.

According to Ministry of Basic Education and Culture (MBEC) (2001), in Namibia, the government provides local communities with extension materials on Integrated Forest Fire Management to enhance their awareness regarding the environment and the effects of fire. They prepare basic training programme and appropriate extension materials for local communities to enhance their awareness on the importance of forest resources.

This includes Billboards (English and local languages), posters, car stickers, newsletters and video. Another method that they used was to develop Fire Drama Plays with local units (Community Theatres) of the National Theatre of Namibia (NTN). It involves the Chief Cultural Officer in each region to support the Forest Fire Extension work and

cooperate closely with MBEC in carrying out fire education in local schools for students and their teachers.

2.2 Community Participation in Forest Management

Community participation is the process "whereby people act in groups to influence the direction and outcome of development programmes that will affect them." Participation may be thought of as the deliberate action of the people and government to respond jointly in the formulation, planning and implementation of a strategy to satisfy a particular need (Paul, 1987).

As in many countries in Africa, for a long time forests and woodlands in Tanzania have been managed without full participation of the local communities that live near the resources (Iddi, 2002). Currently, there is growing recognition in many countries in Africa (and elsewhere) that forest management succeeds best where communities living close to the forest are involved in the management process (FBD, 2005). Currently, different countries e.g. Namibia, Mozambique, Malawi and Kenya involve communities in forestry management. They realize that without the participation of the communities living near and around the forests, no programme for sustainable management of forest can succeed (Njana, 1998).

Involvement of local communities in forest management is seen as the only option where the government faces a severe shortage of staff and financial resources to manage forests, particularly where population pressure on forests is increasing. The costs of forest management are very high if local communities are not involved (Kigula, 2007). Under PFM, various activities are shared with the communities, hence, costs are minimized (Kigula, 2007). The author added that however, participation is still largely seen as a

means to achieve externally-desirable goals, meaning that whilst recognizing the need for people's participation, many conservation professionals place clear limits on the form and degree of participation that they can allow in forest management.

People's participation is said to occur when they effectively sustain programmes/ projects that are desired and utilized by the people after external support is phased out. However, despite the fact that people's participation is going on in forest management in Tanzania, there is clear evidence that the performance in many areas is not encouraging and genuine participation is far from reality (Kajembe and Mwaseba, 1994). However, community participation in any new intervention depends on various factors including communication means, flow of information exchange, awareness creation and local communities themselves (Rutatora, 1995).

2.3 Socio-economic Factors Influencing Community Participation in Forest Management

Socio-economic factors refer to economic, social and institutional patterns and their linkages that compose the context to development (Huisinga, 1997). Factors influencing participation as identified by Ashlyly *et al.* (1989) include education level, age, community awareness about a programme, extension contact, traditional practices, availability of extension agents, land and tree tenure, institutional characteristics and level of wealth.

Newmark (2002) observed that in Africa and elsewhere natural resources projects have failed because socio-economic factors were inadequately considered. Moreover, participation in forest management is based on the socio-economic characteristics of individuals and levels of participation are determined by the benefit obtained from the

forest (Maskey *et al.*, 2003). Furthermore, a study by Mustalahti (2007) indicated that “No forestry without poverty reduction in Vietnam” means that communities can only participate in the sustainable management of forest resources when there are adequate alternatives for income generation.

2.4 Forest Extension

Forest extension is a process of helping communities to make their own decisions by increasing the range of options from which they can choose, and helping them to develop insight into the consequences of each option (Danicom, 2002). The forest extension approaches that have been adopted in Tanzania can be grouped into three: Mass approach (Radio, TV, and newspapers newsletters), Group approach (meetings, seminars, field visits) and Individual approach (personal contact) (Matiko, 2003).

The National Forest policy (URT 1998) mentioned forest extension services to be a prerequisite for the promotion of SFM. This is reflected Policy statements numbers 35 and 36 state that:

Policy statement (35): *To ensure increased awareness and skills acquisition amongst the people on sustainable management of forest resources, forestry extension services will be strengthened.*

Policy statement (36): *Forestry related extension messages delivered by different natural resources management and other related actors will be harmonized through integrated planning, research and training.*

In order to implement these policy statements, the following directions are given:

Statement directions

To ensure increased awareness and skills amongst the people on conservation, management and utilisation of forest resources, the capability of the forestry extension service will be strengthened. Extension efforts will be directed towards SFM of forest reserves. In order to have efficient and effective extension service, cross-sectoral coordination will be promoted. This will be achieved through integrated extension planning, increased input of forestry extension in other services through in-service-training of the extension staff, coordinated on-the-spot advice, farmer-to-farmer extension and other approaches as appropriate. The extension messages will be designed jointly and in a gender sensitive manner (URT, 2009).

Forestry extension curriculum will be reviewed towards SFM. Extension packages for different geographical areas and ecological zones will be developed in close collaboration with the respective users. Involvement of NGOs, CBOs and other institutions in forestry extension activities through coordination, training and preparation of extension materials will be further promoted (URT, 2009).

Forest Resources Management Project (FRMP) (1996) indicated that communities seek information not only from their extension agent, but also from a range of sources, including their own experiences and their colleagues to develop what they need. Extension agents can help communities with their decision making on their pathways towards gaining knowledge as well as their pathways towards choice. People acquire their image of the reality in which they live by:

- Learning from their own experiences;
 - By observing other people's experiences;
 - By talking with other people about their experiences and about research findings;
- and

- By thinking about information, they have gained in these ways.

According to Mustalahti (2006), in order to implement PFM, one of the essential tools the communities need to be empowered with is access to forest extension services to support them to carry out PFM activities. The extension agents' role is to promote and supplement this learning process. In doing so they will improve their own image of reality by learning from the farmers. A study by Kajembe and Mwaseba (1994) showed that farmers have a lot of indigenous knowledge about trees and forests. Therefore, it is important for the extension agents to start from this knowledge base.

Different methods are used in extension services to ensure that forestry information and research results reach communities. The methods include personal contacts, group methods such as meetings, seminars, field visits and environmental exhibitions. Other methods include books, leaflets, magazines, posters, and newspapers as well as audio visuals i.e. radios, videos, film slides and TV (Matiko, 2003). The only problem with extension services is few extension agents especially in the districts. Therefore, communities do not get adequate extension services. Furthermore, the few extension agents available do not have adequate and reliable transport to reach farmers in remote areas (Danicom, 2002). Kajembe and Mwaseba (1994) noted that forest extension agents and other extension agents from other fields seldom visit the villages studied.

2.5 NGOs Involvement in Forest Extension

The government of Tanzania realises that for effective environmental conservation to occur, critical services need to be coordinated. The services include extension, training, research, input supply, credit and marketing. NGOs and Community Based Organisations (CBOs) in the field of forestry represent a potentially effective channel to reach farmers and communities with extension advice and other incentives (URT, 2009).

Involvement of NGOs is also reflected in statement no. 37 of the National Forest policy

Policy statement (37): *Coordination and cooperation between the forest sector and NGOs and CBOs will be promoted in order to avoid overlap, conflict or duplication of interventions.*

The directions on implementation of the statement are as follows:

Coordination between the forest sector and NGOs and CBOs will be promoted. An up to date list of NGOs and CBOs will be maintained. Establishment of NGOs and CBOs in the field of forestry will be encouraged in collaboration with relevant authorities. NGOs and CBOs participation in the preparation of forest-related plans and programme will also be encouraged. Moreover, NGOs and CBOs will be encouraged to increase self-financing in order to ascertain their sustainability (URT, 2009)

The efforts of the government are supported by NGOs and development partners who provide an important contribution to PFM development in the country (MNRT, 2009). Some NGOs that are participating in forestry development in Tanzania are TFCG, WWF, TAF and IUCN.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Materials

3.1.1 Location of Mufindi district

Mufindi District covers 7122 km² and lies between 8° 00' - 9° 15' S and 34° 35'–35° 55' E. with an altitude of 1600 – 2200 metres above sea level (Mufindi District Council, 2006). It is one of the seven districts of Iringa region, in southern highlands of Tanzania. Administratively, the district is divided into 5 divisions namely Ifwagi, Sadani, Kibengu, Kasanga and Malangali, 28 wards and 132 villages. The district borders Iringa rural district in the North, Kilolo district in North-east, Njombe district in the South, Kilombero in the South-east and Mbarali district in the West (Mufindi District Council, 2006).

3.1.2 Description of the Study Area

The study was conducted in Tambarang'ombe, Igombavanu, Ihanu and Mtwango villages in Mufindi district. Tambarang'ombe and Igombavanu villages are found in the north-west part of the district in Sadani and Igombavanu wards respectively, where CEPA is implemented by government through Mufindi District Council. These villages are adjacent to the Mandumbulu Village Land Forest Reserve (VLFR) with an area of 357.5 ha. Ihanu and Mtwango villages are found in south-east part of the district in Ihanu and Mtwango wards respectively, where CEPA is implemented by TFCG. These villages are in Ifwagi division. Ihanu village has a VLFR called Ilangamoto that covers 6 ha while Mtwango village has a VLFR known as Mnyangala that covers 5 ha. Fig. 1 shows the map of Mufindi District showing the study areas.

