

# **Evaluation of the Performance of Joint Forest Management (JFM) Programme: Case of Dambwa Forest Reserve in Livingstone District, Zambia**

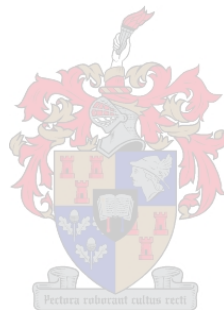
by

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## **Declaration**

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## Abstract

The past forest management strategies in Zambia did not allow participation of local communities in the management of Forest Reserves and sharing of benefits. The Zambia forest sector was reviewed between 1987 and 1997 culminating into the National Forestry Policy of 1998 and Forests Act of 1999, which provided for joint or participatory forestry management and share of derived benefits. In 2000, the Forestry Department initiated a pilot project to develop and implement JFM. This study was conducted in Dambwa JFM area in Livingstone to evaluate local people's participation in JFM; perceptions on the effect of JFM on local livelihoods; and the impact of JFM on forest condition. The study was conducted through the use of household questionnaires, interviews with key informants, focus group discussions, field observation, and vegetation assessment.

The results showed that more than half (68%) of the respondents were aware of JFM and almost the same number (64%) participated in JFM project. Participation of men in JFM activities was higher than women, although more women attended meetings than men. The results further showed that local management structures existed at district, forest area and village levels for coordination of JFM activities. Forest User Groups (FUGs) were also established in the area. The prominent FUG was the Mungongo oil pressing and was the only FUG functional at the time of the study. Forest Management Committee, Village Resources Management Committee and FUG members were found to be more involved in JFM activities than other members of the local community. Only a small number (8%) of local people reported improvement in household socio-economic conditions after the introduction of JFM, while the majority (79%) perceived the Forestry Department to be the major beneficiary in the JFM. The study revealed that there was a loss of enthusiasm in JFM among local people largely due to the absence of economic benefits and limited decision-making powers. However, the relationship between local people and Forestry Department was reported to have improved.

The overall forest stocking was found to be low (219 SPH) with nearly all (90%) of the stems below 30 cm DBH, including the selected valuable tree species of *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Guibourtia coleosperma*, *Azelia quanzensis* and *Colophospermum mopane*. This implies that the forest area was previously overexploited rendering it uneconomical for commercial exploitation to provide benefits to local people on sustainable basis. However, the results showed a lot of saplings (10,000 SPH) in the Forest Reserve signifying adequate regeneration, including that of the valuable species, except for *Azelia quanzensis* and *Guibourtia coleosperma*. The abundant natural regeneration implies that there was adequate forest protection and management following the introduction of JFM, which enhances regeneration.

It is recommended that the Forestry Department should continue with public awareness on JFM to increase understanding and stakeholders' involvement. The Forests Act of 1999 should be commenced and amended to support full implementation of JFM. The value of the forest also needs to be enhanced to increase benefit for local people and long-term conservation.

## Opsomming

In die verlede het die bosbou bestuur strategieë in Zambië nie voorsiening gemaak vir die deelname van die plaaslike gemeenskappe in die bestuur van Bosbou reserwes of vir die verdeling van die voordele nie. Die hele bosboubedryf in Zambië is tussen 1987 en 1997 in oënskoue geneem en dit het gelei tot die Nasionale Bosbou Beleid van 1998 en die Wet op Bosbou van 1999 waarvolgens die gemeenskap kan deel in die bestuur van bosbou en van enige profyte. In 2000 het die Bosbou Departement 'n loodsprojek ontwikkel vir die ontwikkeling en implementasie van Gesamentlike Bosbou Bestuur (JFM). Hierdie studie is gedoen in die Dambwa JFM area in Livingstone om die plaaslike mense se persepsie van en deelname in JFM te evalueer; die effek van JFM op plaaslike mense se geldsake en die impak van JFM op die toestand van die woude. Die studie is gedoen deur middel van huishoudelike vraelyste, onderhoude met sleutel informante, observasies en waarnemings van die plantegroei.

Volgens die resultate is meer as die helfte (68%) van die resondente bewus van JFM en omtrent dieselfde getal (64%) het deelgeneem aan die JFM projek. Meer mans as vrouens het deelgeneem aan JFM, maar meer vrouens het die vergaderings bygewoon. Die resultate wys verder daarop dat plaaslike bestuurs strukture die vorm aanneem van distriks-, woud area-en dorpsvlakke vir die koördinasie van JFM aktiwiteite. Bosgebruikers Groep (FUGs) is ook in die area gestig Die prominente FUG is die Mungongo olie persing en dit was die enigste FUG wat funksioneel was tydens die studie. Bosbou Bestuur Komitee, Dorps Bronne Bestuurs Komitee en FUGs lede was meer betrokke by JFM aktiwiteite as ander lede van die plaaslike gemeenskappe.

Net 'n klein persentasie (8%) van plaaslike mense rapporteer 'n verbetering in hulle sosio-ekonomiese toestande na die implementering van JFM. Die meerderheid, (79%) voel dat dit Bosbou Departement die meeste voordeel trek. Die plaaslike mense is baie minder entoesiasties oor JFM meestal omdat hulle nie ekonomiese voordeel daaruit trek nie en min besluit-makende mag het. Die verhouding tussen die plaaslike mense en die Bosbou Departement het egter blykbaar verbeter.

Die oorhoofse ouderdom van bome is laag (219 SPH) met amper al (90%) die stamme onder 30 cm DBH. Dit sluit die kosbare spesies van *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Guibourtia coleosperma*, *Azalia quanzensis* en *Colophospermum mopane* in. Dit impliseer dat die woud voorheen oorontgin is en dat dit nou onekonomies is vir kommersiële ontginning en nie op 'n volhoudbare basis profit aan die plaaslike mense kan bied nie. Daar is egter baie jong bome in die woud (10,000 SPH) wat bewys dat daar genoegsame regenerasie is, dit sluit die kosbare spesies behalwe *Azalia quanzensis* in en *Guibourtia coleosperma*. Die grootskaalse regenerasie bewys dat daar genoegsame woud beskerming en bestuur was na die implementasie van JFM en dat regenerasie aangemoedig is.

Daar word aanbeveel dat die Bosbou Departement aanhou met die beleid van publieke bewus -making en om die kennis van deelnemers te vergroot. Daar moet ook 'n groter bewustheid wees van die waarde van woude en van die voordele wat dit vir plaaslike mense kan inhou en van die waarde van langteryn bewaring.

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## **Acronyms and Abbreviations**

ADMADDE	Administrative Management Design for Game Management Areas
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBFM	Community Based Forest Management
CBNRM	Community-Based Natural Resources Management
CRB	Community Resource Board
DBH	Diameter at Breast Height
FAO	Food and Agriculture Organization
FBD	Forestry and Beekeeping Division of Tanzania
FD	Forestry Department
FMC	Forest Management Committee
FUG	Forest User Group
GMA	Game Management Area
GRZ	Government of the Republic of Zambia
JFM	Joint Forest management
MTENR	Ministry of Tourism, Environment and Natural Resources
NTFP	Non Timber Forest Products
NWFP	Non Wood Forest Products
PFAP	Provincial Forestry Action Programme
PFM	Participatory Forest Management
PRA	Participatory Rural Appraisal
SAPs	Structural Adjustment Programmes
SPH	Stems Per Hectare
VRMC	Village Resource Management Committee
ZAWA	Zambia Wildlife Authority
ZFAP	Zambia Forest Action Programme

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# Chapter 1 - Introduction

## 1.1 Background Information

Management of forests through the government agency was a common approach in most African and Asian countries. Such approach did not consider the needs of the local communities. The past forest management strategy as reported by Vandergeest (1996) was more concerned with conservation of forests and woodland from human exploitation. The lack of local community participation cause local communities to have negative attitude towards conservation efforts and the enforcement of conservation-related regulations. For example, in Uganda as reported by Obua *et al.* (1998) local people did not value sustainable use of the forest because they were for many years not allowed to collect any forest produce from Budongo Forest Reserve.

The management of forest reserves in Zambia was also in the past based on a government policy and legislation that restricted the access of local communities to the forests except with special permits (GRZ, 1973; GRZ, 1998; PFAP, 2005). Local people had no power over forest reserves and as such did not have meaningful incentives to conserve and manage these forest resources. The government also failed to effectively manage the forest reserves due to financial constraints and inadequate manpower (ZFAP, 1998).

Pressure within the country for sustainable natural resource management and the events around the globe, such as the United Nations Conference on Environment and Development (UNCED) referred to as the Earth Summit held in Rio de Janeiro in Brazil in 1992, led to the recognition of the role of local communities in natural resource management and revision of the policies in Zambia (ZFAP, 1998; GRZ, 1998; Jumbe and Angelsen, 2007). The information available and the lessons learnt from within and outside the country provided evidence of the potential for JFM to contribute positively to the improvement of forest status and rural livelihoods (PFAP, 2006).

The government of Zambia revised and adopted a new Forestry Policy in 1998 to allow participation of local communities, traditional institutions, NGOs and the private sector in the management and development of the forestry sector. The main feature of the revised national forest policy was the stakeholders' participation in forestry development and promotion of sustainable forestry development (GRZ 1998; GRZ, 1999; PFAP, 2005). The Forests Act was also revised in 1999 to support the implementation of the revised National Forestry Policy of 1998.

The Forests Act of 1999 provided legal framework for joint forest management. It allowed the participation of local communities, traditional institutions, non-governmental organizations and other stakeholders in sustainable forest management and the establishment of joint forest management areas. The Forests Act subsequently provided for the Forestry Department in partnership with local communities, traditional institutions and private sectors to develop and implement management plans for national forests, local forests and open areas which are jointly managed. Furthermore, the Act provided for the constitution of the Forest Management Committees (FMC), comprising of representatives of various stakeholders, to negotiate with Forestry Department the co-management agreements, to develop and implement the Joint Forest Management (JFM) plans, to manage and develop the JFM area, and to distribute benefits among the local communities.

The Zambia Forestry Department in the Ministry of Tourism, Environment and Natural Resources embarked on implementation of JFM on a pilot basis. The piloting of JFM was undertaken through the Provincial Forestry Action Programme (PFAP) Phase II with technical and financial support from the government of Finland. The Programme was aimed at developing a model for joint management of forest reserves with local communities living in close proximity to forest reserves in line with the national forestry policy. The programme was implemented in three provinces of Luapula, Copperbelt and Southern with the objectives of improving livelihoods of local people and condition of forests (PFAP, 2005). If the pilot programme proved to be successful, the same approach would be replicated and scaled up elsewhere.

## 1.2 Problem Statement

Rural households, particularly in Africa derive wide range of products for their subsistence from the rich and diverse vegetation type (Campbell *et al.* (1993: cited in Grundy *et al.*, 2000). In developing countries, people depend on forests and forest products such as timber, fuelwood, medicine, and food for livelihood support (ZFAP, 1998; FOSA, 2001; Sethi and Khan, 2001). It is not possible, therefore, to have the forests for exclusive use by the State alone and deny forest-adjacent communities access to the forests (Lise, 2000). The local communities particularly poorer households would continue to access and use forest resource despite not having legal right to access the forest resources. This scenario can lead to rampant deforestation and increased poverty levels among the rural communities (Jumbe and Angelsen, 2007), as the forest resources may be used in an unsustainably and in a disorderly manner.

Furthermore, in early 1980s the International Monetary Fund (IMF) and International Bank of Reconstruction and Development (IBRD) or the World Bank designed economic policies known as Structural Adjustment Programs (SAPs). These policies were aimed at assisting developing countries to emerge from the debt crisis for the re-scheduling of existing loans as well as granting further loans with new conditions (World Bank Group, 2003). The SAPs were characterized by elimination of subsidies on major farm inputs, market liberalization, reduction in public spending, privatization of state owned industries, and reducing labour force in the public sector, among others (World Bank Group, 2003; Odera, 2004).

Conversely, SAPs resulted in contributing to the decline in agricultural productivity, emergence of commercialization of forest products and increased unemployment forcing many people to turn to forests and forest products for livelihood sustenance (Odera, 2004). The SAPs resulted in an increase in deforestation and forest encroachment due to illegal and uncontrolled forest exploitation. These effects were also exacerbated by decrease in the government's capacity to effectively protect and manage forest resources as a result of reduced manpower and budgetary allocation.



Consequently, SAPs had negative impacts on the status of the forests and on the livelihoods of the local people following the increase in deforestation, forest encroachment, and poverty levels. The poverty levels were high such that according to GRZ (2003) approximately 70% of the population in Zambia was characterized as poor during the 1990s. As such, the SAPS contributed to the search for new forest management strategies, such as the participatory forest management (PFM) or joint forest management (JFM), aiming at improving the condition of the forests and to enhance the livelihood of the local people. The government of Zambia, therefore, initiated JFM to co-manage the forest reserves with the involvement of forest-adjacent communities.

The JFM initiative was in line with the revised National Forestry Policy and it was expected to reduce the management costs, have a positive impact on quality of forest resources; and improve the livelihoods of the local communities over time (GRZ 1998; ZFAP, 1998; Murali *et al.*, 2003; PFAP, 2005). The initiative had been under pilot since early 2000 (GRZ, 1998; PFAP, 2005). However, despite claims that PFM/JFM can contribute significantly to the improvement of forest condition and people's livelihoods, few efforts have been made to review the performance of such policy interventions. Lack of evaluation of such intervention has led to emergence of substantial gap between theory and practice.