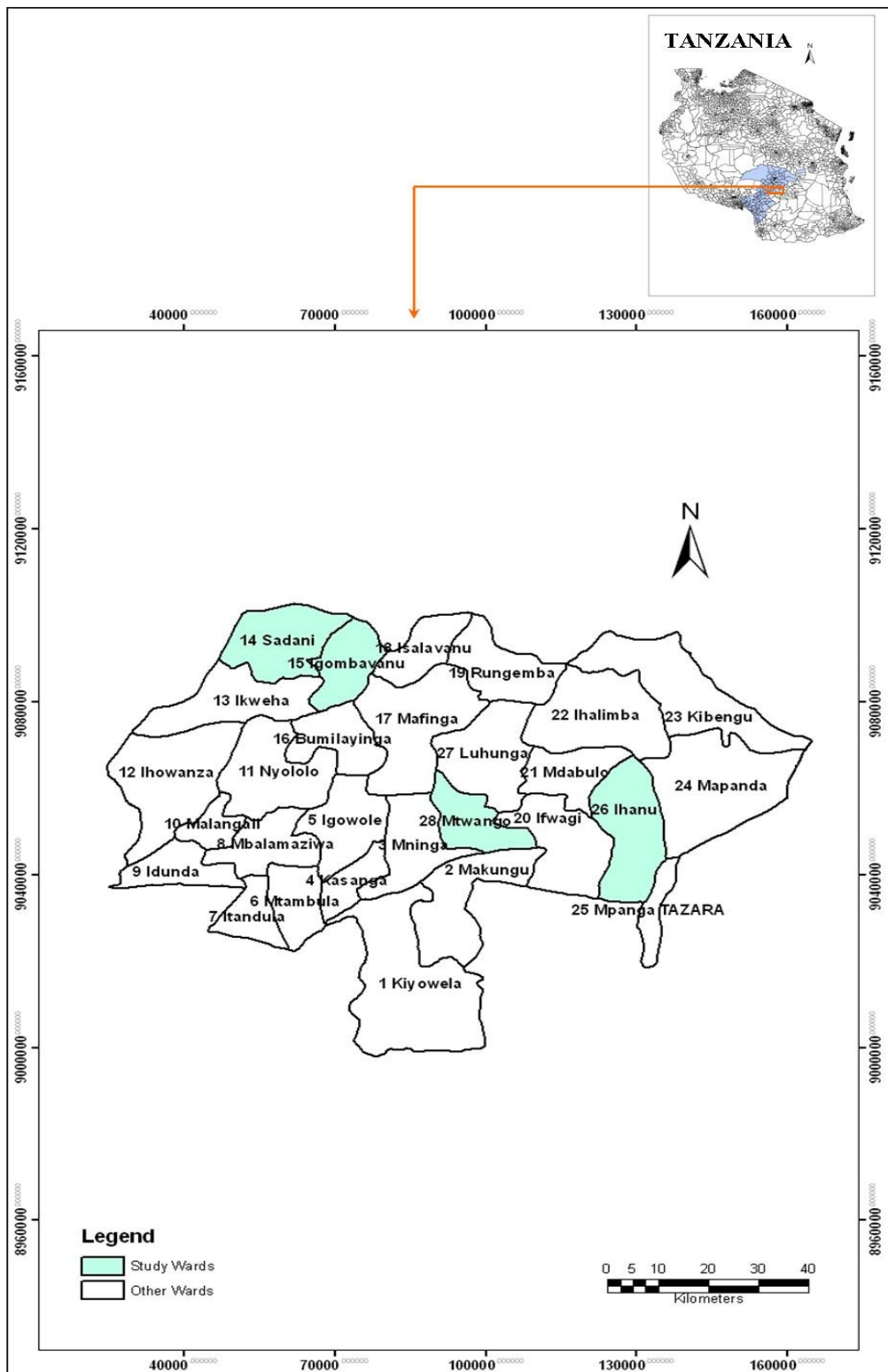


Figure 1: Map of Mufindi District

Source: Mufindi District Council (2006)

NB: The study areas are marked in green

3.1.2.1 Climate and soils

The district experiences a dry tropical type of climate with rainfall averaging between 600 and 1500 mm per annum. It has one rainfall season starting from early November and ending in June. Temperature ranges between 10° and 28°C. The soils are generally red clay of moderate fertility with dark top soils having high organic matter content.

3.1.2.2 Vegetation

Mufindi district is endowed with 206 377.7 ha of valuable forests that provide numerous goods and services for both national and local economy .The pattern of forest cover in the entire district comprises the following categories:

- (a) Unreserved miombo woodlands (80 000 ha) with spatial distribution in the general land.
- (b) Forest Reserves (57 031 ha) which are water catchment areas. These include The Eastern Arc Mountains Forests (47 261 ha) mainly found in Kibengu, Ifwagi and Kasanga divisions owned by central government and LGA, VLFRs (5664 ha) and Private forest reserves such as Ifwagi- Mufindi Tea Company (MTC) and Unilever Tea Tanzania Ltd – 4106 ha.
- (c) Plantation forests (69 282.6 ha) dominated by *Pinus patula*, *Pinus eliotii* and *Eucalyptus maidenii*. The forest plantations are mainly government owned (Sao hill 42 000 ha), individuals, local authority, schools, private companies and faith based institutions (Mufindi District Council, 2006)

The Eastern Arc Mountains forests are rich in biodiversity and endemic species of global importance for example, the famous Kihansi toads. On the other hand, the hydrological values of forests have an economic importance in the production of electricity at Kihansi and Mtera- Kidatu power plants. Plate 1 shows Kihansi waterfalls.



Plate 1: Kihansi water falls

3.1.2.3 Population and Ethnicity

Mufindi District has a population of 282 071 (133 150 males and 148 921 females) with a growth rate of 1.5% per annum and population density of 39.6 people/km² (URT, 2002b). The largest ethnic group are the Wahehe. Others include Wabena, Wawanji, Wakinga and Wazungwa. The population profile of the study villages is shown in Table 1.

Table 1: Population of the study villages

Village	Population	Number of households
Tambalang'ombe	1901	429
Igombavanu	1582	357
Ihanu	1208	294
Mtwango	2497	607
Total	7188	1687
Mean	1797	422

Source: DED - Mufindi (2007)

3.1.2.4 Economic activities

The major economic activity and source of livelihood in the study villages is agriculture. Main food crops grown include maize, beans and irish potatoes. The main cash crops are tea and sunflower. Other economic activities are livestock keeping, wood processing and small businesses such as selling local brew, vegetable garden and kiosks. The government as well as private plantations are contributing a lot to the economic growth of Mufindi residents exhibited by better housing and improved livelihood. Timber industries and carpentry workshops have boosted employment levels among the youth in the entire District (Mufindi District Council, 2006).

3.2 Methods

3.2.1 Research design

A cross-sectional research design was adopted for data collection. Using this design, data was collected at a single point in time from a selected sample of respondents to represent some large population as suggested by Kothari (1985) cited by Kajembe (1994). This design was adopted for the study because it is economical in terms of resources and time utilisation.

3.2.2 Reconnaissance survey

Before actual data collection, a reconnaissance survey was conducted in Mkonge village that was not involved in the actual study, so as to pre-test the questionnaires for the main study. Ten households were visited, questionnaires administered and necessary modification was done to questionnaires to suit the prevailing local conditions. The questionnaires were pre-tested in order to check their validity and reliability (Kajembe, 1994).

3.2.3 Sampling frame and sample size

Multi-stage sampling procedure was used to select sample villages. Two divisions and two wards in each division were purposely selected. Two categories of villages where CBFM is implemented were selected. The first category comprised villages where government (District Council) implements CBFM and the second category comprised villages where the programme is implemented by TFCG. This was a comparative study among Government and NGO villages where CBFM has been implemented.

The sampling frames were village registers. Here, respondents were selected by matching their numbers in the village register with the numbers in a table of random numbers. The sampling intensity was 5% of total households in each village (Bailey, 1994). In a village where 5% of total households resulted in a sample size of less than 30 households, 30 households were deliberately selected for detailed study irrespective of the population size (Bailey, 1994).

Simple random sampling was applied to obtain the number of households from each of the study villages. Simple random sampling was aimed at minimizing sampling bias as every individual household in each village had an equal chance of being selected. Household

heads were the key respondents during household survey as they are the decision makers for the households (Kajembe, 1994). Therefore, in this study, 120 respondents were selected for interview.

3.2.4 Data collection

Both primary and secondary data were collected. Primary data were collected using structured and unstructured questionnaires, PRA techniques and participants observation. Secondary data related to the study was obtained through a review of relevant documents.

3.2.4.1 Primary data collection

PRA was employed prior to questionnaire survey to learn about rural conditions in an intensive and interactive manner. The PRA tools used were Focus Group Discussions (FGD) and pair wise ranking. FGD was purposely chosen to explore information from people of different ages, sex and occupation. FGD was used to gather opinions on the importance of participation in forest management, identify commonly used channels of communication and education materials in their villages. Pair wise ranking helped to determine the types of CEPA materials/channels preferred by respondents.

The structured questionnaire (Appendix 1) was designed based on the specific objectives of the study. The questionnaires were administered to heads of sampled households to collect information from respondents at household level. The total number of households in the study villages (i.e. Tambalang'ombe, Igombavanu, Ihanu and Mtwango) was 1687 (Table 2) of which 120 households were selected for interview.

Table 2: Distribution of sampled households in the surveyed villages

Village	Number of sampled households
Tambalang'ombe	30
Igombavanu	30
Ihanu	30
Mtwango	30
Total	120

Both open and close-ended questions were asked. Unlike close ended questions, open-ended questions accommodate respondents' ideas and opinions through free explanation (de Vaus, 2002).

A checklist (Appendix 2) was prepared to solicit information from key informants. Key informants included Village Leaders, Mufindi District Forest Officer, Mufindi TFCG Project Officer, Zonal Forest Extension and Publicity Officer, Tanzania Forestry Research Institute (TAFORI) Officer, and Forest Extension and Publicity Officers in FBD HQ

Participant observation was also used, where the researcher tried to be part of the community to be studied. This involved direct observations of the community and household activities, behaviour, relationships, networks and processes and their perception towards participation in forest management.

3.2.4.2 Secondary data

Secondary data was collected through literature search, major sources being Mufindi District Council, Sokoine National Agricultural Library (SNAL), Internet, TFCG, TAFORI, FBD, National Environmental Management Council (NEMC), Wildlife Conservation Society of Tanzania (WCST) and the University of Dar es Salaam library.

3.3 Data Analysis

Data was analysed using qualitative and quantitative methods.

3.3.1 Qualitative data analysis

Data collected using PRA was analyzed by involving the communities through group discussions where immediate feedback was produced. The components of verbal discussions held with key informants were analyzed 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 enabled the researcher to ascertain values and attitudes of respondents.

3.3.2 Quantitative data analysis

Quantitative data was subjected to inferential statistical analysis. Socio-economic data were coded and fed into Statistical Package for Social Sciences (SPSS) programme for analysis. Descriptive statistical analysis was then used in exploring the data for distribution of responses, central tendencies and dispersion. Cross tabulation and multiple response analyses were also performed to ascertain responses. Cross tabulation is a powerful way of communicating information and the commonest data presentation (Casey and Kumar, 1988).

In order to measure the level of awareness in the community on participation in forest management, the index scale method in line with the method employed by Poucher (2001) was used. Five test questions weighing 25 points in total, each question carrying five points were designed and administered through questionnaire (Appendix 1). The levels of awareness were determined by dividing the scores into four (4) different categories namely no awareness, low awareness, moderate awareness and high awareness. Determination of the level of awareness of an individual group of respondents was made by adding total number of points in that group assigned and then calculating its percentage. Thus, the level of awareness was determined using percent of respondents.

Chi-square test was used to determine the significance worthwhile of relationship between two attributes. This was used to compare two institutional relationships on community participation in forest management, namely government and NGO.

A multiple regression analysis was used to show the relationship between CEPA and socio-economic factors as independent variables and community participation in forest management as a dependent variable. The multiple regression equation used was:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n + e$$

Where;

Y = dependent variable, i.e. community participation in forest management

X_1 to X_n = independent variables i.e. CEPA and socio-economic factors

β_0 = a constant showing intercept for regression equation

β_1 to β_n = independent variables coefficients

e = error term

$i = 1, 2, 3 \dots n$

n = sample size (total number of respondents i.e. 120 in this study)

The variables included in the regression model were:

X_1 = Communication

Effective communication provides appropriate messages to communities and allows them to make informed decisions on forest management. Communication was assumed to have positive regression coefficient.

X_2 = Education

Adequate knowledge about forest management has positive regression coefficient in the sense that education would enhance villagers' willingness to manage forests. High education tends to build people's capacity, confidence and ability in implementing laid down management plans and procedures in forest management.

X₃ = Public awareness

Raising awareness on the value of managing forests was assumed to have positive regression coefficient. This implies that awareness brings attention to individuals and helps them know the importance of forest management.

X₄ = Age of the respondent (years)

Age of respondents is an important parameter in social analysis. The age of an individual has an influence on the productivity as well as management of forests. The age was assumed to have positive regression coefficient up to a certain level after which it assumes a negative sign. It implies that, the high level of experience may diminish with increase in age of respondent hence decreases participation in forest management activities.