### **1.3 Objective of the Study**

#### 1.3.1 Overall Objectives

The study aimed at evaluating the performance of JFM programme in Dambwa Forest Reserve, which involved the participation of local communities and the Forestry Department in the Southern province of Zambia. The focus was to analyze and determine local people's participation, significant changes in livelihoods of the local people and conditions of the forest.

### 1.3.2 Specific Objectives

1. To assess the perception and extent of participation of local forest-adjacent community in JFM.
2. To determine factors influencing local people's participation in joint management of state owned forest reserve.
3. To assess the effects of JFM on livelihoods of local forest-adjacent communities.
4. To assess the impact of JFM on the status of the forest reserve.

### 1.3.3 Research Questions

This research attempted to answer the following:

1. What are the perceptions and levels of local community participation in JFM programme?
2. Which factors influence households in the study area to be involved in co-managing the forest reserve?
3. What changes have occurred in local people's livelihoods as a result of their participation in protection and management of the forest reserve?
4. What major changes have occurred in the condition of the forest reserve following local people's involvement in forest protection and management?
5. What improvement options can be made to the present JFM approach for it to be sustainable?

## **1.4 Rationale of the Study**

The practice of PFM in recent times has been accepted as the way for sustainable management of the forest resources. It is well documented that PFM provides opportunities for local people to participate in forest conservation and management, thereby contributing to improved status of forests and the well-being of local communities (Wily, 2002). The approach is based on the concept of involving local people, whose daily lives are affected by the operation of a forest management system, in the forest management (Wily, 2001; Bhattacharya and Basnyat, 2003; PFAP, 2005). PFM or JFM, therefore, appears to be one of the solutions towards reducing deforestation and alleviating poverty.

Programme evaluations are essential in assisting to identify changes, and enables progressive learning at individual, community, institutional and policy levels. This evaluation study is important to policy makers, the project implementers and the donor community in assessing whether the goals of the project are met and drawing some lessons on the performance of the project. The information provided could be used for continuous improvement process in project implementation and also provides useful information to aid replicating and scaling up JFM approach to others areas of the country.

## **1.5 Thesis Structure**

The thesis is structured in the following ways: Chapter 2 gives an account of relevant literature reviewed for the study. Chapter 3 gives the description of the methodology. The methodology includes the description of the study area, forest resource and how the research was conducted. Chapter 4 covers a report of the study results. It includes the finding of the household questionnaire, focus group discussions, interviews with key informants and the rapid forest resource assessment. Chapter 5 covers discussions of the study results. The discussions are supported by relevant literature where appropriate. Chapter 6 is the conclusion of the report and recommendations.

## **Chapter 2 – Literature Review**

Chapter two provides a review of literature on forest management and utilisation; contribution of forests to people's livelihoods; meaning of participation and types of participation. The chapter also covers the concept of participatory forest management, its implementation and performance at global, regional and national levels.

### **2.1 Forest Resource and People's Livelihoods**

#### 2.1.1 Forest Protection and Management

Forest resource management is defined as the art and science of making decisions with regards to the organization, use and conservation of forest and related resources. A number of variables are involved in forest resource management which include biological, economical and social (Boungiorno and Gilles, 2003). All these variables are interrelated and affect different stakeholders in a different way.

Although it is not well documented, natural resources management systems prevailed among indigenous African people before the arrival of European colonialists. Traditional institutions such as kings, chiefs, headmen, and traditional healers played important roles in regulating and monitoring natural resource use through rules and procedures designed to regulate the use and management of natural resources (Matose and Wily, 1996; Fabricius, 2004). However, during colonial and post-colonial period large areas of natural forests in many developing countries, particularly in sub-Saharan Africa, were withdrawn from the local people into the hands of the state either as game reserves, forest reserves or simply state land (Matose and Wily, 1996).

Game reserves and forest reserves were often established for the purposes of conservation, securing valuable areas against settlement, for agricultural expansion, securing water catchment areas or as a revenue generating mechanism for government. The act of removing local tenure or control over natural resource areas

undermined sense of local responsibility for natural resource management (Matose and Wily, 1996), a practice that had proved dreadful up to the present.

In Zambia, extensive forests exist consisting of forest reserves, open areas (forest areas under traditional leadership) and plantation forests (GRZ, 1998); and it is estimated that there are about 33.5 million hectares of forest in Zambia (PFAP, 2005). The forest resource covers 60% of the country's 752,614 Km<sup>2</sup> total land surface area, and the country is regarded as one of the highly forested countries in Southern Africa. The main vegetation type is Miombo woodland, which covers 47 % of the country's land area. The other types are the savannah woodland and grassland (MENR, 1994; GRZ, 1998; ZFAP, 1998).

Forest reserves were established in Zambia for the purpose of conserving certain forest areas and to provide wood raw material to the surrounding communities and the industries, particularly the mines. These forest estates occur on state land, trust land or reserve land. The areas officially designated as forest reserves through legislation are about 7.2 million hectares, representing 9.6% of the country's total land area (GRZ, 1998; ZFAP, 1998; FOSA, 2001). Forty four percent (44%) of the forest reserve was set aside for production, 26% for protection, and 30% for both production and protection (GRZ, 1998). Forest reserves are also categorized as national forests and local forests. The national forests serve the interest of the entire nation while local forests serve the interest of local communities (GRZ, 1973; GRZ, 1999; FD, 2004).

The management and conservation of forest reserves in Zambia like in many African countries is the responsibility of the government through Forestry Department. Harvesting of wood products, settlements or cultivation in forest reserves is only permissible under a permit (GRZ, 1973). The Forestry Department, however, does very limited forest management activities in forest reserves because of insufficient funding and reduced manpower. Encroachment, late bush fires, uncontrolled charcoal production, and illegal timber harvesting have become common in forest reserves and have resulted in reduction of forest resources.

As supported by Abbot and Homewood (1999), human pressure on forests has caused decline in forest cover and modification of tree species composition. Factors leading

to the reduction in forested area are complex and varied, which include expansion of human settlements, expansion of agricultural land, unregulated charcoal production and forest wild fires (ZFAP, 1998). Forests located near human settlements and major towns are most vulnerable as they face serious threat of overexploitation and encroachment. It is estimated that Zambia loses about 850,000 ha of forest annually (FAO, 2005). However, other studies estimated deforestation rate to be between 250,000 and 300,000 ha per year (ZFAP, 1998; PFAP, 2005). These estimates were based on partial sampling and extrapolation, as there had not been intensive national forest inventory since the 1960s (ZFAP, 1998). According to these estimates, the rate of annual forest loss is high despite the varied estimates.

There are many examples of inadequate and unsustainable management of the forests by central governments both in developing countries and developed countries (Anderson, 2000). The Zambian government as such undertook forestry sector review between 1987 and 1997. The review was in recognition of high deforestation rates and the inadequacies of the past forest policy to conserve and manage the forest resources. The sector review was also in line with the changing global trends in natural resource management and upon recognizing the role of stakeholders in sustainable forest resources management (ZFAP, 1998; Wily, 2001).

The review resulted in the National Forestry Policy of 1998 and the Forests Act of 1999. The new policy encouraged active involvement of stakeholders, particularly local communities, in protection, management and utilization of forest resources. The involvement of local communities in forest protection, management and sustainable use of forest resources entailed withdrawal of the exclusive powers from government to own, control, plan and manage forest reserves (GRZ, 1998; ZFAP, 1998; Wily, 2001).

### 2.1.2 Contribution of Forests to Local People's Livelihoods

Forests are one of the most important natural resources in Zambia, covering almost 60% of the total land area though most of it is degraded (GRZ, 1998; PFAP, 1998). Forests play an important role in people's livelihoods as they provide a wide range of products and services (PFAP, 1998; Campbell *et al.* (1993: cited in Grundy *et al.*, 2000); FD, 2005; FAO, 2007). They are major sources of food, wood fuel, building materials, and traditional medicines. They also play vital role in carbon sequestration and hydrological cycles, and are key factors in watershed and soil conservation (GRZ, 1998; FAO, 2007). The role of forests in local people's livelihoods cannot be over emphasised.

Carney (1998) defined livelihood as the capacities, assets and activities required to achieve a means for living. According to DFID (2001), livelihood strategies denote a range and combination of activities and choices that people make in order to achieve their livelihood goals. Livelihood becomes sustainable if it can cope with and recover from stresses and disturbances, and maintain or enhance its capabilities for now and in the future.

In rural Zambia, the primary livelihood system is subsistence and semi-subsistence agriculture (Olson, 2007; FD, 2005). A wide range of agricultural crops are grown such as maize, millet, cassava, finger millet, sweet potatoes and vegetables. Off-farm income generating activities for sustaining local livelihoods are also available and they include beer brewing, petty trade and casual labour (PFAP, 1998). A wide range of forest products are also collected and utilised by local people, some of which are traded and form an important source of income to supplement household income.

Forests are also important in improving people's physical well-being through the use of traditional medicine. The use of traditional medicines is widespread among rural people. This is attributed to the lack of money to purchase drugs, cultural preference for traditional healing practices, and poor distribution and service of rural health facilities (PFAP, 1998).

Furthermore, forests sustain rural people's livelihoods through soil conservation, protection of water catchment areas, provision of grazing areas for livestock, for soil conservation, and provision of wood energy (FAO, 2007). About 88% of the households in Zambia rely on wood energy sources (PFAP, 1998). Firewood forms the common domestic fuel source for the rural community and charcoal is the major source of wood energy in urban community and its demand is on the increase (PFAP, 1998; Puustjärvi *et al.*, 2005).

Sustainable use of forest resources is critical for people's livelihoods. The poor rural communities tend to be the most vulnerable to the effects of environmental degradation (Warner, 2000). According to 2003 Poverty Reduction Strategy Paper (PRSP), the average poverty level in Zambia stood at 73% of which rural areas had a prevalence of 83% and urban areas 56% (GRZ, 2003).

Rural households reduce their vulnerability by deriving food security and increase household income from forests (Olson, 2007; Warner, 2000). As supported by Murali *et al.* (2003) and Bwalya (2004), the degree of dependence on forests and forest products is high among poorer households in the community. Forests reduce the vulnerability of households by acting as safety net in time of needs (Warner, 2000; Arnold, 2001; Bwalya, 2004; Olson, 2007).

## **2.2 People's Participation in Forest Management**

In the past, many governments took upon themselves to manage forest reserves without the involvement of other stakeholders, particularly the forest-adjacent communities. Local communities were excluded from forestry management activities despite the important role of forests in people's livelihoods. Local communities and other stakeholders had no legal rights, access and economic incentives to manage and use forests. But it has been recognised that sustainable forest management cannot be achieved without the participation of key stakeholders and that forests can contribute significantly to poverty alleviation among forest dependent communities (ZFAP, 1998; Wily, 2001; Belcher *et al.*, 2005; PFAP, 2005).



It became evident that management of forests exclusively by central government was not sustainable as they lacked capacity both financial and human (Bojang and Reeb, 1998; Brown, 1999; Anderson, 2000; Fabricius, 2004; and Luoga 2006). Participatory approaches to forest management were therefore adopted in order to move away from the predominant sanction and command approach. The approach offered an alternative management strategy, which uses local empowerment and capacity with the objective of uplifting local livelihoods and at the same time improving forest condition (Burkey, 1993; ZFAP, 1998; Lise, 2000; DWAF, 2004). It responds to the immediate socio-economic needs of local people and to the long-term problems of sustainable natural resource management.

Lise (2000) further pointed out that high dependence of people on forests and good forest quality enhances voluntary people's participation. It may therefore not be practical, particularly in developing countries, to have forests only for government use because many people depend on forests for basic needs such as food, wood fuel, timber, and medicines, among others. Participation of local communities in forest management is expected to lead to sustainable utilisation of forest resources (Lise, 2000; Ham *et al.*, 2008). Incorporating local people in forest management is also expected to enhance indigenous and scientific technical knowledge (FOSA, 2001).

Dewee (1994) supported the importance of empowering local communities in planning, implementation and monitoring local forest conservation to prevent loss of forest resources. Local empowerment, decentralisation of decision-making and increased involvement of local communities in forest management should ultimately result in changes in forest ownership and tenure. As reported by Bwalya (2004), the other expectations of CBNRM approach are rapid return on natural resource protection and management and complete transfer of rights to communities to improve local people's livelihoods.

Securing benefits from forests is expected to improve livelihoods of forest dependent communities at the household, village, and community levels. The benefits take the form of financial returns from the sale of forest products, lease of forest resources and collection of fines. The other benefits are secured rights over local resources; reduced vulnerability through a sustainable supply of forest goods and services and improved

partnerships with external institutions such as local governments and other service providers (Blomley and Ramadhani, 2006).

Due to the foregoing factors and in line with the changing global trends in natural resource management, many countries including Zambia reviewed the forestry sector (ZFAP, 1998; Wily, 2001). Review of the forestry sector resulted in the adoption of a new forest policy, which incorporated aspects of participatory forest management. The participatory approach to forest management allowed forest-adjacent communities to be involved in planning, protection and management of forest resources and sharing of derived benefits. The intervention is aimed at improving the condition of forests and livelihoods of local communities (GRZ, 1998; ZFAP, 1998).