X₅ = Education level of the respondent

Education level of a respondent tends to increase awareness, self-reliance and stimulates self-confidence, motivation and positive attitude, so it was assumed to increase participation of household heads in PFM activities since educated people have more access to technical information that enables them participate in innovations compared to illiterate ones. Education was assumed to have a positive regression coefficient.

X₆ = Household income

Household income is an indication of wealth of an individual. It was assumed that individuals with higher income should have a negative influence on forest management because households that are better off have surplus income that could be diversified and invested in other investments or positive influence in forest management activities because people with higher income have ability to purchase big land, tree seedlings and hire labour for tree planting. Therefore plant more trees compared to poor people/ people with low income.

X₇ = Farm size (ha)

The assumption with this variable was that the bigger the size of the farm, the more the area that will be available for tree planting, resulting into many trees being planted by the households. The expected sign of the regression coefficient was positive implying that increases in size of household farm, would increase the number of trees planted.

X₈ = Residence duration (years)

It was assumed that an increase of duration of residence of a respondent in the study area influenced the number of trees planted. This means that the longer an individual stays in any area, the more they are likely to plant many trees. The regression coefficient was therefore expected to be positive.

X₉ = Extension services

This could have positive regression coefficient in the sense that extension services would enhance villagers' willingness to participate in and understanding the importance of forest management. Extension service was coded in forms of the number of days per month the extension workers visited the village.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

This chapter presents results on the existing CEPA materials/channels and level of awareness in the community on participating in forest management in villages in Mufindi District, the influence of CEPA and social economic activities on community participation in forest management and finally comparison of community participation in forest management in villages where CBFM programme is implemented by the government (Mufindi District Council) and in those villages where it is implemented by TFCG.

4.1.1 Household characteristics

According to Msokwa (2008), the main general characteristics of households are sex, marital status, age and education level of respondents. These characteristics provide general understanding of the cultural behaviour of the people in studied villages and influence communities in one way or another on their attitude, decision-making and perception on participation in forest management. Other factors examined in this subsection include respondents' economic activities.

4.1.1.1 Sex

Table 3 reveals that 67.5% of respondents interviewed in the study area were men and 32.5% were women. The reason for fewer women respondents might be the fact that the interview focused on head of households. Under traditional setting in the study area, households with spouses are male headed. Thus, in cases where women were heads, they were single, separated or widowed. The same situation has been observed in similar other studies. For example, a study conducted in the same district but different villages by

Raphael and Swai (2008) on impact of PFM, the majority (63%) of the respondents were males and the rest (37%) were females whereas another study conducted in Morogoro Rural District, male-headed households were 73% of sampled households (Lema, 2003).

4.1.1.2 Marital status

Table 3 shows that most (76.6%) of respondents were married, while 16.7% were widowed, 4.6% separated and 2.1% were single. The marital status influences decision making at the household level. A study conducted in the Uluguru Mountains, Morogoro by (Ruheza 2003) reported similar result that, the majority (92%) of respondents were married. Moreover, McKean (1998) reported that marriage has an effect in production activity as it affects availability of labour at the household that in turn has effect on the chances to engage in forest management. For this study, availability of labour on forest management did not depend on marriage but household size.

4.1.1.3 Age

Age is an important parameter in social analysis since in most societies different age groups perform different sets of activities. Overholt *et al.* (1991) shows that age can be seen as an indicator of knowledge and experience as well as a measure of maturity of an individual. The age of respondents ranged from 23 to 81 years with an average of 54 years. The majority (70.8%) of respondents were in the mid age category (30 – 50 years) followed by those with age between 51 - 71 years (21.7%) while only 4.2% were below 30 years and 3.3% were above 71 years (Fig. 2). The results imply that most respondents interviewed were mature.

Cross tabulation, analysis of age structure versus community participation in forest management in Table 4 shows that the majority (65%) of respondents between ages 30 –

50 years were participating in forest management activities followed by 20% from age group of 51 – 71 years old. A chi-square test in the same table indicated significant difference ($p < 0.01$) between age of respondents and participation in forest management.

This implies that age of individuals has positive influences on community participation in forest management up to a certain level after which it influences negatively. It implies that, the high level of experience may diminish with increase in age of respondent hence decreases participation in forest management activities. Furthermore, personal field observations revealed that the majority of youths in the study area were engaged more in petty business, carpentry, garden and timber processing activities than forest management activities.

Table 3: Household characteristics

Households characteristics	Frequency	Percent
Sex of the respondent		
Male	81	67.5
Female	39	32.5
Marital status		
Single	3	2.1
Married	92	76.6
Widow	20	16.7
Separated	5	4.6
Age group		
< 30 years old	5	4.2
30 - 50 years old	85	70.8
51 - 71 years old	26	21.7
> 71 years old	4	3.3
Education level		
No formal education	20	16.7
Primary education	95	79.7
Secondary education	4	3.3
Adult education	1	0.8

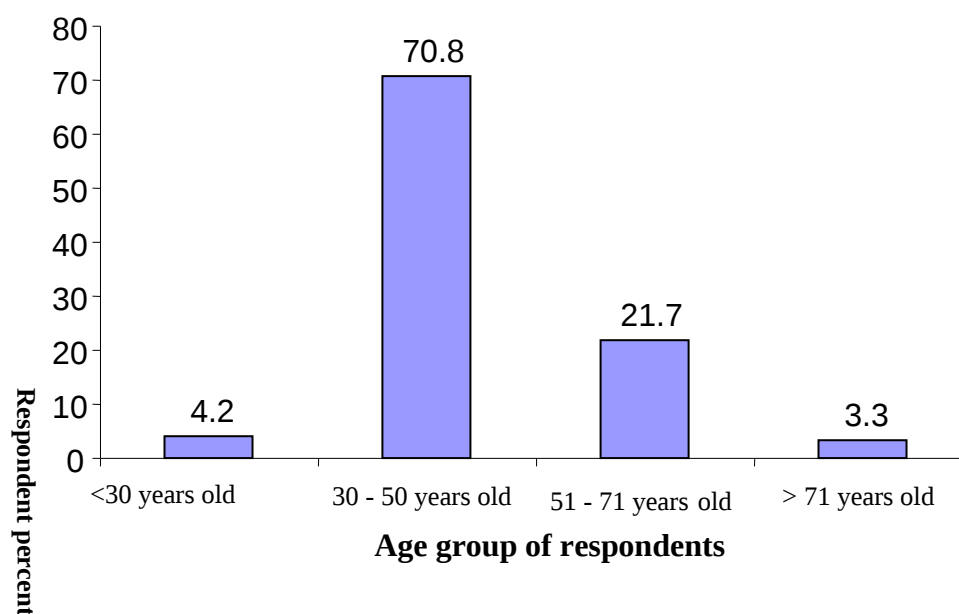


Figure 2: Age of respondents

Table 4: Relationship between respondent's age and their involvement in forest management activities

Age group of respondents	Involvement in forest management activities		Total	χ^2 -Value	Significance
	Yes	No			
> 30 years	5 (4.2)	0 (0.0)	5	14.781	0.002*
30 – 50 years	78 (65)	7 (6)	85		
51 - 71 years	24 (20)	2 (1.6)	26		
> 71 years	4 (3.3)	0 (0.0)	4		
Total	111	9	120		

Note: Figures not in parentheses indicate respondent counts whilst in parentheses indicate their percentage

* Statistically significance at 0.01 level

4.1.1.4 Education level

Knowing the education level of participants of targeted communities was an important factor in assessing their skills and knowledge they have through reading printed materials distributed to them and understanding issues that are aired through radios. The results show that the majority (79.7%) of respondents attained primary education, 16.7% had no formal

education and 3.3% had secondary education while 0.8% attended adult education (Fig. 3). High level of primary education in the study area might be due to deliberate effort made by the government in 1978 to expand and making compulsory primary education in the country for all children of 7-14 years (THDS, 1996). The low number of respondents who had secondary and post secondary education may be explained by the fact that many of the primary school graduates did not get access to secondary education. Alternatively, people with secondary education moved from rural to urban areas in search of well-paid jobs. This argument conforms with the Push-Pull Migration Model, which advocates that people migrate from rural to urban centres in search of better-paid jobs to improve their living standards (Mbonile, 1995). Even after retirement, no one goes back to the village because of inadequate social services.

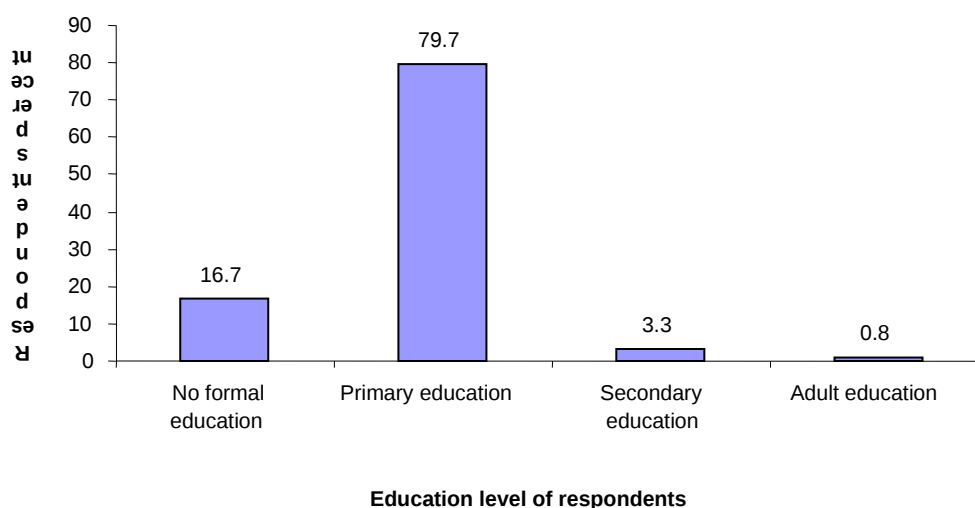


Figure 3: Education level of respondents

4.1.2 Major economic activities

Table 5 shows that 44.2% of respondents are engaged in crop production and livestock keeping, 34.2% are engaged in crop production only while 21.7% undertake crop production, livestock keeping and wood processing. Main food crops grown include maize, beans and irish potatoes. The main cash crops are tea and sunflower. Information from key informants showed that livestock kept were mainly cattle, goats, pigs, sheep and poultry.

Table 5: Major and alternative economic activities

Economic activities	Frequency	Percent
Major activities		
Crop production	41	34.2
Crop and livestock production	53	44.2
Crop, livestock and timber processing	26	21.7
Alternative activities		
Petty business	35	29.2
Gardening	14	11.7
Carpentry	19	15.8
Local brew	16	13.3
None	35	29.2
Employment	1	0.8

Other economic activities undertaken in the study area are mainly petty business done by 29.2% of respondents and carpentry done by 15.8% of respondents. Others are gardening which includes vegetable garden and tree nursery is done by 11.7% of respondents, selling of local brew 13.3%, employed 0.8% and 29.2% of respondents did not have other economic activities in spite of major economic activities. FGD revealed that other economic activities that are undertaken by women mostly are preparation and selling of local brew, tea harvesting (Plate 2), collecting mushrooms and wild fruits in the forests and selling these products.