## 2.2.1 Meanings and Typology of Participation

### 2.2.1.1 *Meaning of Participation*

There are different meanings and different forms of participations (Fabricius, 2004) as there are also many different users of different forms of participation (Hobley, 1996). Participation implies influence, whilst to others it is empowerment; participation is largely determined by the initiators of participation and the purpose to be achieved.

The World Bank defines participation as "a process through which stakeholders influence and share control over development initiatives and the decision and resources which affect them" (World Bank). Dolisca *et al.* (2006) define participation as an active process by which beneficiaries or client groups influence the direction and implementation of a development or natural resource management project with a view of enhancing their well-being. As indicated by Pongquan (1992) in Lise (2000), participation consists of three components, namely: contribution to, benefiting from, and involvement in decision-making and evaluation. In developmental context meaningful participation encompasses influence and empowerment (Hobley, 1996).

By sustaining participation local people should be able to organise themselves and through their own organisations they are able to identify their needs, share in design,

implementation and evaluation of their activities. Meaningful participation of local people in forest management should therefore entail active involvement of forest users in planning, implementation, resource utilization, and monitoring (Coralie and White, 1994; Rishi, 2007). Meaningful participation also implies the ability to positively influence the course of events (Burkey, 1993).

Cohn and Uphoff (1977: cited in Burkey, 1993) acknowledged that local participation in decision-making during implementation was even more critical to project/programme success than participation in the initial design of the project. Fabricius (2004) further states that it is comparatively easy to get people interested in a community-based natural resources management initiative at the onset and they would attend meetings and show interest because it is something new or they are inquisitive. However, on going interest and participation may call for incentives to encourage local communities and other stakeholders to participate and also to manage natural resources sustainably.

In conclusion, participation is a critical factor in development process (Coralie and White, 1994). However, Ravnborg and Westernmann (2002) pointed out that the concept of participation is often misunderstood to be the attendance of local people in meetings irrespective of their inputs and opinions about the issues at stake. Murali *et al.* (2003) support the notion that inadequate local community participation can be a drawback to participatory approaches. Local people also consider participation in a development process as an investment such that they will participate in anticipation of a reward (Coralie and White, 1994; Dolisca *et al.*, 2006; Jumbe and Angelsen, 2007).

#### 2.2.1.2 *Types of Participation*

There are different types of participation, ranging from complete outside control, token involvement of local people, to a collective action of local people where own their agenda is set and implemented without outside facilitation. There are also various forms of participation in-between the range. According to Petty *et al.* (1994) adapted in Fabricius (2004), seven types of participation are identified along the gradient of community involvement and empowerment. At the least end of the spectrum of participation, people are merely informed and do not contribute any

views, while on the upper end of the spectrum community-based programmes are self-initiated.

Table 1: Typology of Participation

<b>Type</b>	<b>Description</b>
Passive participation	People are informed of what is going to happen or what has already happened. The information being shared belongs only to the external people and no response is expected from the audience.
Manipulative participation	Participation is not as genuine as it seems to be or it is a deception
Participation in information giving	People answer questions, questionnaire survey or similar approaches. People do not have opportunity to influence proceedings. Findings are neither shared nor checked for accuracy
Participation by consultancy	People are consulted and external agents obtain their views. But external agents define the problems and solutions and may modify in light of the response from the people. The external agents do not concede any share in decision-making and are under no obligation
Participation for material incentives	People provide resources such as labour or materials for a project in return for food, cash or other material incentives
Functional participation	People form groups to meet predetermined objectives such as establishment of externally initiated committees. Initially dependent upon external initiators and facilitators and may become self-dependent.
Interactive participation	Joint analysis leading to action plan and formation of new local groups or strengthening existing ones. Involves interdisciplinary methodologies, multiple perspectives and learning processes. Groups take control over local decisions; people have a stake in maintenance of the structures
Self-mobilisation	Initiatives taken independently of external institutions.

Source: Adapted from Fabricius (2004)

In cases where the State lacks the capacity to manage and protect natural resources or where there is need to uplift livelihoods of local people, genuine participation of the local communities living around the resource is a key to sustainable management. Lise (2000) acknowledged that forests are better managed when people's participation

is secured. However, participation can also be a manipulative tool to manage people in predetermined process (Castrol and Nielsen, 2001).

The level of participation can also be vertical or horizontal. According to Dalal-Clayton *et al.* (2003), horizontal participation involves interactions on an issue across sectoral interest groups. Conversely, vertical participation refers to interaction on an issue throughout the hierarchy of decision-making such as from national to local levels or from leaders to marginalized groups. Dalal-Clayton *et al.* (2003) further indicated that the deeper the vertical participation within a given institution, the better would be the understanding and support for the strategy.

### 2.2.2 Participatory Approaches to Forest Management

There has been a long history of participatory approach to forest management in India, Nepal and elsewhere in Asia. In India, participatory approach to forest management was started when it was introduced in different states as a participatory tool to conserve and manage forest resources in a sustainable way. But experiments were already underway elsewhere to involve rural people living in the periphery of forests in the management of forest resources in the early 1970s (Rishi, 2007).

Participatory approach to natural resource management came about as an alternative approach to address environmental, social, and economic concerns (Jumbe and Angelsen, 2007). Although the first JFM arrangement in India was informal, communities were allowed to get involved in forest conservation and in turn they were offered employment and permitted to use non-timber forest produce from forest and share profits from timber sales.

Participatory approach to forest management was initiated upon realisation that the old forest protection system of policing to manage and protect the forest resource was not successful in the protection of forests and in responding to the needs of rural communities. Saxena (1992) and Joshi (1999) also reported that the early experience in West Bengal State of India in the 1970s revealed that successful forest management and conservation occurred when forestry personnel collaborated with rural

communities living around State forests. The new approach also was reported to have led to change of attitude among local people towards forestry personnel from the hostile relationship that had existed before due to the policing approach that the forestry department had adopted (Rishi, 2007).

The demand for change in forest resources management system was also largely influenced and driven by global and international concerns over the future of forests and failure of central governments to stop or reverse the loss of forest resources (Odera, 2004). Most of the international agreements that facilitated CBNRM emanate from the United Nations Conference on Environment and Development (UNCED), referred to as the Earth Summit, which was held in Rio de Janeiro in Brazil in 1992 where global conflict between economic development and environmental protection was discussed. Participatory development has since been accepted as an integral part of development strategy (Jumbe and Angelson, 2007).

Participatory forest management or joint forest management has many definitions, but in summary it is defined as the management of forests in collaboration with government and forest-adjacent communities (Blomley and Ramadhani, 2006; FBD, 2003; FD, 2003; PFAP, 2005). Ham *et al.* (2008) also define participatory forest management as the sharing of responsibilities, control, resource and decision-making authority over forestland between Forestry Department and local user groups. PFM encompasses all participatory approaches to forest management. It incorporates collaborative forest management, community forests, shared forest management and joint forest management, among others (Hobley, 1996; FBD, 2003; PFAP, 2005). The approach also incorporates different perspectives, interests, and interaction of different stakeholders with the forest environment and beyond forest resources (Hobley, 1996; PFAP, 2005; Rishi, 2007).

The underlying principle of JFM is based on the assumption that a willing and active partnership between State and local community can promote conservation through sustainable management of forest resources (Murali *et al.*, 2003). It encourages the development of partnership between the State forest agency and local people to manage forest resources jointly through legalised access by communities to forest and woodland area (Lise, 2000; Ham *et al.*, 2008). This enhances mutual trust between the

State and the participating local people, and among the local people so that mutual participation is sustained (Lise, 2000).

On the other hand PFM is supposed to improve the forest condition in terms of increased forest regeneration, availability of forest products, availability of valuable tree species, and reduced rate of illegal forestry activities (PFAP, 2005). The success in west Bengal and other States in India in reversing forest degradation resulted in the adoption of national JFM resolution, a move from policing and protection to collaboration (Joshi, 1999). Involvement of various stakeholders, especially local communities, in natural resource management projects also has generated successful and sustainable results in several West African countries, such as Benin, Burkina Faso, Cote d'Ivoire and Mali (World Bank, 1998). The involvement of communities in forest management is now a significant feature of national forestry policies and practices and of internationally supported programmes throughout the world (Fisher, 1999; Shackleton *et al.*, 2002).

The policies and legislations of other sectors, such as wildlife, land, agriculture and cooperatives, water development, decentralization, resettlement, and energy have also had an influence on the implementation of CBFM. Although the ADMADE programme was centred on wildlife, was the earliest and influential initiative in Zambia to enable local people to participate in and benefit from natural resource management (Bwalya, 2004; PFAP, 2005; Olson, 2007). The programme was implemented in Game Management Areas (GMAs), the semi-protected areas adjacent to national parks, with the basic idea that local communities would be involved in decision-making process and assist in the conservation of wildlife resource. In return, the local residents would receive a share of revenues generated from the protected areas in their area for investment in the local economy, and establish a system of user rights with defined access to wildlife resources (Olson, 2007).

The experiences of PFM in Zambia were also drawn from the Tanzanian PFM model though decentralization processes are different between the two countries (FBD, 2003; PFAP, 2005). Two forms of participatory forest management are recognized in Zambia: joint forest management and community forest management (FD, 2004; PFAP, 2005). It is aimed at developing partnerships between local communities and

Forestry Department for the sustainable use and management of forest areas on the basis of trust and mutually defined rights and responsibilities for both parties (Hobley, 1996). The involvement of local communities in forest protection and management is also expected to reduce management costs, create positive impact on quality of forest resources; and improve livelihoods of local people over time (Murali *et al.*, 2003; PFAP, 2005). In contrast, community forest management is referred to as the management of forestland under control and ownership of local communities (FBD, 2003; FD, 2004; PFAP, 2005; Blomley and Ramadhani, 2006). It takes place in forests on village or traditional land and the local residents take full ownership and management responsibility for the forest area within their jurisdiction (Blomley and Ramadhani, 2006).

### 2.2.3 Policy, Institutional and Legal Framework for PFM

For many years, policies for managing common pool resources, including forests had marginalized local people, thereby denying them access to these resources. There was also a realisation that policing approach for managing and protecting forest resources was not responding to the needs of nature or the rural communities (Rishi, 2007). The resolutions of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 further influenced the involvement of local inhabitants in planning and management of natural resources as an integral part of development strategy (Loikkanen *et al.*, 1999; UNCED, 2008). The main documents agreed upon at the Earth Summit were:

Declaration on Environment and Development known as the Rio Declaration which laid down 27 broad non-binding principles for environmentally sound development;

Agenda 21 which outlined global strategies for cleaning up the environment and encouraging environmentally sound development;

Statement of Principles on Forests, aimed at preserving the world's rapidly vanishing tropical rainforests, which is a non-binding statement



recommending nations to monitor and assess the impact of development on their forest resources and take steps to limit the damage done to them;

UN Framework Convention on Climate Change, or Global Warming Convention, a binding treaty, which stopped short of setting binding targets for emission reductions (UNCED, 2008); and

World Conservation Union (IUCN) principles and guidelines on indigenous and traditional peoples and protected areas (IUCN Resolution 1.53 of 1996, amended in 1998). These IUCN principles promote the recognition of indigenous people's rights, decentralisation, transparency and benefit sharing arrangements (Fabricius, 2004).

There are also SADC protocols at regional level that institutionalise active participation of local people and communities in the management of natural resources in the SADC region. According to SADC (2002) Article 12(a) of the SADC protocol on forestry, member states of Southern African Development Community (SADC) are required to develop policies and mechanisms that enable local people and communities to benefit from the use of forest resources and to ensure their effective participation in forest management. Article 13 (a) also requires parties to adopt measures that facilitate effective participation of women in sustainable forest management (SADC, 2002).

The interest in and support for policy and legislative frameworks that promote community participation in natural resources management have influenced most governments. Many countries, particularly in Asia and Africa have since undertaken review of policies and legislation on forestry to incorporate aspects of PFM (Dalai-Clayton, *et al.*, 2003; Jumbe and Angelsen, 2007) to conserve and manage forest resources in a sustainable way (Rishi, 2007). These policy reforms have allowed greater involvement of local communities or user groups in managing forest resources (Jumbe and Angelsen, 2007). Involvement of local communities in natural resources management is now a significant feature of national policies and practices and of internationally supported programmes throughout the world (Fisher, 1999; Shackleton *et al.*, 2002).

The participatory approach to natural resource management has become widely known as community-based natural resources management. The participatory approaches are aimed at promoting user rights and economic benefits for participating communities by ensuring that benefits earned from protection and management of natural resources are shared in form of community development and resource use (PFAP, 2005). The approach takes into account different stakeholders and incorporates their different perspectives, interests, and interactions with the forest environment and beyond forest resources (Hobley, 1996; PFAP, 2005). Some of the best-known CBNRM programmes in the region are CAMPFIRE in Zimbabwe; the CBNRM programmes practised in Botswana and Namibia (Clarke, 2000; Thakadu, 2005; Matose, 2006), ADMADE programme in Zambia (Bwalya, 2004), and Participatory Forest Management in South Africa (Holmes, 2007).

At the national level, the legislative review of the forestry sector was undertaken between 1987 and 1997 in the context of the Zambia Forestry Action Programme (ZFAP). The ZFAP was formulated as a strategic plan aimed at promoting sustainable forest management. The plan identified methodologies for sustainable forest management, which included revision of the National Forest Policy and the Forests Act of 1973 that provided for setting up of forest reserves and mandated the Forestry Department to manage forest resources. The review resulted in the National Forestry Policy of 1998 and the Forests Act of 1999, which incorporated PFM strategy as an option for sustainable forest management and development of the forestry sector. The stakeholders in PFM approach included local communities, traditional institutions, non-government organizations and the private sector. As reported by Odera (2004), harmonization of existing instruments could also stimulate effective local resource management by clearly defining mandates and jurisdictions.

PFM, at present, is legally applicable to local forests, forest plantations and open areas, and government or other stakeholders can propose co-management of these areas (FD, 2005; GRZ, 1998; GRZ, 1999). In South Africa, as reported by Holmes (2007), the policy and strategic framework for PFM focuses on State forests, but it is also promoted on private and communally owned lands in collaboration with other stakeholders (DWAF, 2004; Holmes, 2007). The revised National Forest Policy and

the Forests Act have also spelt out new statutory requirements for forest management plans, stronger environmental controls, and establishment and strengthening of local resource governance structures for management and sustainable utilisation of forest resources. However, the decentralisation process in Zambia has not progressed very well as involvement of local government in forest management is marginally realised except for the involvement of traditional leaders and local forestry management committees and forest user groups (FBD, 2003; PFAP, 2005; GRZ, 2006).

Furthermore, although the Forests Act of 1999 was passed by parliament in Zambia and consented to by the President, it has not been operational because it also provided for the establishment of the Zambia Forestry Commission. The establishment of the Forestry Commission was supposed to transform the current Forestry Department into a more efficient, effective and accountable semi-autonomous body and carry out the provision of the revised Forests Act. However, the Zambia Forestry Commission has not yet been established due to financial and other legal implications for setting up the commission.

The Statutory Instrument No. 47 of 2006, which is a subsidiary legislation, was put in place as a supportive legislation for the implementation of JFM in Zambia following the delay in implementing the provision of the Forest Acts of 1999. However, the legal instrument does not provide clear cost and benefit sharing mechanism between the government and the participating local communities (FD, 2004; GRZ, 2006).

#### 2.2.4 Local Management Structures for PFM

The National Forest Policy and the Forests Act guide the control and management of forest resources in Zambia and the legal ownership of all trees and forest produce derived from customary areas or State land is vested in the President on behalf of the republic (GRZ, 1973; GRZ, 1999). The administrative powers have been delegated to either the traditional chiefs or the Director of Forestry for operational purposes on behalf of the President. Forestry Department has therefore been mandated to manage forest resources through the provision of National Forestry Policy and Forests Act (GRZ, 1973; GRZ, 1998; GRZ, 1999).

The forest policy and legislation also support the formation and strengthening of local forest management committees for effective coordination, management and mobilization of resources in JFM (FD, 2005; ZFAP, 1998; GRZ, 1998). Consequently, there are provisions in forest legislation for the formation and strengthening of local management structures, and for the roles of local institutions stipulated for management and sustainable utilization of forest resources. Kayambazinthu *et al.* (2003) stated that institutions that better integrate traditional structures, with socio-cultural traits and incentives and are given moral and political legitimacy at local level, are more stable and enduring than those not integrated. Campbell *et al.* (2003) further reported that the type of organization that exercised authority at local level through devolution and high degree of local participation has strong influence on the outcome of devolution policies.

The institutional settings for JFM are based on the forest area and the surrounding villages in order to represent the local community in the management of the forest resource and sharing of derived benefits between the state and the community and within the community (PFAP, 2005). These institutions are referred to by various names. In India they are commonly known as Forest Protection Committees (FPC) and are formed at the village level where a number of communities are involved, depending on the requirement (Damodaran and Engel, 2003). In Zambia, local institutions are referred to as Village Resource Management Committees (VRMCs), established at the village level and Forest management Committees (FMC) at forest area level (FD, 2004). At the community level, between four and ten Village Resource Management Committees were established, while one Forest Management Committee is established at the forest area level to coordinate the works of Village Resource Management Committees (FD, 2005; PFAP, 2005; GRZ, 2006).

Local management committees administer local rules and regulations formulated by local communities to govern themselves in the management of forest resources. Formulation of community by-laws created a useful platform to specify the necessary restrictions that communities were willing to accept (PFAP, 2005). Local rules and regulations are supposed to be made in such a way that they are binding on both the local people as well as outsiders. But the challenge to this type of arrangement is that

at times outsiders disregard local bylaws (World Bank, 1998). Local forest committees have since been turned into legal entities by registering with a government as a cooperative or community trust (PFAP, 2005). However, the degree of effective functioning of local resource management committees varies (Matose and Wily, 1996).

Forest User Groups were also identified and established for the support of forest-based income generating activities. Forest User Groups were amongst the community based JFM organisations responsible for the production of goods and receives income through sale of forest products. The most common income generating activity was beekeeping (FD, 2004; PFAP, 2005).

Traditional leaders have a major role to play in natural resource management, but the degree of legitimacy and control varies. Inclusion of traditional leaders in decision-making processes is important for the success of community-based natural resource management in southern Africa (Campbell, 2003). Traditional leaders should be involved in issues pertaining to land use and community management structures. Hence, the consent of traditional leaders is paramount during the start up of JFM arrangement.

Traditional leaders should also be informed and be aware of every critical stage in JFM. However, when traditional leaders are left out in the JFM arrangement it may be counterproductive, but when included they may assume too much authority to the detriment of programme implementation (PFAP, 2005). In Zambia, the status of traditional chiefs in forest management committees under JFM is limited to that of ex-officio executive role, but important issues are discussed privately with the concerned traditional leaders (FD, 2004; PFAP, 2005; GRZ, 2006). In some cases, the traditional leaders were consulted as arbitrators. However, in most cases the state retains ultimate authority and continues to make decisions some of which may have negative impact on local people as the reported case in Nepal and India where ownership had not been transferred from the state to the local communities (Saxena, 1992; Joshi, 1999).

Furthermore, the national forestry policies recognize the roles of NGOs in CBFM. NGOs are permitted to play a key role in facilitating the establishment and

strengthening of local governance structures for CBNRM. They may also play a crucial role as mediators and mobilisers of local institutions under JFM (Poffenberger, 1990 in Matose and Wily, 1996).

### **2.3 Cost and Benefit Sharing Mechanisms in PFM**

Burkey (1993) appropriately noted that sustainable livelihood and rural development would only be achieved through the efforts of the rural people themselves. Livelihoods of forest dependent communities are expected to improve by capturing the benefits of forests and woodlands at the village, community and household levels under CBNRM. The benefits take the form of financial returns from the sale or lease of forest resources; collection of fines; empowerment through securing of rights over local resources; and improved local governance through more effective and accountable institutions and the improved partnerships with external institutions such as local governments and other service providers. The other expected benefits of PFM are the reduced vulnerability as a result of sustainable supply of forest-based goods and services such as supply of water, food, firewood, and building materials (Blomley and Ramadhani, 2006).

Benefit sharing was one of the strongest reasons for acceptance and success of JFM in India (Murali *et al.*, 2003). As supported by Arnold (2001), the most important rationale behind community participation in forest management is the direct benefits for the participating communities. DWAF (2004) also reported that local communities tend to have high expectations of immediate benefits that could accrue from PFM. These expectations if not met could lead to decline in local communities attendance and participation or complete withdrawal. Fabricius (2004) urged that programme implementers should be ready to deal with the raised expectations from the onset.

Cost-benefit sharing mechanism should clearly be defined before deciding on the proportion of share of benefits by taking into account various costs and benefits to be incurred under PFM. Opportunity costs for local communities in protecting forests include loss of revenue due to protection, hardship encountered through loss of labour, and costs of conflicts. In Zambia, although the community takes the

responsibility for protecting local forest reserves, there are no formal mechanisms or standards for equitable benefit sharing between Forestry Department and the community, and also among the community members (PFAP, 2005). The Forestry Department still has the legitimate right to issue licenses and collect revenue for the major forest products without sharing with the participating local communities. The only reported benefits accrued to the local communities in JFM areas are some acquisition of some technical skills, availability of forest products, and opportunities for forest-based income generating activities (PFAP, 2005).

## **2.4 Factors Influencing People's Participation**

Participation must not just be a policy statement, but it must be accompanied by genuine commitment to encourage participation in all aspects and at all levels. It is important to know conditions under which voluntary participation takes place and those factors that affect people's participation. Coralie and White (1994) indicated that there were many critical factors that could affect people's participation.

There are several pre-requisites for effective community participation in natural resources management. There are also a number of key factors that would affect voluntary and active participation. People's participation is dependent on norms, values, skills, qualification and personal qualities of resource users and the proximity to the resource. It is also dependent on institutional arrangements in the community, the degree of market integration, and the local economic environment.

### **2.4.1 Tenure rights and ownership**

Community-based approaches provide alternative management strategies, through local empowerment and capacity building. They respond to immediate socio-economic needs of local people and to the long-term problems of sustainable natural resources management (World Bank, 1998). However, local empowerment, decentralisation of decision-making and increased involvement of various stakeholders in forest management should entail changes in forest ownership and tenure with the support of appropriate legal provisions.

Oakley and Marsden (1984: cited in Burkey, 1993) indicated that access to the resource and influence in decision-making are some of the main factors that influence people's participation in developmental programmes such as JFM. Tenure rights for communities over a protected forest would create a long-term interest and motivation among the people towards protection and sustainable use of the forest (Murali *et al.*, 2003). But most of the forests have remained under public ownership despite policy changes towards participatory approach to resource management (FRA, 2005). Unclear rights over tenure, ownership and control create uncertainty among local communities (Murali *et al.*, 2003) and that affect their participation in JFM.

#### 2.4.2 Costs and Benefit Sharing

The underlying assumption in CBNRM, such as JFM approach, is that gains in collaborative management of natural resources will result in benefits to the resource base and to society (Ashley, 1998 in Fabricius, 2004). Benefits accruing to local communities under participatory arrangement are legal access to resources, provision of their daily needs such as firewood, construction materials and some supplementary foods, and cash income (PFAP, 2005). Other benefits include preservation and sustainable use of forest resources, watershed protection, and carbon storage and sequestration among others (GRZ, 1998).

Opportunities for local people to obtain enough benefits to offset the opportunity costs associated with their participation are key for cooperating. Inmadar *et al.* (1999: cited in Bwalya, 2004) indicated that local communities or user groups reject conservation programmes whose transaction costs of managing and monitoring exceed perceived benefits. In cases where communities are encouraged to share responsibilities and benefits, forest degradation declines or ceases, as was obtained from the evaluation of the first JFM arrangement in India. However, in areas where communities are not involved in shared responsibilities and derive benefits, degradation had accelerated (Arnold, 1990; Poffenberger *et al.*, 1990 in Matose and Wily, 1996).



Distribution of benefits between the government and local communities is, therefore, one of the critical factors that can enhance people's participation (Jumbe and Angelsen, 2007). Nepal and Weber (1995: cited in Rich 2007) suggested that forestry departments should be sensitive to the short-term needs of local people to encourage their involvement in PFM. The government should legally allow local community to have a share of economic benefits derived from their participation. The arrangement would sustain participation of local people and enhance mutual trust between local people and the State (Woolcock, 1998).

#### 2.4.3 Proximity and Value of the Forest Resource

The extent of participation of forest dependent communities in forest protection and management depends on the relative importance of forest resources for sustainable livelihoods. It has been reported that participation of local people in forest management increases where forest conditions were good and when local people were more dependent on the forests (Lise, 2000; Jumbe and Angelsen, 2007). However, the high forest dependency at times reduces incentives for community participation where there is a heterogeneous community social structure and more commercial uses of forest (Jumbe and Angelsen, 2007).

Proximity of local community to the resource and to the forestry offices has also been reported to have a positive effect on local people's participation and subsequent success of the programme. Holmes (2007), during a similar study in the Eastern Cape province of South Africa, observed that the further the forestry offices are from the resource and the community, the less they interact with the local communities. Similarly, the further the communities are from the forest resource, the less they interact with the resources. Interaction is essential in PFM/JFM because it enhances sharing of information, creation of mutual relations, and builds trust and confidence among the concerned parties.

#### 2.4.4 Forest Products Market Opportunities

Market opportunities for forest products can also influence community participation and the eventual success of PFM/JFM. Areas with very high market opportunities, such as proximity to urban settlements, may cause proliferation of illegal and unsustainable activities such as timber harvesting and charcoal production among forest-adjacent communities. On the other hand, areas with weak market opportunities, possibly due to poor road network or long distance to the market, local forest-adjacent communities may become discouraged although the forest products may be in abundance. Furthermore, illegal harvesting of forest products from open areas located near a JFM area and at low costs, may discourage local communities to market forest produce from JFM area at reasonable prices (Blomley and Ramadhani, 2006). This may subsequently affect their participation in JFM activities.

#### 2.4.5 Institutional Arrangements and Legal Framework

Supportive institutions and legal framework are other factors that would affect people's participation and subsequently implementation and success of JFM. Matose and Wily (1996) indicated that institutional arrangements that govern forest resources are significant in ensuring sustainable use of forests. Institutional arrangements and legal frameworks secure active and sustained community participation in forest management and regulate forestry activities to achieve sustained forest utilization.