Plate 2: Tea picking at Ifwagi estate

4.2 Existing CEPA materials/channels on forest management and level of awareness in the community on participation in forest management

4.2.1 Existing CEPA materials/channels on forest management

4.2.1.1 Existing educational materials in the study villages

Results in Fig. 4 show that 83% of respondents said educational materials concerning forest management existed in the study areas, 14% said there were no education materials while 3% of respondents said they could not read therefore did not know whether the materials existed. Education materials that were asked about are written materials such as brochures, newsletters, posters and small books. The high responses may be was because the study villages were purposively selected i.e. where CBFM was being implemented. In these villages, educational materials are important inputs on implementation of CBFM programme. However, most of the respondents who said educational materials were

available complained that the materials were not enough for the households. This observation is not in keeping with studies conducted in other areas such as in six districts in the Eastern Arc Mountains namely Mpwapwa, Kilombero, Handeni, Muheza, Same and Kilolo which indicated that 78% of respondents said they do not receive environmental education materials, while 22% said they did receive such written materials (FBD, 2006). The difference could probably due to external support to villages, some villages had received extensive donor support and others are involved in current PFM process lead by FBD and PMO-RALG.

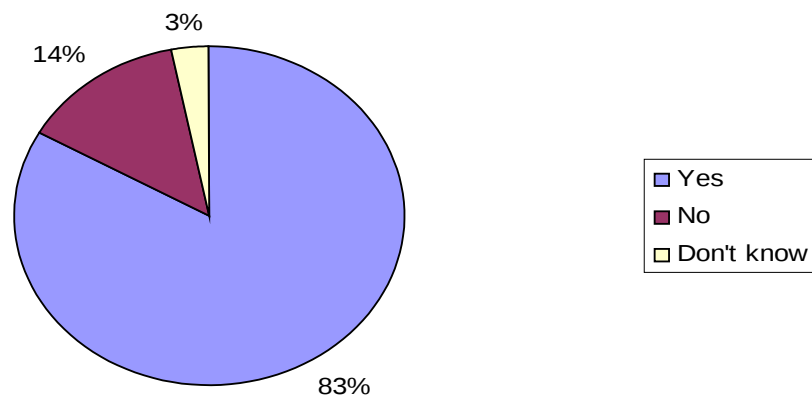


Figure 4: Responses on existing educational materials in the study villages

4.2.1.1 Types of educational materials available in the study area

Table 6 shows that the most commonly mentioned types of educational materials in the four villages studied were Posters and brochures (mentioned by 36.7% of respondents) that have been influenced by more respondents from Tambalang'ombe (43.3%) and Igombavanu (66.7%) who admitted to receive many posters from PFM through Mufindi District council.

Posters (mentioned by 20% of the respondents), posters and newsletters (mentioned by 20%), newsletters 3.3% (Table 6), brochures and newsletters (5.8%), posters, brochures and newsletters (1.7%), calendars (2.5%) while 10% of respondents said they did not know the type. Probably due to attractive pictures that attract the communities respondents mentioned posters frequently.

The findings of this study differ from a similar study conducted in six districts in the Eastern Arc Mountains that revealed that textbooks were the most preferred form of written materials, followed by small books, magazines, posters, letters and finally leaflets (FBD, 2006). The difference may be due to the fact that printed materials as media of information dissemination, varies depending on their availability and the education level of communities. The similar observations were reported by Mbwana (1995) that the difference of printed materials varies depending on their contents, availability as well as literacy of the farmers.

Table 6: Responses on educational materials available in the study villages

Type of educational materials available	Responses for villages				
	Tambalang 'ombe	Igombavanu	Ihanu	Mtwango	Total
Posters	9(30.0)	7(23.3)	4(13.3)	4(13.3)	24(20.0)
Newsletters	0(0.0)	0(0.0)	3(10.0)	1(3.3)	4(3.3)
Posters and brochure	13(43.3)	20(66.7)	7(23.3)	4(13.3)	44(36.7)
Posters and newsletters	1(3.3)	0(0.0)	12(40.0)	11(36.6)	24(20.0)
Brochures and newsletters	0(0.0)	0(0.0)	1(3.3)	6(20.0)	7(5.8)
Posters, brochures and newsletters	0(0.0)	0(0.0)	2(6.7)	0(0.0)	2(1.7)
Don't know	5(16.7)	2(6.7)	1(3.3)	4(13.3)	12(10.0)
Calendar	2(6.7)	1(3.3)	0(0.0)	0(0.0)	3(2.5)

Different villages in Mufindi District received different education materials depending on external support on forest management for the last 10 years. Table 7 shows donors who supported forest management activities in different villages in Mufindi district. In this study, villages supported by Mufindi District Council through PFM Programme are Tambalang'ombe and Igombavanu while the rest are supported by TFCG. Moreover, key informants from the District Natural Resources Office (DNRO) added that TFCG HQ mainly prepares posters, brochures and newsletters and distributes them to their target villages, while Mufindi District Council received mainly posters and brochures from FBD HQ through Zonal Forest Extension & Publicity Office to distribute to the target villages. Inadequate financial resources in Government caused insufficient productions of education materials (Kigula. J. J. personal communication, 2010).

Table 7: Donor support in the study villages for last ten years

Donor (PROJECT)	Year of support	Village
DENMARK (HIMA)	1998 - 2002	Tambalang'ombe
DANIDA (PFM)	2004 to Date	Igombavanu
GEF (TFCG)	2004 to Date	Ihanu and Mtwango

Group discussion and pair wise ranking comparison of written materials in the study area shows that Posters were the most preferred (mentioned by 19 respondents out of 40 respondents). Brochures (10 respondents), newsletters (8), small books (2), and finally newspapers 1 (Fig. 5). These preferences are thought to reflect the literacy of the people. Posters were preferred because they have attractive pictures that attract the communities. This enables even illiterate communities to get an idea of the messages.

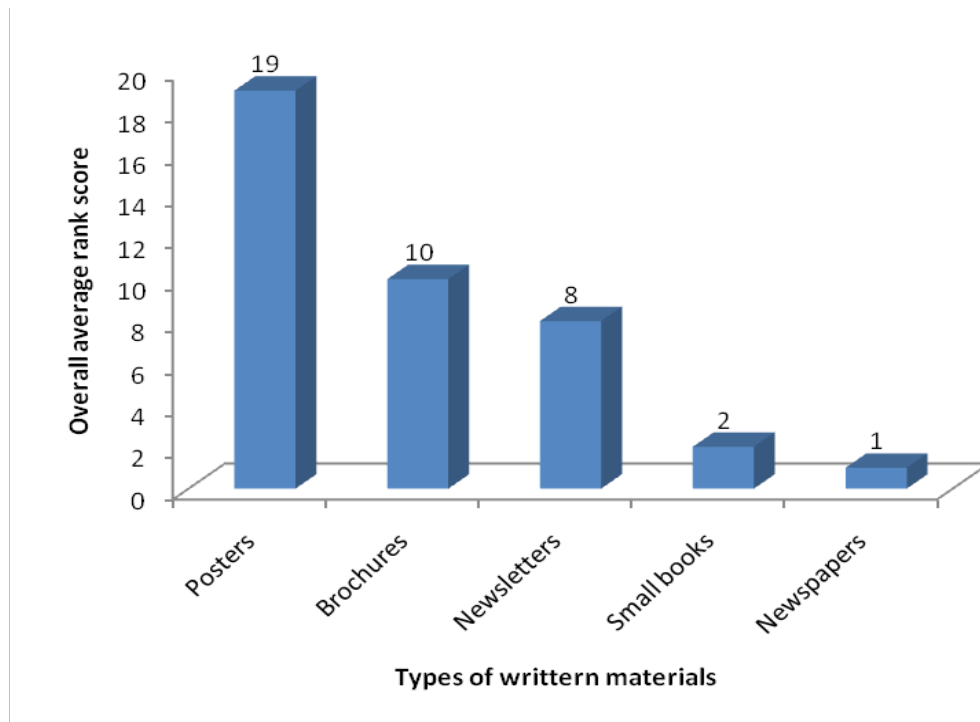


Figure 5: Pair wise ranking comparison of educational materials

4.2.1.2 Existing communication channels on forest management

The results in Fig. 6 show eight channels that were mentioned. The most frequently mentioned communication channel was Village meetings mentioned by all (100%) of the respondents, seminar (95.8% of the respondents) whilst 89.2% of the respondents said they get information from the posters, 70.8% get from video shows, 55.8% get from District forest officers (contact), 53.3% of the respondents from TFCG officers and 36.7% of the respondents said from letters. Lastly, 30.8% of the respondents mentioned radio as channel of information. The trend of these results shows that communication can be facilitated through a range of media. All respondents mentioned meetings probably because extension workers in villages hold many meetings. The reason behind is that, it is easy for extension workers to cover more people in a village meeting or seminar rather than visiting individuals.

Extension agents or project/programme should use the communication approaches preferred by the target groups. For example, Matiko (2000), found that the HASHI project was using visits, video shows and traditional theatre groups as the main communication approaches.

Findings of this study are not in keeping with the study by FBD (2006) conducted in six districts in the Eastern Arc Mountains which shows that individual contact was the most effective and commonly used method, followed by meetings, seminars, written materials, mass communication and finally songs / poetry / drama..

Juma (2003) indicated that communication channels used vary from each other in three important ways:

- (a) The extent to which there is higher opportunity for feedback, in a small group discussion e.g. a meeting than a radio broadcast;
- (b) The extent to which receivers are influenced by their own group membership. Group influence is much stronger when participating in a discussion e.g. in seminars or meetings than when reading about the same topic in a newsletter; and
- (c) The extent to which receivers are free to interpret or work out a message according to their own views, which depends on the nature of audience.

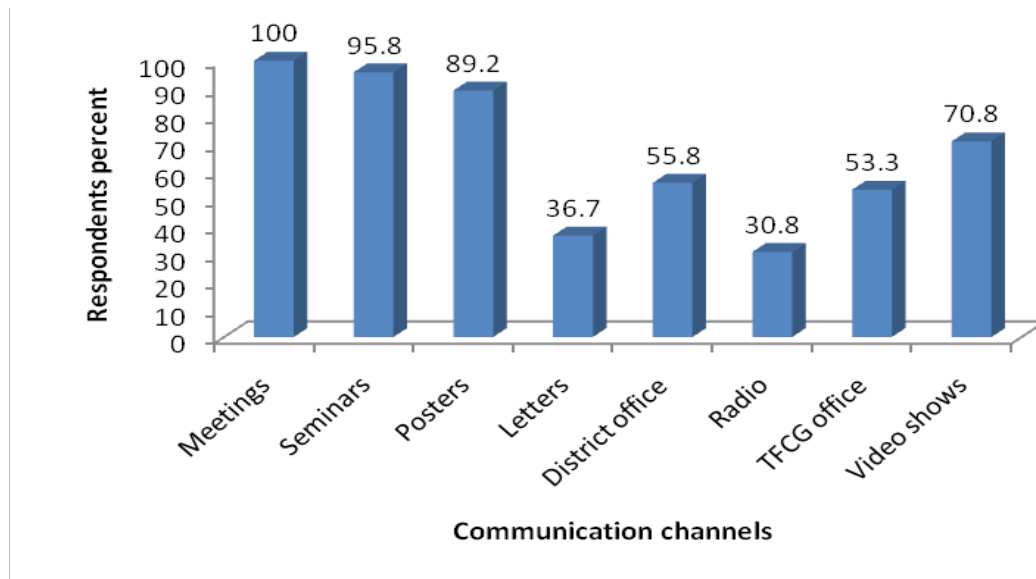


Figure 6: Existing communication channels on forest management in the study villages¹

The study observed that 57% of the respondents (Fig. 7) in the study areas own radios while 43% do not. However, only 5% of those with radios said they listened to “Forests is Wealth” (*Misitu ni Mali*) programme aired by FBD HQ once per week through TBC Taifa on Mondays from 1845 to 1900 h p.m. Only 3% of respondents who own radios revealed that they listened to broadcasts aired by TFCG in TBC Taifa through “*URITHI WETU*” Programme.