Existing cultural and social structures of local communities can be used to organise, sanction and enforce social norms or local rules and regulations, and benefits all those who are part of the structure. For example, Jumbe and Angelsen (2007) observed that traditional leaders of an ethnic group in Malawi used their influence to foster cooperation among individuals because the local people already had high regard for authority. As reported by Holmes (2007), social, economic and cultural backgrounds of communities affect and influence people's understanding, perception and acceptance of developmental initiatives such as JFM. Therefore, norms, values, skills, qualification and personal qualities of the people can induce community's greater participation in forest management.

#### 2.4.6 Educational Level and Employment Opportunities

Educational levels and employment opportunities are other factors that affect participation at the individual level. People with formal education in rural communities are likely to participate in forest management due to their understanding of the need to conserve forests and also motivate other community members (Glendinning *et al.*, 2001; Wabash *et al.* (2001: cited in Dolisca, *et al.*, 2006)); Lise, 2000). High levels of education enhanced participation because of the increased understanding of environmental, social and economic issues (Lise, 2000).

Employment opportunities under JFM enhance local people members to participate in forest management. Contrary, lack of wage employment opportunities under JFM discourages local people to actively participate in forestry activities. This is particularly true for the local community members with high education levels as they would be more willing to be involved in more rewarding off-farm and off-forestry activities elsewhere outside forests (Jumbe and Angelsen, 2007).

#### 2.4.7 People's Attitude

Although many studies on PFM focus on ecological and economic dimensions, behavioural dimensions are very important. Attitudes of local people towards Forestry Department staff and developmental programmes are critical factors that can affect participation. It has been reported that local people are likely to support PFM programmes if they have positive attitude towards forestry personnel or towards PFM programme (Rishi, 2007).

### **2.5 Performance of CBNRM Programmes**

CBNRM came out with the goal of improving natural resources management and empowering local communities with the underlying assumption of sustainable rural livelihoods in the process. But the performance of CBNRM programmes is dependent on a number of elements such as institutional arrangements, characteristics of the implementing agents and resource users, and the physical characteristics of the

resource. Puustajarvi *et al.* (2005), among others authors, have indicated that the suitability of a forest for JFM and subsequent success of JFM approach depend on a number of factors. As a result, there had been mixed results on performance of most PFM programmes where both successes and failures have been recorded (Holmes, 2007). For example, evaluation of the first JFM arrangement in India showed declined or halted degradation of forest resources where communities were encouraged to share custodian functions. Kajembe *et al.* (2003) also reported similar success in Duru-Haitemba forest in Tanzania. On the other hand, accelerated degradation was reported in areas where local people were not involved (Arnold, 1990; Matose and Wily, 1996). However, the implementation of CBNRM programmes is initially relatively slow, takes time, and requires high financial input (World Bank, 1998). As a result, the impacts on livelihoods are not easily attained.

## **2.6 Programme Evaluation**

Programme evaluation is a field of social science that uses a wide range of scientific methods in assessing or evaluating programme or policy intervention (Babbie and Mouton, 2001). According to Frechtling and Sharp (1997), programme evaluation is a systematic and objective process for determining project effectiveness. Programme evaluation is essential in assessing whether goals of the project are met (Frechtling, 2002) and can also help to have objective information on programme performance and how it can be improved (Bless and Higson-Smith, 2000).

Equally important is that evaluation helps identify changes, and enables progressive learning at the individual, community, institutional and policy levels (Bellamy *et al.*, 2001). Project evaluation also provides information on how different aspects of the project are working and on the project outcomes that were not anticipated. The information provided could be used for continuous improvement process (Frechtling, 2002).

In this respect, evaluation is critical to the success of policy development and implementation. Nonetheless, it has been reported that evaluation of natural resource management policy has been neglected, leading to emergence of substantial gap

between theory and practice (Wallace *et al.*, 1995; Bellamy *et al.* (1999a: cited in Bellamy, 2001)). Despite the claims that participatory forest management can contribute significantly to the improvement of forest condition and people's livelihoods, few efforts have been made to review the performance of such policy interventions.

### 2.6.1 Types of Programme Evaluation

There are many types of programme evaluation, but the main types as categorized by many authors are: programme monitoring; programme performance assessment; process evaluation; outcome or impact evaluation; and programme cost-effectiveness and cost-benefit assessments (Babbie and Mouton, 2001; USDJ, 1997; Frechtling and Sharp, 1997; Holmes, 2007).

Monitoring evaluation focuses on continued monitoring of the programme through selected indicators of the project activities as a tool for effective programme management. This type of evaluation is usually integrated into the routine programme implementation with the aim of providing information and improving performance (Babbie and Mouton, 2001). It is an ongoing collection of information to determine whether the programme is operating according to the formulated plan and focuses on programme implementation and function (USDJ, 1997; Frechtling and Sharp, 1997).

Programme performance assessment is also an ongoing collection of information with a focus on whether the programme is meeting its goals and objectives. It deals with programme activities and delivery of its services. Programme process on the other hand focuses on programme implementation and operations. It addresses programme operation and performance, identifies processes or procedures used in carrying out the programme functions, and answers questions regarding programme efforts.

Programme outcome or impact evaluation is another form of evaluation. It is employed to measure programme performance and determines whether programme activities produced the desired outcome or whether the programme achieved its intended objectives. Impact evaluation is aimed at providing an estimate of the impact

of the intervention or programme that are without the influence of other outside factors or events. The outcome may be divided into short-term, intermediate and long-term, with long-term outcome being the programme goal. As outlined by Holmes (2007), impact assessment requires that the programme objectives be adequately and well articulated to make it possible to measure the expected outcome. The programme should be sufficiently implemented before impact assessment can be conducted.

Programme cost-effectiveness and cost-benefit assessment focuses on assessment of programme effectiveness in terms of costs. It does not determine whether the programme worked but the results of this type of evaluation are used to compare programme economic outcomes and costs (USDJ, 1997; Frechtling and Sharp, 1997; Holmes, 2007).

All the above types of programme evaluation are relevant and important to ensure successful programme implementation. However, application of all the types of evaluation in evaluating a programme or an intervention is rarely done due to constraints in logistics and resources for evaluation studies.

## 2.6.2 Programme Evaluation Methods

There are different ways of defining and measuring any particular evaluation process. The choice of a measurement method is critical to programme evaluation process (Bless and Higson-Smith, 2000; USDJ, 1997). The programme should be well-understood and conceptualized before evaluation, and the understanding and conceptualization are best achieved through the use of programme logical framework. According to Renger and Titcomb (2002), logic model is a tool for describing various components of a programme in a systematic and structured manner. Most evaluators make use of programme logical framework to assist in establishing whether the programme goals and objectives are well formulated, and whether programme activities and outputs are clearly specified, and whether the outcome and associated indicators are provided.

This study employed programme outcome or impact evaluation in order to evaluate programme success and accomplishment. The evaluation examined programme effectiveness, achievement of goals and objectives, and other unintended consequences. According to Rossi and Freeman (1999: cited in Holmes 2007), the aim is to produce an estimate of impact of the intervention not influenced by other events or processes. The prerequisites for outcome or impact evaluation are that the objectives are well articulated and activities are sufficiently executed (Holmes, 2007).

According to Babbie and Mouton (2001), there should also be change over time after the introduction of an intervention and that change should be attributed to that particular intervention and not other unrelated causes. The outcome may be divided into short-term, intermediate and long-term, with long-term outcome being the programme goal (Bless and Higson-Smith, 2000; USDJ, 1997).

### 2.6.3 Programme Evaluation Criteria and Indicators

Policy initiatives, such as participatory forest management need to be evaluated, linking the objective of the evaluation and the rationale to the performance of the project. The fundamental basis for evaluation is the establishment of practical criteria by which change can be monitored and assessed in order to assess progress and impact of the policy initiative (Bellamy *et al.*, 2001). Programme or project evaluation must be clear, with measurable project goals and objectives that outline what the project planned to accomplish. The success indicators enables evaluation of what was set to be accomplished and what has been the impact of the project (PHAC, 1996).

## Chapter 3 – Methodology

### 3.1 Study Area

#### 3.1.1 Zambia

##### 3.1.1.1 Location of Zambia

The Republic of Zambia is located in south-central Africa and lies between latitudes 8° and 18° South and between longitudes 22° and 34° East. It is bordered on the north-west by the Democratic Republic of the Congo; north-east by Tanzania; on the east by Malawi; on the south-east by Mozambique; on the south by Zimbabwe, Botswana, and the Caprivi Strip of Namibia; and on the west by Angola (see Figure 1). The country is administratively divided into nine provinces namely, Central, Copperbelt, Eastern, Luapula, Lusaka, Northern, North-western, Southern, and Western provinces (CSO, 2003; FOSA, 2001).



Figure 1: Map of Zambia



### 3.1.1.2 *Climate*

Zambia consists largely of a highland plateau, which rises in the east. Elevations range from 915 – 1,520 m. Higher altitudes are attained in the Muchinga Mountains, where Zambia's highest point is located at unnamed location in Mafinga Hills at 2,301 m., and the lowest point is the Zambezi River in the southeast at 329 m. (Aregheore, 2006). The mean altitude is about 1,200 m above sea level. The climatic conditions are subtropical in nature, although the country lies within the tropical zone because the country's climate is modified by high altitude.

There are three seasons: cool and dry season from May to August; hot and dry season from August to November; and warm wet season lasts from November until April. July is usually the coldest month of the year with occasional ground frost occurring in sheltered valleys (FAO, 2007). The average temperature during July is 17.2°C. The hot and dry season is a period of rapidly rising temperatures, and October is usually the hottest with the average temperature of 30°C, but if the rains are delayed November can be hotter.

The annual rainfall ranges from 760 mm in the southern part of the country to over 1,250 mm in the north (FAO, 2007; "Zambia", Microsoft Encarta, 2008). The rain is usually during the period of November to March varying in amount with latitude and altitude (FOSA, 2001). December and January are the wettest months (FAO, 2007).

### 3.1.1.3 *Vegetation*

According to Storrs (1995), vegetation in Zambia is generally classified into four major categories: the closed forests; open forests or woodland; termitaria; and grassland. Chidumayo and Marjokorpi (1997: cited in FOSA, 2001) further identified five forest types and five woodland types. The closed forests are identified as Parinari, Marquesia, Lake Basin, Cryptoseplum, Baikiaea, Itigi, Montana, Swamp and Riparian, while woodland types have been identified as Miombo, Kalahari, Mopane, Munga and Termitaria. In addition to the natural vegetation types, there are forest plantations of tropical pines and eucalyptus, covering an area of about 61,000 hectares (ZFAP, 1998; FOSA, 2001).

#### 3.1.1.4 *Population*

According to population census of 2000, the population of Zambia was 9,885,591 and its population density was 13.1 persons per square km (CSO, 2003). In 2008, the population was estimated to have increased to 11,669,534. There has also been an increase in population density from 5.4 persons per square km in 1969 to 7.5 in 1980 and 10.3 persons per square km in 1990. (“Zambia”, Microsoft Encarta, 2008).

An important feature of the country’s population distribution is that Copperbelt and Lusaka provinces, which have the smallest land area of 31,328 and 21,896 square km, respectively, exhibit the highest population density. Much of the north-east and far west of the country are sparsely inhabited. The population and housing census of 2000 recorded population density of 49 persons per km<sup>2</sup> for Copperbelt province, 61 persons per km<sup>2</sup> for Lusaka province, and 14 persons per km<sup>2</sup> for Southern province. However, during the same period Northern, North-western and Western provinces that take the largest share of the Zambian land each had population densities of less than 10 persons per km<sup>2</sup> (CSO, 2003).

According to CSO (2003), almost two thirds (65 percent) of Zambia’s population live in rural areas. The proportion of rural population has steadily increased during the last three decades, from 60% in 1980 to 62% and 65 % in 1990 and 2000, respectively. This could be attributed to urban-rural migration trend, which is most significant in Copperbelt, Lusaka, Southern and Central provinces, which are the most urbanized provinces of the country.

Zambia’s population mostly (99.5%) constitutes persons of African origin and a smaller percent (0.5%) constitute other ethnic groups (CSO, 2003). The population dominated by African ethnic groups is made up of more than 70 Bantu-speaking ethnic groups including the Bemba, the single largest group (36% of the population), who live in the north-east and predominate in the Copperbelt), the Lozi of the west, and the Tonga of the south. Despite Zambia’s ethnic diversity, it has been less affected by ethnic tensions than many other African states. This could in part be due to the policy of former first republican president, Dr Kenneth Kaunda of uniting the different ethnic groups in the country (Zambia”, Microsoft Encarta, 2008).

### 3.1.2 Description of the Study Site

#### 3.1.2.1 *Location*

The study site is Dambwa Forest Reserve No.22, which is located adjacent to the Mosi-oa-Tunya National Park in Livingstone district in Southern province of Zambia. The study site was purposely chosen out of the 7 JFM pilot areas under the Provincial Forestry Action Programme given that it was the largest forest reserve under JFM pilot project with diverse ethnic composition (FD, 2003; PFAP, 2004).

Dambwa Forest Reserve is located approximately 5 km north of Livingstone town centre along the Great North Road and approximately 470 km south of Lusaka, the capital city of Zambia (see Figure 1). The forest reserve has an area of 10,690 hectares and it is located between latitudes 17° and 18° South and between longitudes 25° and 26° East, with an altitude of 1,000 m above sea level (FD, 2003). The area was set aside and gazetted as a protected forest area (Forest Reserve No. 22) in 1976 for the purpose of supplying timber, fuelwood and other forest products to the local communities in Livingstone.

## Dambwa Joint Forest Management Area



Figure 2: Map of Dambwa JFM Area

The ownership of the forest reserve is vested in the Republican President, as provided for under section 3 of the Forests Act Cap 199 of the laws of Zambia (GRZ, 1973; GRZ, 1998). The area was further declared a joint forest management area through the Statutory Instrument No. 47 of 2006 (GRZ, 2006). The central government through the Forestry Department administered the management and protection of the

forest reserve before the introduction of joint forest management. The Forest Department and local communities around Dambwa Forest Reserve have into a formal partnership through the memorandum of understanding to jointly manage Dambwa Forest Reserve and share the derived benefits from such partnership since 2002. The partnership was with the consent of Chief Musokotwane and Livingstone City Council (FD, 2003; PFAP, 2005).

#### 3.1.2.2 *Population*

There are 11 villages with a total of 447 households in the immediate vicinity of Dambwa Forest Reserve (FD, 2003; PFAP, 2005). The area on the western boundary of the reserve is Maunga with 6 villages: Chibuyu, Ikasaya, Kasiya, Lukuni, Sianyumbu and Kantumbi. On the northern boundary there is Siandavu village. All these villages fall under chief Musokotwane. The area on the eastern boundary is Natebe consisting of 4 villages: Old Natebe, Natebe, Kangongo and Makalanguzu, and they fall under Chief Mukuni (FD, 2003) (see Figure 2).

Each chief is responsible for his/her chiefdom and is assisted by a prime minister (*Ngambela*) based at a palace. Villages are headed by village headmen and there are also senior village headmen each in charge of a group of villages. The chief communicates to his or her subjects through the Prime Minister (*Ngambela*), who in turn communicates to senior village headmen. The senior headmen convey the information to village headmen. The feedback or any information to the chief follows the same protocol in a reverse order (JFMP, 2004). Under JFM arrangement, the chief is a member of Forest Management Committee as an ex-official, though usually represented by the chief's representative (FD, 2005; GRZ 2006).

Though Dambwa Forest Reserve is located in Livingstone district, the surrounding communities on the western, eastern and northern boundaries of the forest reserve are located in both Livingstone and Kazungula districts. The main ethnic groups of the local people around the reserve are the Tonga, Subiya, Leya, Toka and Totela (IUCN, 2007). Lozi, Kololo and Ndebele are reported to be the more recent immigrants to the area (FD, 2003). The western and northern villages are comprised of Toka-Leya,

Tonga, and Luvale though Toka-Leya is the dominant. The villages on the eastern side comprise of Mbunda, Luvale, Tonga, Ngoni and Toka-leya.

#### 3.1.2.3 *Livelihoods*

The main livelihood system for the local people is subsistence agriculture. The main agricultural crops cultivated are maize, cassava, groundnuts, beans, sorghum and sweet potatoes. They also keep livestock, particularly cattle, goats, pigs, and chickens. These agricultural products are used for household consumption and for sale (Riché, 2007; FD, 2003).

Local people harvest wide range of forest products for subsistence use. Forest products such as firewood, timber, charcoal, Mungongo seeds and Mungongo oil, wild fruits, and mushroom are also sold to supplement household income. Mungongo (*Schionziophyton rautanennii*) seed oil production occurs in all communities around the forest. Local beer brewing is also a common trade as one of the income generating activities to supplement household income (FD, 2003).

The communities on the eastern boundary of the forest reserve can easily access markets in town throughout the year because of a good road. The communities on the western and northern boundaries, however, have difficulties to access the markets in town due to poor road network. Accessibility becomes extremely difficult, particularly during rain season as the two streams in the area, Kabondo and Sinda streams, experience seasonal floods (JFM 2004).

#### 3.1.2.4 *Climate*

Dambwa Forest Reserve falls within a semi-arid zone with a mean annual rainfall around 700 mm that usually falls between November and March. The area lies at an altitude of between 900 m and 1,000 m above sea level. The average maximum temperature range is 26°C to 37°C, and the average minimum temperature range is 6°C to 19°C. The mean annual temperature is 20°C. On average, relative humidity is 56.8% throughout the year.

### 3.1.2.5 Vegetation

The predominant vegetation types of the forest reserve are Mopani (*Colophospermum mopane*) in the northern boundary; Miombo woodland (*Brachystegia*) also found in the northern portion of the forest; *Baikiaea* remnants are present throughout the forest, but more concentrated in the north; and grasslands occur on the southern part of the forest with *Baikiaea* remnants. In the northern part of the forest, there is a concentration of *Baikiaea plurijuga*, *Pterocarpus angolensis* and *Brachystegia* (miombo) species. In the south, *Schinziophyton rautanenii* (Mungongo), *Azelia quanzensis*, *Strychnos cocculoides*, *Diplorhyncus condylocarpon*, *Combretum* spp, *Ochna* spp, and *Albizia* species are common.



Photo 1: Forest Vegetation of Dambwa Forest Reserve in Livingstone

*Lannea* species, *Ochna* species, and *Pseudolachnostylis maprouneifolia* are common understorey trees in Dambwa Forest Reserve. *Diplorhyncus* shrubs dominate much of the forest area demonstrating high human activity, which had affected the forest in the past (FD, 2003). Wildlife species such as elephants, monkeys, kudu, impala, warthogs

and even buffalo, are also found in the forest reserve, as it is adjacent to Mosi-oa-Tunya National Park (FD, 2003; IUCN, 2007).

There is a high demand for forest products from the communities in Livingstone town. Illegal harvesting of selected commercially valuable timber trees such as *Baikiaea plurijuga*, *Azelia quanzensis* and *Pterocarpus angolensis*, and production of charcoal, which were promoted by outsiders had been reported in the past. Dambwa Forest Reserve had suffered some serious disturbances, mostly in the southern part due to uncontrolled charcoal production and late fires that usually occur in dry season.

## **3.2 Methodology**

All evaluations that involve participants or their records are subject to rules that govern the treatment of human subjects in research (Bless and Higson-Smith, 2000; Babbie, 2004). Therefore, prior consent was obtained from participants and relevant authorities before the study was undertaken. As a requirement for social surveys, the local participants were informed about the purpose of the study, type of data to be collected, and that their participation was voluntary. Safety of participants and confidentiality of the information collected about them was also guaranteed (Bless and Higson-Smith, 2000; Babbie, 2002; Babbie, 2004).

There is a wide range of information collection tools, depending on the evaluation needs of the project (PHAC, 1996). Data collection for the study involved field survey and analysis of secondary information because they were considered most appropriate data collection method for evaluation studies (Babbie, 2004). Field survey comprised of semi-structured interviews and questionnaire. Participatory Rural Appraisal (PRA) methods were used to collect information during the survey.

### **3.2.1 Participatory Methods**

Participatory Rural Appraisal (PRA) provides a framework for data collection and analysis. PRA, as defined by Mukherjee (1993), is a methodology for interacting with rural communities, understanding them, and learning from them. It is also a method



that allows free generation of information without undue demand. During the study, the main objective of participatory research methods was to understand the perspective of the rural community expressed both qualitatively and quantitatively (Kumar, 2002; Mukherjee, 1993).

Survey data collection was conducted in the study area between April and May 2008. Quantitative and qualitative data collection methods were used and involved the household survey using a household questionnaire, discussions with focus groups, interviews with key informants, and conducting forest resource assessment. Reliability and validity of results of this evaluation study depended on the correctness and truthfulness of information obtained from respondents and the perception of the interviews (Babbie, 2002). Existing secondary information was also used to increase reliability and validity of the data collected (Babbie, 2002; Kumar, 2002; USDJ, 2006). The use of different methods to collect data helped to cross check correctness of data with different people using different methods and these methods compliment each other through triangulation (Neumann, 1999; Kumar, 2002; Cunningham, 2001).

The data collection was done in three phases. The first phase involved the household survey with the use of questionnaire. The second phase was the focus group discussion with some members of the Forest Management Committee (FMC) and interviews with selected Forestry Department staff. The third phase was the forest resource assessment in the forest reserve.

Assistant researchers were engaged locally to assist in the survey. The selection was based on ability to communicate in local languages, familiarity with the area, and knowledge of participatory rural appraisal techniques. The assistant researchers were familiarized with the administration of the questionnaire before undertaking the survey. As supported by Bless and Higson-Smith (2000), and Babbie (2002), research assistants were oriented on the correct procedures and good ethics of data collection.

### *3.2.1.1 Household Survey*

The perception of local communities towards JFM was assessed through the questionnaire and discussions as supported by Stanley and Sedlack (1992) who

indicated that the questionnaire is an ideal technique for measuring attitudes and perception of a population. A total of 447 households in 11 villages surrounding Dambwa Forest Reserves were recorded (FD, 2003; PFAP, 2005). Inclusion of all households and villages in the survey was not feasible due to inadequate time and funds. Probability sampling was used to randomly select sample of households to participate in the survey (Bless and Higson-Smith, 2000; Babbie, 2004).

The unit of measurements for household survey was the household heads. Homesteads in villages were scattered, but grouped according to families. Sampling was based on sample frame showing names and respective numbers of each village and household. Sampling intensity of 25% was used to ensure that households selected were a representation of the population (Hetherington, 1995; Turyahambwe 2006). In order to choose the sample of households, each household was assigned a number and interviews were conducted with households whose numbers were selected randomly (Babbie, 2004).

Palm *et al.* (1993: cited in Ndayambaje, 2002), recommended sample size of 70 households as appropriate for making inferences about a larger population. In another study conducted by Appiah (2001), a sample of 10% of households, which represented 100 households in a study area, was used. However, due to the heterogeneity and large size of the population of the Dambwa forest community, a sample size of 110 households was considered adequate to represent the demographic distribution around the Dambwa forest reserve, consistent with Ndayambaje (2002).

A team consisting of three persons was used to administer the questionnaire. The questions were asked in vernacular languages predominant in the area that are Lozi, Tonga and Nyanja, but the questionnaire was in English. The interviewer administered the questionnaires to the head of the household representing each selected household. In the absence of a household head, any older member of the household was allowed to lead in answering the questionnaire. The questionnaires were administered through reading of the questions to the respondent and recording the respondent's answer.

The advantage of questionnaire filled by the interviewer is that the questionnaire can be administered to respondents who are unable to read and write. The approach helps also to overcome misunderstanding or misinterpretation of words or questions, and ensured that the respondents understand the questions correctly (Stanley and Sedlack 1992; Babbie, 2002; and Babbie, 2004). Direct administering of questionnaire by a researcher also ensures that all items on the questionnaire are considered and no question is omitted. Furthermore, the interviewer is able to ask the respondent for an explanation on certain unclear answers. However, the danger to this approach is the interviewer may subtly affect the respondent's answer and may lead to disparities in the results, thereby reducing their comparability. The other danger is that the presence of the interviewer may be perceived as a handicap if anonymity and respect for privacy of the interviewer was a concern (Bless and Higson-Smith, 2000).

The questionnaire was pre-tested by administering to a selected small number of people drawn from the local community, as recommended by Babbie (2004). Pre-testing is an important part of questionnaire administration because questionnaire must be clear to the respondents in order to collect information that is relevant to the study (Frechtling, 2002; Stanley and Sedlack, 1992). Information obtained was used to clarify and also in question wording and question direction. The pre-testing of the questionnaire was done in Kangongo and Natebe communities.

The household survey generated primary data from the members of the local communities through their responses to the questionnaire. Men, women both old and young were involved in the interviews and supplied the answers although the questionnaire targeted the head of the household. The information collected included gender, age, and educational level of the respondent, household types, household size, means of livelihoods, and knowledge and awareness about JFM. The other information included access and user rights to the forest, ownership and management of the forest reserve, benefits derived from JFM initiative and the perceived condition of the forest before and after the introduction of JFM. Demographic data was collected in order to assess local community participation in JFM programme.

### 3.2.1.2 *Focus Group Discussions*

The second phase was the discussion with Forest Management Committee (FMC) members and selected Forestry Department staff as focus groups. According to Stanley and Sedlack (1992), interviews are an effective way of obtaining information about perceptions of the programme. Bless and Higson-Smith (2000) and Babbie (2004) indicated that the focus groups consist of 4 to 8 persons, whilst PHAC (1996) pointed out that a focus group should compose of 10 to 12 people.

During the study, discussions were held with members of the Dambwa Forest Management Committee. Forest Management Committee members (FMC) are selected from the respective Village Resource Management Committees (VRMCs). FMC represents the whole community and oversees the operation of the Village Resource Management Committees and the Forest User groups. They are also a link between the community and the Forestry Department (FD 2004; FD, 2005).



Photo 2: Focus Group Discussions with FMC Members

The discussions were conducted in a semi-structured manner to enhance discussion among focus group participants, and also to allow the researcher ask systematically and simultaneously several people at the same time (Babbie, 2004). Participants were allowed to express, share and analyze their experiences and knowledge. The method

allowed participants to debate among themselves the issues brought before them in order to clear any differences in opinion and explore the disagreement in detail. The technique, according to Bless and Higson-Smith (2000), helped to triangulate the information generated; and the method also helped participants to learn from one another. When using this approach there is no individual response as participants influence one other.