The low number of listeners of extension programmes by radio broadcasts was probably due to the fact that farmers can turn on their radios but tune in to music or other radio stations such as Radio Free Africa, Radio One, FM Stereo, Radio Maria and Regional radios like Ebony FM and Country FM instead of TBC Taifa. A study by FBD (2006) on the unique biodiversity of the forests in Eastern Arc Mountains reported similar findings where many households (average of 69%) own radios.

¹ As some of the respondents gave more than one option, percentages would not necessarily add to one hundred

The report further indicated that, male-headed households were more likely to have radio than female-headed households about 64% of male- headed households owned radios compared to only 36% of female-headed households. This implies that households that are male-headed have opportunity to get various information through radio than female-headed.

A study on media habits and the Danicom report 2002 on PFM communications options have shown that most people do not read printed material, but prefer more entertaining radio programmes (Danicom, 2002). However, a study by Van den Ban and Hawkins (1996) revealed that in some parts of India farmers listening to agriculture practices on radio would adopt such practices only if they get recommendations from other farmers with trustworthiness. This implies that combined several media are required to ensure effectiveness of information dissemination.

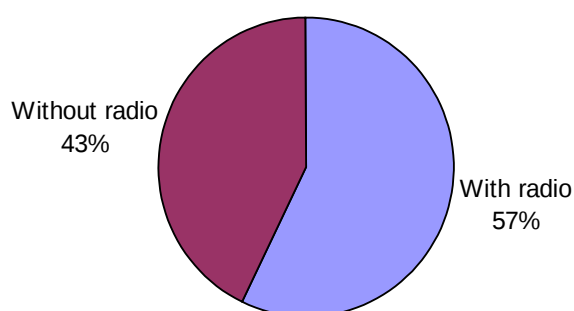


Figure 7: Responses on possession of radio by households.

4.2.1.3 Existing methods of creating public awareness

Fig. 8 shows different methods of creating public awareness on forest management that were grouped into Group (meetings, seminars, and workshops), Mass (radio, vehicle with speaker, newspapers, video shows and TV) and Theatre art (singers, drama and poems).

Respondents ranked methods of creating awareness as follows:

Group and mass media methods were used more frequently (39%), group, mass and theatre arts methods (35%), group and theatre arts (17%), group only (16.7%), mass and theatre arts (5.8%) and mass only (0.8%).

Key informants indicated that Group methods reach fewer members of communities but offer more opportunities for interaction and feedback while mass media such as video shows reach quite a big number of audiences but offer less opportunities for interaction and feedback. Other reports, Danicom (2002) and Matiko (2003) indicated that various interactive activities such as meetings and exchange visits are effective means of communication at community level. Radio and indigenous media such as cultural shows, songs and interactive drama music are very powerful media too. Furthermore, a video show is popular and seems to have a greater attraction at community level; its impact has been significant especially in projects, where campaigns are accompanied by other extension approaches on the ground (Matiko, 2003).

A FGD in the study area revealed further that most of respondents do not possess radio sets and had an opportunity to watch TV only once per month, while other villagers had never seen a TV in their life. However, studies in industrialized countries revealed that radio and TV are important media in transmitting information to farmers in many countries (Van den Ban and Hawkins, 1996). The authors added that radio communicates ideas and

information to large number of people over wide areas and in a short time, is fast and most powerful method of communicating with the rural people and its use does not require literacy.

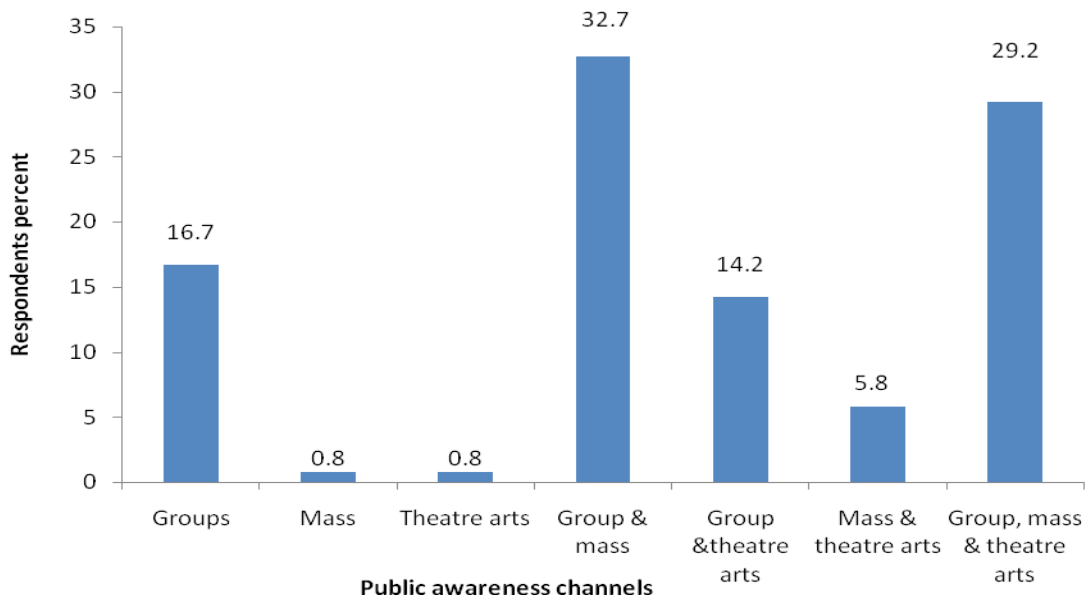


Figure 8: Public awareness creation methods.

4.2.2 Level of awareness in the community on participating in forest management

4.2.2.1 Community awareness on participation in forest management in general

The results in Fig. 9 shows that 92% of the respondents were aware of participation in forest management, whilst 8% were not. This high awareness may be because the studied villages are under the CBFM programme. In order to confirm the respondent's awareness, they were asked if they participate in any forest management activities. The results show that every respondent participates in at least one activity. No one did not participate at all in forest management activities (Table 8).

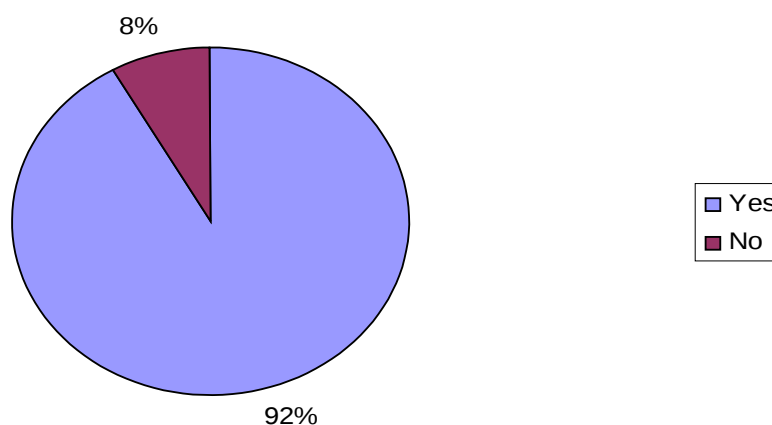


Figure 9: Responses on awareness on participation in forest management

Table 8: Responses on involvement in forest management activities

Activities involved in.	Count	Percent
Nursery establishment	25	20.8
Tree planting	65	54.2
Patrol	55	45.8
Boundary clearing	88	73.3
Fire break	72	60.0
Total	305	254.2

NB: As the respondents gave more than one option, percentages would not necessarily add to one hundred.

Respondents were asked on their knowledge about PFM and the results show that majority (31.7%) said it means community involvement in protection of forest from bush fire, 27.5% said community involvement in patrolling in their forest, 21.7% said community involvement in boundary clearing, while 19.2% said it means villages to set aside their own forest (Table 9). This implies that most of the community members in the study areas are aware of PFM.

Table 9: Responses on knowledge on participatory forest management

Knowledge on PFM	Frequency	Percent
------------------	-----------	---------

Communities participate in guiding/patrol in their forest	33	27.5
Community involved in protecting their forest from bush fire.	38	31.7
Villages to set aside their own forest	23	19.2
Villagers to be involved in boundary clearing	26	21.7
Total	120	100.0

In addition, some forest officials in the District revealed that currently the level of community awareness in forest management is estimated to be 85%. This high level of awareness was the result of various efforts done by the supporting agents of previous project activities such as HIMA and MEMA dealing with environmental conservation and attributable to current projects and government extension officers conducting many environmental awareness meetings at the initial stage of the PFM programme. Moreover, in Mufindi there is Sao hill plantation, so the communities appreciate the importance of establishing their own woodlots (Plate 3) and the benefit of trees.



Plate 3: Woodlot in Mtwango village

Furthermore, key informants from the villages added that the present condition of forest has been improved when compared to previous periods. The indicators of

improved forest condition include: High number of regenerants and the forest is closed which makes its difficult to pass through (Plate 4) compared to previous, reduced illegal tree cutting and bush fires, increase in number of wild animals, increase in flow of water, reduced encroachments, reduced soil erosion and increase of trees with big diameter as shown in the Mandumbulu VLFR (Plate 5) that is found adjacent to Tambalang'ombe and Igombavanu villages. In addition, field observations and focus group discussions revealed that community awareness rose after introduction of CEPA in the studied villages.



Plate 4: Ilangamoto VLFR in Ihanu village



Plate 5: Mandumbulu VLFR in Tambalang'ombe and Igombavanu villages

Findings of the study are in line with the study conducted by Raphael and Swai (2009) in different villages in Mufindi District that revealed that there was high (91%) level of community awareness on participation in forest management.

4.2.2.2 Level of awareness in the community on participation in forest management

Results in Table 10 show that majority (56.4%) of the respondents in the study area had high awareness, 21.8% had moderate awareness, 13.4% had low awareness and those who lack awareness were 8.4% of the respondents. Furthermore, findings show that majority (96.7%) of the respondents were aware of the uses of forest, they were able to mention more than five uses of forests. Whereas 87.5% were aware on current forest management and ownership, 71.7% were aware on who was responsible for village forest allocation while 51.7% were aware of availability of extension materials.

However, only 16% of the respondents were able to mention different types of extension materials (Appendix 3). There are many reasons for this, but most probably, extension materials used were not user friendly (because most extension materials are written). In addition, there was an argument in the study villages that, forest extension materials are not enough. The researcher observed that there were only few copies found in the village offices.

Table 10: Level of awareness in community on participation in forest management

Index scale for assessing level of awareness on forest management	Score counts			
	No awareness (0)	Low awareness (0- 10)	Moderate awareness (11-20)	High awareness (21- 25)
Are you aware that anybody can own and manage his/her forest?	0	3	12	105
Mention at least five uses of forests	0	0	4	116
Who is responsible for allocating forest land in this village	5	6	32	77
Have you come across any forest				

extension materials? Mention at most five extension	17	15	25	63
materials	22	46	41	11
TOTAL	44	70	114	295
Percent	8.4	13.4	21.8	56.4

On the other hand, when asked about PFM guidelines and National Forest Policy, most of them said had not seen copies. Table 11 shows that 33.7% had seen PFM guidelines while 66.3% had not seen the guidelines.

Table 11: Responses on knowledge of PFM guidelines

Have you seen a copy of PFM guideline?	Frequency	Percent
Yes	40	33.7
No	80	66.3
Total	120	100.0

Table 12 shows that 20.8% of respondents had seen a copy of the National Forest Policy of 1998 while 79.2% had not seen a copy of the National Forest Policy or Forest laws. The low percentage of the respondents who had seen a copy of the National Forest Policy or the PFM guidelines could be because not enough copies have been distributed at village level. This is proven by the fact that there was not a single copy of the National Forest Policy or PFM guidelines in all the villages covered in this study.

Table 12: Responses on knowledge of National Forest Policy

Have you seen a copy of forest policy?	Frequency	Percent
Yes	25	20.8
No	95	79.2
Total	120	100.0

Furthermore, distribution of extension materials as well as government documents from the District Natural Resources Office to the target villages is not well documented. For example, there were no records of what extension materials or documents were received from Southern Highlands Zonal Forest Extension Office and those received directly from FBD HQ and from other institutions. In addition, no records show how distribution of these materials was done. The findings was in line with the study by Nyagawa and Kahemela (2006) who found that 91% of community representatives in Eastern Arc Mountains indicated that they had not seen a copy or summary of the National Forest policy and Forest Act.

4.3 The influence of CEPA and socio-economic factors on community participation in forest management

4.3.1 Communication

Table 13 shows a statistically significance ($p=0.005$) and positive ($\beta=0.840$) regression coefficient between communication and community participation in forest management. This implies that, as communities had increased access to effective communication, they tended to participate more in forest management activities. This is because effective communication enhanced understanding, motivation and reduced communication breakdown.

Table 13: Relationship between community participation in forest management and CEPA and socio-economic factors

Xi	$R^2 = 0.649$			
	β	SE	t	P (Sign. level)
(Constant)	2.629	1.347	1.953	0.053
Education level of respondent	0.912	0.171	5.348	0.000**
Age of respondent	-0.428	0.246	-1.743	0.084 ^{ns}
Duration of residence	0.002	0.006	0.266	0.791 ^{ns}
Major sources of income	-0.175	0.152	-1.152	0.252 ^{ns}
Farm size	-0.026	0.066	-0.386	0.701 ^{ns}
Households annual income	-0.432	0.171	-2.533	0.013**
Communication	0.840	0.292	2.880	0.005**
Education	0.731	0.362	2.017	0.046*
Public awareness raising	0.902	0.452	1.998	0.048*
Household land ownership	0.564	0.331	1.703	0.091 ^{ns}
Availability of extension agents	0.456	0.237	1.922	0.057 ^{ns}

Dependent Variable: Community participation in forest management

Xi	=	Independent variables: (CEPA and socio-economic factors)
β	=	Regression coefficients
*	=	Indicates statistically significance at 0.05 level
**	=	Indicates statistically significant at 0.01
***	=	Indicate statistically significant at 0.001,
ns	=	Indicates statistically non-significant at 0.01, 0.001 and 0.05 levels
Se	=	Standard error
t	=	Student's t-test
P	=	Significance level
R^2	=	Regression of determination

These **results** are in line with the study by Danicom (2002) which was conducted in Mkuranga, Morogoro and Muheza Districts on the achievement and impact of communication and awareness creation activities under NFP, NBKP and PFM where it is reported that communication by itself promotes dialogue between stakeholders, which is the basic prerequisite for public participation in forest management.

4.3.2 Education

Results (Table 13) show statistically significant ($p = 0.046$) and positive ($\beta = 0.731$) regression coefficient between education and community participation in forest management. This implies that provision of education to communities on the advantages of forest management creates awareness, builds interest and increases the willingness of people to practice. Therefore, education on different aspects of forest management boosts people's participation. This observation is in agreement with the findings of the study by Kajembe *et al.* (2004) who emphasized that to ensure full participation in PFM programmes all stakeholders at community level need to be educated and sensitized about their rights, responsibilities and expected returns.

Mallik (2000) and TANGO (2004) emphasized the importance of capacity building among villagers and attitude change for stakeholders. Training for capacity building and competence development of the villagers creates immediate interest of the people to participate in forest management activities. Furthermore, the findings are supported by the study of Kalineza *et al.* (2000) who argued that farmers who are knowledgeable are expected to adopt the techniques compared to those who are not knowledgeable.

4.3.3 Public awareness

Results (Table 13) show a statistically significant ($p = 0.048$) and positive ($\beta=0.902$) regression coefficient between public awareness and community participation in forest management. This indicates that as awareness raising increases in communities on a certain intervention more people are able to participate. This signifies that participation in forest management activities will likely depend on how aware the communities are on forest management activities. Awareness helps people to know what and why this is an important issue to them, hence encourage participation.

This argument is in line with the findings of a study by Anim (1999) who concluded that awareness on land degradation and perception of the benefits to be accrued out of the forest management practices are crucial factors for investment and adoption of any conservation measures. Furthermore, a study conducted by Matiko (2000) found that tree planting campaign (public awareness) shows that the mean area planted with trees before the campaign was significantly different from the mean area planted after the campaign.

4.3.4 Education level of respondents

Table 13 shows a highly statistically significant ($p = 0.000$) and positive ($\beta=0.912$) regression coefficient between education level of respondents and community participation in forest management. This implies that participation in forest management increased with the education level of a respondent, thereby enhancing biodiversity conservation. The plausible explanation might be increase in the level of education tends to increase awareness, competence, efficiency and self-reliance in forest resource management hence keenness to participate. Therefore, level of education of the respondent contributes significantly to participation in forest management activities.

The relationship between respondent's education level and their participation in forest management activities indicated that majority of respondents with primary education participate in forest management activities (Table 14). These findings are in agreement with a study by Kalineza *et al.* (2000) who reported that knowledgeable farmers are expected to adopt the technique compared to those who are not knowledgeable.

Table 14: Relationship between education level of respondent and community participation in forest management

Education level of respondent	Community participation on forest management		Total
	Yes	No	
No formal Education	18	2	20
Primary Education	85	7	92
Secondary education	4	0	4
Middle school	3	0	3
Adult education	1	0	1
Total	111	9	120

Furthermore, Mbwambo (2000) argued that education has a direct influence on people's participation in natural resources management and promotes sustainable utilization of the resources. Increase in education level increases the level of awareness and thereby creating positive attitudes. Generally, education in various environmental issues is very crucial at all levels in order to enhance participation of all stakeholders (Katani, 1999).

4.3.5 Household average income

Table 13 shows statistically significant ($p=0.013$) but negative ($\beta=-0.175$) regression coefficient between household average income and community participation in forest management. This implies that there was a strong association between household level of income and participation in forest management activities. The negative regression coefficient suggests that participation in forest management activities decrease with increases of household income. This means that, households that are better off have surplus

income that could be diversified and invested in other investments including tea growing and processing or wood industry. Key informants in the study area explained that most of the communities with money were engaged in tea business, they saw forest management activities e.g. tree planting to be a long-term activity. In a study conducted in Monduli, Tanzania by Dugilo (2009), reported similar observations that wealth category has negative regression coefficient value.

Table 15: Annual income of respondents

Respondents average income(TZS)	Frequency	Percentage
< 50,000	2	1.7
50,000 - 200,000	35	29.2
201,000 - 500,000	55	45.8
501,000 -1,000,000	26	21.7
> 1,000,000	2	1.7
Total	120	100.0

Regarding economic status of the respondents, 46% have annual income between TZS 201 000 to 500 000, 29.2% of the respondents had income between 50 000 to 500 000, 21.7% of the respondents had income between TZS 501 000 to 1 000 000 and only 1.7% had income of less than 50 000 and the same percent had more than 1 000 000 (Table 15). One of the constraints in getting data on income from farmers is that the farmers are not willing to reveal their annual income. This is because of their perception that they would be tax if they revealed their income. The results are in agreement with a similar study by Samson (2007) conducted in Diredawa Administrative Council, Ethiopia.

4.3.6 Duration of residence

Table 13 shows that duration of residence had positive ($\beta=0.002$) regression coefficient on community participation in forest management but not statistically significant ($p=0.791$). The positive regression coefficient implies that the longer an individual stays in a village, the more he or she will be interested to invest in long term enterprises including forest

management. This may be due to the fact that people who stayed longer were willing to invest in forest management activities, especially tree planting because they have a land already compared to those stayed for short period.

This observation is shown in Table 16 where about 87% of the respondents have stayed in the study area for more than 30 years, while about 12% of the respondents have stayed between 10 – 30 years and less than 2% have stayed for less than 10 years. This implies that most of the respondents interviewed were born in the study areas. However, temporary residents would not be interested in long-term enterprises like forest management because it take long time to get intended products especially for cash seeker. Luoga *et al.* (2000) conducted a study in Kitulanghalo Forest Reserve in Tanzania and came out with similar observation that short-term residents are not very much committed to resource conservation as opposed to the local residents.

Table 16: Duration of residence in study villages

Duration of residence	Frequency	Percent
< 10 years	2	1.7
10 - 30 years	14	11.7
> 30 years	104	86.7
Total	120	100.0

4.3.7 Household land ownership

Table 13 shows positive ($\beta=0.564$) regression coefficient between household land ownership and community participation in forest management though non-statistically significant ($p = 0.091$), The positive regression coefficient implies that forest management activities are influenced by land and tree tenure within communities. In areas where land tenure systems do not guarantee continued ownership and control of land, there is less possibility of participation in forest management activities.

These findings are supported by a study by James (2004), who argued that there is a need to understand the issue of land and tree ownership on the same piece of land and who has the right to harvest some or all of the products at any time as these will determine the necessary incentives that have been extensively used in the world for encouraging the community to participate in forest management activities. Moreover, Mndolwa *et al.* (2009) reported that high participation of the villagers in forest resources management in Iringa district was contributed by the fact that many people (87%) had sense of ownership to the forest resources.

Results in Table 17 show that 99.2% of the respondents owned farmland, while only 0.8% of respondents had no farmland. This observation was also reported by Ruheza (2003) in adoption of Agroforestry in the Uluguru Mountains where 98% of the respondents owned farmland while 2% of respondents did not.