The discussion helped to assess progress in JFM programme implementation, impact of the programme on the forest and on the community, and sustainability of joint forest management approach to forest management. A list of broad questions was prepared before the interview. These questions were used to develop and direct the discussion among the focus group participants. Maunga community school, which is situated within the study area, was selected for focus group discussions, as it was neutral and convenient venue for local communities.

### 3.2.1.3 *Key Informant Interviews*

The interviews were conducted with local community members and local District Forestry Department staff who are the implementers of the programme in order to obtain in-depth general view of the research problem. Semi-structured interviews were conducted with open-ended questions and the key informants included both men and women (Mukherjee, 1993; USDJ, 2006).

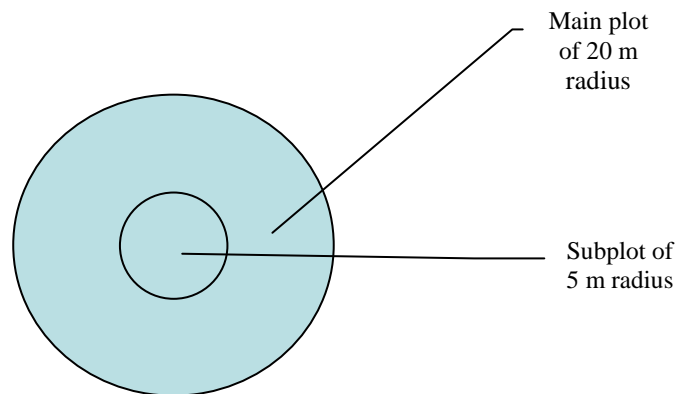
### 3.2.2 *Vegetation Assessment*

Forest resource assessment was conducted in the form of rapid vegetation assessment in order to determine the condition of the forest and impact of joint forest management on the status of the forest reserve. As indicated in Karki *et al.* (1994), rapid vegetation assessment is used in evaluation studies to collect information on trees and other vegetation in order to analyze resource availability and resource conditions.

### 3.2.2.1 *Sample Plot Establishment*

A transect walk was used to establish sample plots during forest resource assessment. This method is based on Rapid Rural Appraisal (RRA) techniques (Karki *et al.*, 1994), and involved systematic walking through the forest with participants and establishing sample plots. The method is considered useful in knowing rural ecological conditions because it involves physically walking through the forest and making necessary assessments with participants (Mukherjee, 1993). Sunderland (1996) also supports the use of this method and further indicated that line transect survey technique is a simple forest resource assessment technique used when it is not feasible to conduct a detailed forest resource assessment.

Different researchers have used different plot sizes in their forest resource assessment. The difference in plot sizes is because the plot size and forest inventory design are dependent on the type of information to be collected from the resource assessment. Geldenhuys (2004) used sampling units of 20 m radius in miombo forest inventories. In this study, the sample size of 20 m radius was used as it was considered large enough for the study area. According to Philip (1994), large sample units are more effective than smaller units in representing the variation.



Lay out of 20 m radius sample plots and 5 m radius subplots located inside.

Figure 3: Layout of Sample Plot

#### 3.2.2.2 *Plot Assessment*

The 20 m radius sample plot was used to collect data pertaining to diameter measurement, nomenclature, and frequency of tree species above 2 cm DBH. Subsequently, the 5 m radius sample subplots were used to assess the presence of saplings, seedlings, sprouts and other woody plants of less than 2 cm DBH in order to determine regeneration of woody plant species. Land use pattern and ecological condition of the forest reserve were also observed and discussed with the local people and Forestry Department staff.



Photo 3: Forest Vegetation Assessment in Dambwa Forest Reserve

Trees and shrubs of  $\geq 2$  cm diameter at breast height were identified, and their diameter at breast height (DBH) measured and recorded. Diameter at breast height of all trees and shrubs was measured with a diameter tape at 1.3 m from the ground. Diameter at breast height is commonly measured in forestry ecological studies to compare cross-sectional area, dominance, ground cover and dynamic long-term study to measure growth (Philip, 1994; Cunningham, 2001; Obiri *et al.*, 2001). Dead trees were not measured for diameter. Multiple stems at breast height on a tree were considered as individual trees and their DBH measured and recorded (Grundy, 1995).

Trees and shrubs of  $\leq 2$  cm DBH, which were considered as saplings, were identified, counted and recorded for regeneration assessment in the subplot (Karki *et al.*, 1994). Other studies such as Lykke (1998: cited in Cruz, 2002) considered minimum DBH of 1 cm for regeneration. Both the Forestry Department personnel and local people were involved in tree identification and citing of local names and their uses. Data were recorded in the field data form (Appendix 2).



### 3.2.3 Secondary Data Analysis

Information collected and processed in the past for other purposes may have value to the performance measurement and evaluation (Babbie, 2004; USDJ, 2006). According to Stanley and Sedlack (1992), the use of secondary data involves extrapolation of information that already exists, but was collected for other purposes. The secondary data provide necessary background information, an in-depth understanding of underlying issues, and a framework in which to analyse primary data for the study (Babbie, 2004). It is important to note that the secondary data, which were used for this study, were derived from reports, official records and other documents within Forestry Department offices and other institutions. Internet was also sparsely used to access other information relevant to the study. The secondary data accessed was assessed for its quality, form and utility.

### 3.2.4 Evaluation Method and Criteria

According to Babbie and Mouton (2001), in order to establish that there has been change over time following an intervention, change should be attributed to a particular intervention and not other unrelated causes. These changes can either be positive or negative, and are determined by comparing baseline measurements with post implementation measurements (Bellamy *et al.*, 2001). The fundamental basis for project evaluation is, therefore, the establishment of practical criteria by which change can be monitored and assessed in order to evaluate progress and impact.

In this study comparison was made between two situations before the introduction of JFM and after the introduction of JFM in Dambwa Forest Reserve. The measurement of the impact of the study was based on programme logical framework that outlined programme goals, purpose, activities, outputs and outcomes assumption. The programme logical framework of JFM project had three results that were fundamental to the achievement of programme objectives.

The three results were: capacity (knowledge, skills, and attitude) and resources of the Forestry Department strengthened for effective implementation of JFM; capacity and

interests of local institutions, organizations and individuals for sustainable natural resources management strengthened; and supportive mechanisms and processes established at institutional level for the implementation of collaborative forest management.

Table 2: Logical Framework for JFM Project

<b>Narrative Summary</b>	<b>Objectively Verifiable Indicators</b>	<b>Source of Verification</b>	<b>Risks and Assumptions</b>
<p><i>Overall Objective:</i></p> <p>Improve livelihoods and condition of forests</p>	<p><i>Impact:</i></p> <ul style="list-style-type: none"> <li>❖ Implementation of JFM plans resulting in a 5% improvement in living conditions for at least 75% of households in the programme areas when measured at one year after implementation begins against socio-economic baseline data</li> <li>❖ No further measurable deforestation in JFM area</li> <li>❖ Implementation of JFM plans results in a 20% improvement in forest condition indices such as regeneration levels, population structure, species diversity and vegetation cover for the 40,000 ha of forest under JFM plans and measured ten years after implementation begins</li> </ul>	<ul style="list-style-type: none"> <li>❖ Stratified random socio-economic assessment of household well-being and income levels in the programme areas</li> <li>❖ Satellite images</li> <li>❖ Forest inventory results</li> <li>❖ Stratified random resource assessment along a transect</li> </ul>	

<p><i>Purpose:</i></p> <p>Sustainable Collaborative forest management practices being implemented in seven pilot areas and experience shared</p>	<ul style="list-style-type: none"> <li>❖ JFM plans prepared for 40,000 ha of forest by end of 2003 and implementation by community groups on-going</li> <li>❖ A minimum of 80% of FD staff (men and women) trained in relevant skills with the programme areas, at least 35% of these will be women</li> <li>❖ A minimum of 80% of community members within participating communities (men and women) trained in relevant skills with programme areas; at least 35% of these will be women</li> <li>❖ Levels of awareness of importance of natural resource management increased among communities in Programme areas</li> <li>❖ Replicable model for collaborative forest management developed and shared</li> </ul>	<ul style="list-style-type: none"> <li>❖ JFM plan documents prepared and gazetted by FD, inspection, FD annual reports</li> <li>❖ Training records and programme reports</li> <li>❖ Awareness assessment reports</li> </ul>	<ul style="list-style-type: none"> <li>❖ All partners willing and able to meet their commitment in a timely fashion (Budgeting, staffing, approval of plans and others)</li> <li>❖ Legal framework in place which supports JFM</li> </ul>
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Narrative Summary	Objectively Verifiable Indicators	Source of Verification	Risks and Assumptions
<p><i>Result 1:</i> Capacity and resources of Forestry Department staff strengthened for effective implementation of JFM in pilot areas</p>	<ul style="list-style-type: none"> <li>❖ Training program developed and implemented within time and budget</li> <li>❖ All Forestry Department staff in pilot districts trained in relevant subjects</li> <li>❖ Forestry Department staff carrying out their duties in a confident and competent manner</li> <li>❖ Forestry Department headquarters and provincial offices in pilot provinces actively supporting field work at district and community level</li> <li>❖ Necessary surveys and preparatory work to support JFM planning carried out with community participation</li> <li>❖ Essential programme equipment acquired and maintained</li> <li>❖ Programme plans completed, finances managed</li> </ul>	<ul style="list-style-type: none"> <li>❖ Training reports</li> <li>❖ Observation and interviews</li> <li>❖ Work plans</li> <li>❖ Activities sheets</li> <li>❖ Maps, forest resource survey report, socio-economic reports</li> <li>❖ Inventory of equipment</li> <li>❖ Financial records</li> </ul>	<ul style="list-style-type: none"> <li>❖ Trained staff retained in the project area</li> <li>❖ Adequate staffing available</li> <li>❖ Timely flow of sufficient counterpart funds</li> </ul>

<p><i>Result 2:</i> Capacity of local institutions/organization/individuals for sustainable natural resource management strengthened</p>	<ul style="list-style-type: none"> <li>❖ Presence of functioning Village, Area and District level JFM Committees and other necessary local governance structure in pilot districts</li> <li>❖ Community members have capacities to implement JFM plans</li> <li>❖ 7 JFM plans prepared and gazetted by end of 2003</li> <li>❖ Community members of both genders enjoying user rights and receiving economic and social benefits from forest management activities</li> <li>❖ Committees able to manage their financial responsibilities in accordance with JFM plans</li> <li>❖ Village level committee members enforcing forest by-laws with confidence</li> </ul>	<ul style="list-style-type: none"> <li>❖ Project reports</li> <li>❖ Training reports</li> <li>❖ JFM plans</li> <li>❖ Committee financial records</li> </ul>	<ul style="list-style-type: none"> <li>❖ All implementing partners willing and capable to respect their agreements and meet their obligations in time</li> <li>❖ The current interest in JFM in the communities and by traditional authorities retained</li> </ul>
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Narrative Summary	Objectively Verifiable Indicators	Source of Verification	Risks and Assumptions
<p><i>Result 3:</i> Enabling mechanisms and process established at institutional level for implementation of collaborative forest management</p>	<ul style="list-style-type: none"> <li>❖ JFM guidelines prepared and adopted by Forestry Department /MTENR</li> <li>❖ By-laws formulated, as necessary, to support Forests Act, by local government</li> <li>❖ A cost-benefit sharing mechanism defined by Forestry Department /MTENR</li> <li>❖ Institutional arrangements to support JFM implementation proposed by Programme to Forestry Department</li> <li>❖ Roles and Responsibilities for efficient JFM agreed and Forestry Department staff Terms of References (TORs) revised to reflect their roles and responsibilities</li> <li>❖ Gender strategy and action plan for JFM development and implemented by Forestry Department and communities</li> <li>❖ Existence and implementation of legal/regulatory framework, including operationalisation of Forests Act of 1999 and Statutory instruments related to JFM</li> </ul>	<ul style="list-style-type: none"> <li>❖ Project reports</li> <li>❖ JFM guidelines</li> <li>❖ Forestry Department Terms of References (TORs)</li> <li>❖ Gender policy forms part of Forestry Department standard operational instructions</li> <li>❖ Legal documents</li> </ul>	<ul style="list-style-type: none"> <li>❖ Institutional support for JFM by Forestry Department continues</li> <li>❖ Gazettement process of JFM plans doesn't delay the implementation unnecessarily</li> <li>❖ Delays in establishment of Forestry Commission do not hinder the development of legal framework supporting JFM</li> </ul>