Table 17: Responses on farmland ownership

Land ownership	Frequency	Percent
Yes	119	99.2
No	1	0.8
Total	120	100.0

4.3.8 Availability of extension services

Table 13 shows statically insignificant ($p=0.057$) and positive ($\beta=0.456$) regression coefficient between availability of extension services and community participation in forest management. The positive regression coefficient denoted that farmers who received extension services were motivated to participate in forest management activities as opposed to those who did not receive such services. The plausible explanation is that when farmers get extension services, they are motivated to carry out conservation activities including tree planting. This argument is in line with the findings of the study by Butuyuyu

(2003) who concluded that availability of extension services motivated farmers in afforestation activities in Same District, Kilimanjaro Region, Tanzania.

4.3.9 Age of respondents

Table 13 shows statistically insignificant ($p=0.084$) and a negative ($\beta=-0.428$) regression coefficient between the age of the respondents and community participation in forest management. The logical interpretation of the negative regression coefficient is that the number of community participation decreased with increase in age of the respondent. Further findings show that majority of the respondents aged between 30 - 50 years old were involved in forest management activities (Table 18). This is also true for tree planting activities in the study villages, where respondents in the middle age category of 30-50 years mostly growing trees in their farms (Table 19).

Table 18: Relationship between age of the respondents and participation in forest management

Age group of the head of household	participation on forest management		Total
	Yes	No	
< 30 years old	5	0	5
30 - 50 years old	78	7	85
51 - 71 years old	24	2	26
> 71 years old	4	0	4
Total	111	9	120

However, individuals in this age category are mainly youths with 30-45 years old. Findings of this study do agree with studies reported by Shifraw and Holden (1998) who reported that, younger farmers are more likely to adopt conservation practices once they perceive the problem than older farmers.

Table 19: Relationship between Age of the head of household and trees planted

Age group of the head of household	Do you plant trees in your farm		Total
	Yes	No	

< 30 years old	5	0	5
30 - 50 years old	69	16	85
51 - 71 years old	21	5	26
> 71 years old	4	0	4
Total	99	21	120

4.3.10 Farm size

Table 13 shows a statistically insignificant ($p= 0.701$) and negative ($\beta=-0.026$) regression coefficient between farm size and community participation in forest management. This result implies that participation in forest management activities decreases with large farm size. This means that a household with large farm size is relatively better off and busy with own undertakings, thus does not have time to participate in forest management activities. A study by Dugilo (2009) observed similar result in Monduli District that the likelihood of participation in CBFM activities decreases for every unit change in the variable. Moreover, James (2004) suggests that adoption of intervention depends on type of technology and farmer characteristics but not farm size.

The findings of this study further indicated that in the study area farm sizes of households are relatively small with an average of 1.3 ha. (with minimum of 0 ha and maximum of 3 ha) (Table 20). This indicates that most of the respondents are peasant farmers. This argument is supported by URT (2001) that, peasant farmers cultivate farms with size ranging between 0.9 – 3 ha.

Table 20: Responses on farm size

Farm size (Ha)	Frequency	Percent
< 1 ha.	67	55.8
1 - 3 ha.	53	44.2
> 3 ha.	0	0
Total	120	100.0

The major (70%) mode of acquiring farmland in the study area was through Inheritance while 19% said was allocation through village government and 9% through buying

(Table 21). This implies that there were decreases in the clan farmland that can be passed on to the next generation. A study by Ruheza (2003) reported that because of increase in the number of immigrants and commercialization in various areas, buying and selling land becoming a common practice

Table 21: Responses on how farmland obtained

Way of acquiring farm land	Frequency	Percent
Inheritance	84	70.0
Allocated by Government	23	19.2
Purchase	11	9.2
Inheritance and purchase	2	1.7
Total	120	100.0

4.3.10.1 Satisfaction with farm holding

Results in Table 22 show that 51.6% of the respondents were not satisfied with the farm size they owned. Only 48.4% of the respondents were satisfied with the farm size they owned. Ruheza (2003) observed similar results and concluded that a decrease in the household farm size could be one of the factors that influenced the clearance of public forests for agriculture.

Table 22: Responses on satisfaction with farm size

Satisfaction with farm size	Frequency	Percent
Yes	58	48.4
No	62	51.6
Total	120	100.0

These results are in line with the study by Winfred (2004) who reported that inadequate land for agriculture and settlement was among the constraints facing biodiversity conservation in the Uluguru North Forest Reserve, Morogoro, Tanzania.

4.4 Comparison of Community Participation in Forest Management between Villages Facilitated by Government and those Facilitated by TFCG, an NGO

4.4.1 Overview

Promotion of environmental management technology involves many institutions. Government institutions whether at national or local level are an important group of actors. Increased attention is also being paid to the role of NGOs and private sectors in forestry management. The number of both international and local NGOs involved in forest management activities in Tanzania has increased in less than 10 years, and the number keeps on increasing. Findings by Lyatuu (2001) show that this is an indication that the services provided by the public sector do not satisfy the needs of the community.

Each institution has its own approach/style on dissemination participation on forest management due to difference in organization structure, resources of money, personnel and equipment, methods and techniques, programme goal and kinds of leadership. Therefore, the advantage of comparing community participation in forest management in different institutions includes:

- (a) To know how different institutions deal with practical information that is useful to rural people in helping them to solve their daily problems.
- (b) To contribute knowledge that will be useful for improving and/or modifying.
- (c) It is valuable in administrative and policy maker as well as academic value.

As was reported at the beginning of chapter three of this study, villages involved in this study were selected from different institutions namely Government and TFCG.

4.4.2 Relationship between villages facilitated by government and those facilitated by TFCG on Community participation in forest management

The results in Table 23 show that about 48% of the respondents from villages where CEPA is implemented through TFCG on community participation in forest management outweighed 43% of the respondents from villages where CEPA is implemented by government through PFM. The chi-square test on respondent from villages where CEPA is implemented through PFM by Government versus respondents from villages where CEPA implemented by TFCG shows that there was significant difference ($\chi^2 = 115.669$; $p < 0.001$) between the two institutions in the influence on communities to participate in forest management. This finding implies that communities in villages under TFCG participate more in forest management compared to villages under the Government.

This could be due to fact that TFCG have ready funds at their disposal (there is no bureaucracy especially on fund disbursement) and all their operations are flexible in the sense that, if one solution in implementation fails an alternative is sought immediately unlike the public sector where there is a long chain of command

Table 23: Relationship between Government facilitated villages and those facilitated by TFCG on community participation in forest management

Institutions	Villages	Community Participation		χ^2 - Value	Sign Value
		Yes in FM	No		
Government	Tambalang'ombe	27	3	115.669	0.000
	Igombavanu	24	6		
	Total count	51	9		
	Percent	42.5	7.5		
	Mtwango	29	1		
TFCG	Ihanu	28	2		
	Total count	57	3		
	Percent	47.5	2.5		

Additional information from key informants (TFCG project officer) was that community involvement including sub-village meetings in planning was very important rather than depending on a few representatives in stakeholder workshops.

Moreover, community participation in implementation of forest management activities and decision-making, results indicated that about 93% of respondents from villages where CEPA is implemented through TFCG outweighed 85% of the respondents from villages where CEPA is implemented by the government. Key informants said that communities are the implementers of all activities in the field and district staff assists in technical advice.

Increased participation in implementation of activities in TFCG villages may be due to the fact that, the organization provides some motivations/incentives such as polythene tubes, seeds, watering canes and other working gears like boots, overalls to communities to encourage them to participate in implementing their activities. Lalika (2007) concluded that socio-economic incentives for tree planting and retention increased the number of planted and retained trees thereby contributing to biodiversity conservation in the Uluguru mountains.

4.4.3 The relationship between Government facilitated villages and TFCG on Community participation in tree planting

Results in Table 24 show that 45% of respondents from villages where CEPA is implemented through TFCG on community participation in tree planting outweighed 17% of the respondents from villagers where CEPA is implemented by government through PFM. The chi-square test on respondents from villages where CEPA is implemented

through PFM by the Government against respondents from villages where CEPA is implemented by TFCG shows that there was significant difference ($\chi^2 = 14.488$; $p < 0.01$) between the two institutions in influencing communities to participate in tree planting.

Table 24: Relationship between Government and TFCG on community participation in tree planting

Institutions	Villages	Participation on tree planting		χ^2 - Value	Sign - Value
		Yes	No		
Government	Tambalang'ombe	14	16	14.488	0.002
	Igombavanu	6	24		
	Total count	20	40		
	Percent	16.7	33.3		
	Mtwango	28	2		
TFCG	Ihanu	26	4		
	Total count	54	6		
	Percent	45	5		

This difference in result of tree planting in the four villages is probably due to land scarcity prevailing in some of the study area, where there is competition with other land uses such as crop farming. This observation is supported by Lalika (2007) who explains that, people with relatively large farms planted more trees as opposed to people with smaller farms. Key informants also insisted that villages where respondents plants more trees are found near Sao Hill plantation, therefore the communities are encouraged to plant their own trees. Moreover, farmers said that they are being provided with seeds and polythene tubes as well as knowledge on tree planting in general from TFCG.

4.4.4 The relative strengths of NGOs in dissemination of CEPA on Participatory Forest Management

It is rather difficult to make a blanket statement concerning the strengths of NGOs over Government institutions. On the other hand, the study shows that NGOs are effective in disseminating community participation in forest management activities.

The effectiveness may have been influenced by flexibility in their operation and because, the NGOs are well equipped to overcome some of the constraints faced by research and extension services.

Moreover, they have transport facilities (i.e. mobility) to reach farmers effectively, they support local communities and schools with various materials such as seeds, polythene tubes, and motivation package to VNRC, and VEOs to encourage them work harder in order to fulfil their obligations in government and NGOs project. Furthermore, NGOs have ready funds at their disposal with which they can easily purchase goods and services for use by the farmers. A similar study conducted by Samson (2007) in Ethiopia supported a study that government extension officers have had moderate to weak work relationship among different organization including NGOs.

However, factors associated with effectiveness of NGOs in their working areas are as:

- (a) The NGOs have found creative ways of giving support to the development activities of the rural poor (because they have funds) e.g. maintenance of schools and dispensary.
- (b) The NGOs concern with resource-poor household means that they are frequently working in remote and difficult areas.
- (c) The NGOs target areas in which they operate are small. This allows them to make clear objectives of their work, to focus their resources and attention. It is easy to supervise a small area and hence more farmers reached by the extension workers more frequently.
- (d) NGOs operate with a concept of participation to strengthen farmer's organizations/groups and popular education enhancing the rural poor's capacities for self-management.

- (e) By their nature, NGOs can play an important informing role because of their flexibility and independence. (There is no bureaucracy especially on fund disbursement).

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- (a) The study concludes that CEPA materials/channels that existed in the study area were meetings, seminars, video shows, posters and radio. These tools are very popular means of communication and are generally well-trusted sources of information.
- (b) CEPA materials in the study area are not sufficient.
- (c) The level of awareness in the communities on participating in forest management in the study area is high (80%). Most of the communities are well informed and were able to express how they participate in forest management.
- (d) CEPA and education level of respondents showed statistically significant and positive regression coefficient on community participation in forest management while the household annual income shows statistically significant but negative influence on community participation in forest management. Duration of residence, household land ownership, and availability of extension agents had positive influence on community participation in forest management, though statistically insignificant.
- (d) NGOs have positive influence on participation of communities in forest management activities.

5.2 Recommendations

In order to raise community participation for sustainable forest management the following are recommended:

- (a) For effective information and education dissemination at local level, printed materials should be published in adequate quantities, at least one copy per household and be distributed immediately after production before information becomes out of date.
- (b) Posters should be produced and distributed to all households in the study areas and other written materials like leaflets, newsletters, textbooks and at least one copy of the National Forest Policy, Forest Act, NFP/NBKP, PFM guidelines and other government documents should remain in the village offices as resource centres or small rural libraries.
- (c) Radio programme should be developed by taking into consideration broadcasting at times when farmers and their families can listen; this includes women who have a heavy workload. This should be usually early in the morning before going to their fields or during night time 2045 – 2100 h pm. It is further recommended that, Regional radios have to be encouraged to suit local needs.
- (d) Planners and decision makers need to take into account CEPA and socio-economic factors that influence community participation in forest management or any other intervention involving communities for better implementation strategies.
- (e) Agents of Technology dissemination (NGOs, CBOs and private sectors) have great influence on forest management. However, it is necessary that they should have a

reasonable time allocation in order to allow farmers to learn, practice and realize the importance of the technologies delivered to them.

- (f) Coordination and cooperation between forest sector (Government), NGOs, CBOs and private sector should be encouraged. NGOs working in rural Tanzania should follow National forest policy and make sure that motivation packages they are providing are sustainable at the termination of NGO project so that the forest sector should be able to take over and carry on the work started by these NGOs.

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APPENDICES

Appendix 1: Household questionnaires

A. BASIC INFORMATION

Village.....

Ward.....

Division.....

Date.....

Households Identification Number.....

1.0. Name of head of household/respondent.....

1.1. Sex

i) Male

ii) Female

1.2. Age.....Years

1.3. Household members age distribution

Age	Male	Female
< 18 Years		
18-55 Years		
> 55 Years		

1.4. Education level (Tick appropriate answer).

S/n	Education level	Code
i	No formal education	1
ii	Primary education	2
iii	Secondary education	3
iv	Others (specify)	4

1.5. Residence duration in the village.....Years

B. SOCIO-ECONOMIC ACTIVITIES AND LAND USE SYSTEM

2.0. What are the major sources of household income? (Tick appropriate answer).

S/n	Sources of household income	Code
i	Crop production	1
ii	Livestock production	2
iii	Wood processing	3
iv	Both crop and livestock production	4
v	Both crop, livestock production & Wood processing	5
vi	Petty business	6
vii	Others (specify)	7

2.1. What is your income per month?.....

2.2. Do you own land?

Yes.....

No.....

2.3. How much land? Ha.....

2.4. How did you get the land?

(i) Inheritance.....

(ii) Allocated by Government.....

(iii) Purchase.....

(iv) Other (specify.....

2.5. Do you have land shortage?

i) Yes.....

ii) No.....

2.6. If yes why?.....

2.7. How do you tackle this problem of land shortage?.....

2.8. What type of crops do you grow on your farms? (Specify whether grown for food, cash or both.)

Crops	Food	Cash	Both
i)			
ii)			
iii)			

iv)			
-----	--	--	--

2.9. What is your income per year from cash crops?

C. Community awareness and participation in forest management

3.0. Community level of awareness on forest management

	Statement testing awareness of respondent	Max score	Score by respondent
1	Are you aware that any villager can own and manage his/her forest?	5	
2	Mention at least uses of forests	5	
3	Who is responsible for allocating forest land in this village?	5	
4	Have you come across any Forest extension materials?	5	
5	If yes, mention them.	5	
	TOTAL		

3.1. Do you know what PFM is?

- (i) Yes
- (ii) No

3.2. If Yes how did you come to know about it?.....

3.3. Have you seen any Government documents related to forest management?

- (i) Yes
- (ii) No

3.4. Can you mention them?.....

.....

3.5. Have you seen or heard about PFM guidelines?

- (i) Yes
- (ii) No

3.6. Do you understand how to use those guidelines?

- (i) Yes
- (ii) No

3.6. How do you participate in forest management?

Characteristics	Never (0)	Sometimes (1)	Always (2)
Planning			
Decision making			
Implementation			
Costs and Benefit sharing			
Evaluation			

Means of Communication

4.0. How is knowledge on forest management communicated to you?

- (i) Meetings.....Yes/No
- (ii) Seminars..... Yes/No
- (ii) Posters..... Yes/No
- (iii) Letters..... Yes/No
- (iv) Leaflets/Brochures..... Yes/No
- (v) Telephone..... Yes/No
- (vi) Newspaper..... Yes/No
- (vii) Radio..... Yes/No
- (viii) Newsletter..... Yes/No
- (ix) Video shows..... Yes/No
- (x) Television..... Yes/No
- (xi) Internet..... Yea/No

Education provisional

4.1. Is Education materials available to you?

- (i) Yes
- (ii) No

4.2. Relevance of education materials

Types	Relevant	Not relevant
Posters		

Leaflets					
Newspapers	High	Efficient	Efficient	Moderate	Not effective
Communication					
Small books					
Education					
Newsletter/Magazine					
Public awareness					
TOTAL					

4.3. Who provided the forestry extension materials?

4.4. Have any of your household members participated in any farmers training opportunities?

Training opportunities.....	Yes/No
Seedling raising.....	Yes/No
Tree planting.....	Yes/No
Natural forest management	Yes/No
Study tours.....	Yes/No
Workshops.....	Yes/No
Energy saving stoves.	Yes/No
Other specify.....	Yes/No

--	--	--	--	--

Public awareness

4.5. How do you get message on forest management?	Code
(i) Groups (meetings, seminars, workshop)	1
(ii) Mass (Radio, Vehicle with speaker, Video shows and TV)	2
(iii) Song/poems/Dram	3

CEPA composite index

5.0. Are there any forest management activities you have been involved in before and after CEPA?

Activity attended	Before CEPA	After CEPA
Forest patrolling		
Forest boundary clearing planting and weeding		
Boundary survey		
Forest gape restoration		
Fire break construction		

Forest fire fighting		
Formulation of village by-laws		
Preparation of village forest management plan		
Attending forest training		
Demarcation of village forest management area		

5.1. Why is Forest important?.....

5.2. What benefits are you getting from your forest?
.....

5.3. What are your comments on availability of forest products before and after PFM?.....

5.4. How did you come to learn about forest management?

(i) Indigenous knowledge

(ii) Learned from others

(iii) Extension agents

(iv) Others (specify)

5.5. How frequent do forest Extension agents visit you per month?

(i) 1 (ii) 2 (iii) 3 (iv) 4 (v) Other (specify).....

5.6. How do you rank the advice provided by Extension Officers on forest related activities?

(i) Adequate

(ii) Inadequate

5.7. Is there any illegal cutting of trees in your woodland/set aside forest or village reserve?

(i) Yes

(ii) No

5.8. If the answer is yes, what do you think are the major causes of illegal cutting of trees?
.....

5.9. What do you think will be the best solutions for the above (5.2) mentioned problems?
.....

6.0. Are there bylaws guiding the use of public forestry in your area?

(i) Yes

(ii) No

6.1. If answer is yes, do you know them?

(i) Yes

(ii) No

6.2. In your opinion, what should be done to make forest management in general effective?

.....

6.3. What alternative income generating activities do you carry out?

6.4. Do you need more training on any forest related activities? Which one

6.5. Do you plant trees in your field/farm?

(i) Yes

(ii) No

6.6. If yes for what objective?.....

6.7. When did you start planting trees?

6.8. What type of tree species do you most prefer?

Why?.....

Total area.....ha

6.9. Where do you get tree seedlings for planting?.....

7.0. If you have your own nursery, did you get assistance in establishing your tree nursery?

i) Yes.....

ii) No.....

7.1. If yes, where do you get the assistances(s)?

7.2. What kind of assistance do you get?

7.3. Do you know any donor-funded projects in this area?

(i) Yes.....

(ii) No.....

7.4. If yes, mention them.....

7.5. What are the objectives of the project?.....

7.6. How do you benefit?.....

7.7. What are your attitudes towards these donor-funded projects?.....

7.8. What do you consider to be the main socio-economic constraints pertaining to sustainable forest management?

How do they affect?.....

7.9. What are your opinions on what should be done to overcome these constraints?

.....

THANK YOU FOUR YOUR CO-OPERATION!!

Appendix 2: Checklist for key informants

A. Village governments and Village Natural Resources Committees (VNRC)

Date.....Place of interview.....

a. NameSex.....

Position.....

- Are there any forest extension workers in your village?
- What are their main activities?
- Does your village have a forest reserve?
- When was it established?
- How much area does it cover?
- What are the objectives of it?
- How is it managed?
- Is there any government involvement in forest management activities in this village?
- If yes what type of involvement?
- Are there any Non-Governmental Organizations involved in forest management activities?
- If yes, mention them.
- What type of involvement?
- Is their land degradation in your village?
- What do you think are the main causes of land degradation in your village?
- What do you suggest as measures to stop land degradation in your village?
- Are there any incentives given to people so as to participate in forest management?
- Who provides the incentives?
- What are the incentives?
- What are the benefits from the forest?
- What are challenges for ensuring sustainable forest management?

B: TFCG extension officers, District forest and natural resources office (DFO and DNRO) and Zonal forest extension Officers

a. Date.....Place of interview.....

b. NameSex.....

Position.....

- What are the goals of the project you are working with?
- How do you disseminate knowledge on forest management activities?
- What is the current level of awareness of communities in forest management?
- In your opinion, what do you think are the main causes of the current adoption rate?
- What are the socio-economic factors influencing sustainable forest management activities?
- How do Government, NGOs and projects working at the district coordinate and collaborate?
- How do you compare the present condition of the forest to the previous periods?
- What are the indicators if the condition of the forest improved or not improved?

- What is the suggestion on community participation in
 - Planning
 - Decision making
 - Implementation
 - Cost- benefits sharing
 - Monitoring and Evaluation
- 18. What do you think should be done in order that forest management in your area be more efficiency.....

B: FBD- HQ officers and TFCG Officers

a. Date.....Place of interview.....

b. NameSex.....

Position.....

- What are the challenges facing forest management in Tanzania?

- What are the incentives provided to communities as motivation to manage forestry?
- How do Government, NGOs and projects working at the district coordinate and collaborate?
- What are the challenges of PFM and three parallel administration structures on forest management?
- Comments on future prospects of PFM

Appendix 3: Level of awareness in the community on participation in forest management

Community level of awareness	Index scale for assessing level of awareness on forest management				
	Are you aware that anybody can own and manage his/her forest	Mention at least five uses of forests	Who is responsible in allocating forest land in this village	Have you come across any forest extension materials?	Mention at most five extension materials
No awareness	0	0	0	0	14.2
Low awareness	2.5	0	8.3	17.5	50.8
Moderate awareness	5.0	3.3	19.2	20.8	19.2
High awareness	87.5	96.7	71.7	51.7	15.9