<b>Results</b>	<b>Activities</b>	<b>Assumption</b>
<p><i>Result 1:</i> Capacity and resources of Forestry Department staff strengthened for effective implementation of JFM in pilot areas</p>	<ul style="list-style-type: none"> <li>❖ Plan training program to prepare staff and partner institutions to support JFM process</li> <li>❖ Implement training programme including facilitating study tours; training workshops and workplace-based training/facilitation</li> <li>❖ Coordinate Programme, periodic work planning and reporting</li> <li>❖ Coordinate and support Programme staff and service providers to ensure field activities are supported</li> <li>❖ Manage programme financial resources and equipment</li> <li>❖ Monitor and evaluate Programme objectives, results and activities to ensure strategic focus</li> </ul>	<ul style="list-style-type: none"> <li>❖ Extension staff remains within Forestry Department in the districts, and work with the Programme</li> </ul>
<p><i>Result 2:</i> Capacity of local institutions, organization and individuals for sustainable natural resource management strengthened</p>	<ul style="list-style-type: none"> <li>❖ Create and strengthen existing community structures at village and forest area levels to undertake PFM activities</li> <li>❖ Mobilize community and other stakeholders</li> <li>❖ Consult relevant stakeholders,</li> <li>❖ Conduct participatory resource assessments, prepare, legislate and register JFM plan</li> <li>❖ Support implementation of JFM plans</li> <li>❖ Establish and support producer/user groups within JFM communities</li> <li>❖ Provide support to forest-based small enterprise development and market linkages once JFM plans ready for implementation</li> <li>❖ Identify mechanisms and partner agencies to support</li> </ul>	<ul style="list-style-type: none"> <li>❖ Community members maintain their interest and participation in JFM activities</li> <li>❖ Access to user rights for the forest is sufficient incentives for adequate participation of community members in the short-term</li> <li>❖ Economic potential of forest areas is sufficient to justify inputs of labour and time by the community members</li> </ul>



	forest-based household livelihood activities	
<p><i>Result 3:</i> Enabling mechanisms and process established at institutional level for implementation of collaborative forest management</p>	<ul style="list-style-type: none"> <li>❖ Prepare JFM guidelines through a consultative process</li> <li>❖ Develop clear cost-benefit sharing mechanisms for JFM implementation</li> <li>❖ Provide legal support to district/provinces to draft lower level regulations in support of JFM plans</li> <li>❖ Identify the need for modifications to the Forests Act of 1999 on the basis of lessons learned from JFM process</li> <li>❖ Fund research to support JFM activities</li> <li>❖ Collect, records and disseminate JFM best practices</li> <li>❖ Support the development and implementation of gender policies in the Forestry Department in relation to JFM</li> </ul>	<ul style="list-style-type: none"> <li>❖ Forestry Department permits sufficient flexibility in the JFM planning process to avoid significant hold-ups in the process</li> <li>❖ Forestry Department responsible for the revision of the Forests Act and national Forest Policy</li> </ul>

Adapted from PFAP (2004)

The aspects outlined below were used in the study as success indicators to evaluate what the joint forest management project was set to accomplish and what has been the impact of the project on the local people and the forest reserve. These aspects were encompassed in the questionnaire and the data on them were captured during the administration of the household questionnaire and during the focus group discussions.

(i) *Livelihoods/socio-economic*

- Household income levels arising from activities within the forest reserve
- Household income diversification through income generating activities
- Accessibility to forest products by the members of the local communities
- Benefits directly accruing from participating in joint forest management

(ii) *Ecological aspects*

- Changes in forest cover of the forest reserve (tree population structure and tree density)
- Evidence of natural regeneration in the forest area (regeneration levels and species diversity)
- Degree of illegal activities in the forest reserve

(iii) *Institutional aspects*

- Number and viability of local forest management committees
- Existence of supportive policy and legal frameworks
- Representation of women in the committees
- Accessibility to the forest by the local communities
- Existence of rules and regulations
- Compliance levels with rules and regulations
- Local community's capacity to manage the forest
- Local community participation in joint forest management

### **3.3 Data Processing and Analyses**

The data collected through participatory rural appraisal tools and forest assessment were checked for errors and verified (Frechtling, 2002). The data were then coded in an appropriate format for entry into the computer (Babbie, 2002; Bless and Higson-Smith, 2000). Primary quantitative data were subjected to statistical analysis by interpreting the questionnaire responses and forest assessment, using computerised means of comparisons and descriptive statistics.

The data were processed and analysed using Statistica version 8.0 and Microsoft Excel software. The data were prepared in Microsoft Excel with all variables of interest to the study for statistical analysis procedure and imported into Statistica for processing and analysis. Three kinds of variables for the data collected were recognised: the continuous variables or data on a ratio scale such as age of the respondents; ordinal variables representing scale of magnitude such as education status; and nominal or categorical variables, which indicate the categories into which the respondents fall such as gender. Data were categorized into classes because statistical analyses differ for each class of variables (Clewer and Scarisbrick, 2006; Ferguson, 1987; Zar, 1998).

Descriptive statistics and chi-square tests were conducted to determine the means, frequencies, percentages and the relationships in the responses of the subjects surveyed using a 95% confidence interval. In conducting the statistical inferential analysis, analysis of variance (ANOVA) was used to test whether continuous variables differ over the different categories of nominal variables. Where data were normally distributed, the ANOVA F-test was used giving a p-value that indicates whether the means on the continuous variable differs significantly between the nominal variables. However, where data were not normally distributed, a non-parametric analysis of variance was used to test the difference between variables.

The appropriate non-parametric test applied for two levels of nominal variables was the Mann-Whitney test, and for more than two levels of the nominal variables, Krustal-Wallis test was applied. Furthermore, where significant difference was observed in Krustal-Wallis test, the Bonferroni multiple procedure was used to

confirm which variables differed significantly from the other (StatSoft Inc., 2007; Dunn and Clarke, 1987; Clewer and Scarisbrick, 2006; Ferguson, 1987; Zar, 1998).

In cases where nominal variable was compared to another nominal variable, a contingency table, also known as cross-tabulation, was used. The assumption for this test is that the level of one nominal variable did not influence the level of the other nominal variable. Therefore, to test whether the influence of one nominal variable on the other is sufficient to state that the two variables are not independent, a Maximum-Likelihood (ML) chi-square test, which is more robust, was used. The p-values of the tests were reported in the analysis and where the p-value was found to be less than 0.05, the result was regarded as significant (StatSoft Inc., 2007; Dunn and Clarke, 1987; Clewer and Scarisbrick, 2006; Ferguson, 1987; Zar, 1998).

The questionnaires were analysed for differences in responses by presenting and integrating the questionnaires using computerised means of comparisons and descriptive statistics. The main parameters used for the analysis were: the age of the respondents; education levels; social position in community; marital status; gender, household size; and type of household (male headed or female headed). These parameters were used with the assumption that they can influence the levels of participation in joint forest management.

Data from the forest resource assessment were analyzed to determine species availability and condition of the forest reserve. Frequencies and DBH measurements from the forest resource assessment were used to determine and compare ground cover, tree species availability, and regeneration of forests (Philip, 1994; Obiri *et al.*, 2001). The size-class distribution of important and prominent tree species were analysed to verify how the trees and the forest responded to various treatments such as harvesting, disturbances or protection.

The population structure of trees was compared by the distribution of different size classes in five most commercially valuable tree species: *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Azelia quanzensis*, *Colophospermum mopane*, and *Guibourtia coleosperma*. The size-class category of 5 cm DBH was used. Examination of population dynamics to determine population trends was based on

recruitment and absence of various size classes. Qualitative data from observation, group discussions, and secondary data sources were used to support the information generated from the data analysis (Bailey and Slater, 2005; Holmes, 2007).

## **Chapter 4 – Results**

### **4.1 Introduction**

The following chapter presents the results of the household survey and forest resource assessment in Dambwa JFM area in Livingstone. The survey was designed to obtain information on the background of local people, awareness on JFM, involvement in JFM, household economic conditions, benefits derived from JFM, and perceptions on the performance of joint forest management programme. While forest resource assessment was designed to obtain information on the condition of the forest reserve. The information collected included tree cover, tree species availability, tree size class distribution, forest regeneration, and human and animal disturbances. Focus was also made on availability and condition of selected major timber species.

The household survey and forest resource assessment revealed that Dambwa Forest Reserve showed signs of reduced disturbances and good regeneration of both pioneer species and some commercial timber species. All respondents indicated that there were no economic benefits accruing to the local people and there had been no improvements at the household level after the introduction of JFM.

### **4.2 Household Survey**

Household demographic and socio-economic data were collected during household survey. It was found that some of the household characteristics contributed significantly to the implementation of JFM by encouraging community participation in JFM activities, while others had no effect.

#### 4.2.1 Household Demographic Information

A total number of 93 respondents were interviewed of which 59% were male and 41% were female. Of the total households interviewed, 81% were male-headed and 19% were female-headed.

The age of the respondents ranged from 15 to over 78 years with an average of 45 years. The majority of the respondents were between 36 and 50 years and constituted 33%, followed by persons between 21 and 35 years, constituting 30% (see Figure 1). Persons younger than 21 years constituted 2%, while respondents between 51 and 65 years and above 65 years constituted 22% and 13%, respectively.

There were more male (37%) respondents in the age groups 21-35 years as opposed to female respondents in the same age group. Conversely, there were more female respondents (44%) in the age group 36-50 years compared to 25% of males in the same age group (Figure 4).

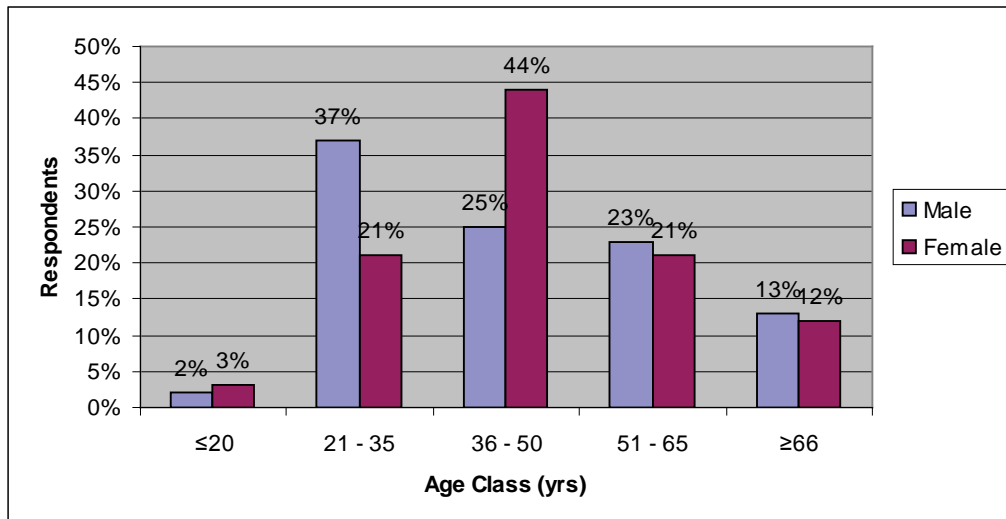


Figure 4: Gender of Respondents by Age Class (N=86)

The minimum number of occupants per household was one and the maximum was thirteen. The majority of the households interviewed had four to six occupants and the average number of occupants per household was found to be six. Four household size categories were set up because of the wide range of the number of occupants per household interviewed. The four categories were: less than 4, between 4 and 6,

between 7 and 9, and above 9 occupants per household. The households with less than 4 occupants constituted 22%; between 4 to 6 occupants constituted 46%; between 7 to 9 occupants, 21%; and more than 10 occupants comprised 10% the surveyed households.

Thirty-eight percent (38%) of the respondents had primary education level, 32% had junior secondary school education, 11% had attained senior secondary education, and 2% had tertiary education. There were 17% of the respondents who had no formal education (Figure 5).

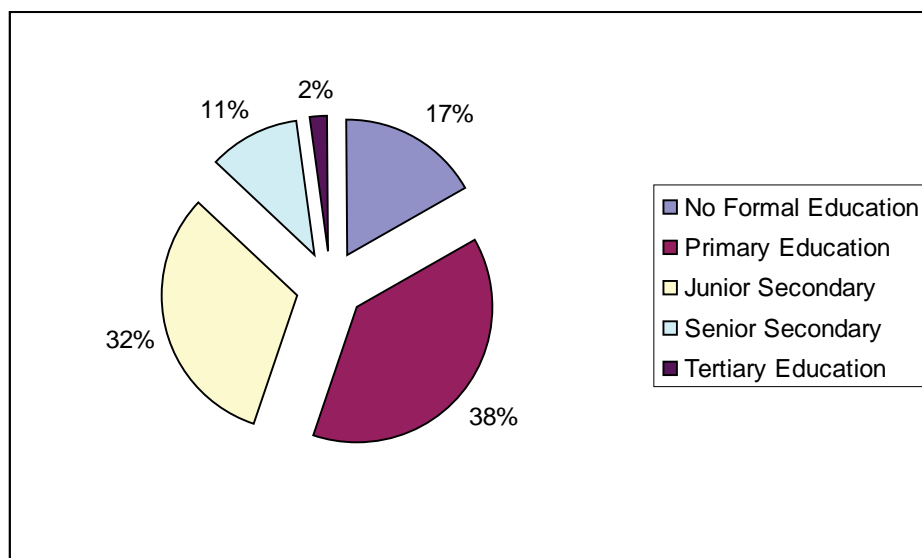


Figure 5: Educational Levels of Respondents

The results of social positions of the respondents showed that 10% were traditional leaders at the village level, 58% were ordinary community members, 25% were members of local forest management committees, and 8% were members of the forest user groups.

The majority (83%) of dependants were involved in farming as their main livelihood activity. Others were involved in farming and formal employment (8%), farming and trading (4%), casual work (3%), formal employment (1%), and formal employment and casual work (1%). Therefore, about 95% of the respondents were involved in agricultural activities for their livelihoods.



#### 4.2.2 Local Community Involvement in JFM Programme

More than half (68%) of the respondents were aware of collaborative management arrangement of Dambwa Forest Reserve between government and the local community. However, 25% of the respondents indicated that the government through the Forestry Department still managed the forest reserve, 3% indicated that only communities managed the forest reserve, while the other 3% did not know who was responsible for managing the forest reserve (Figure 6).

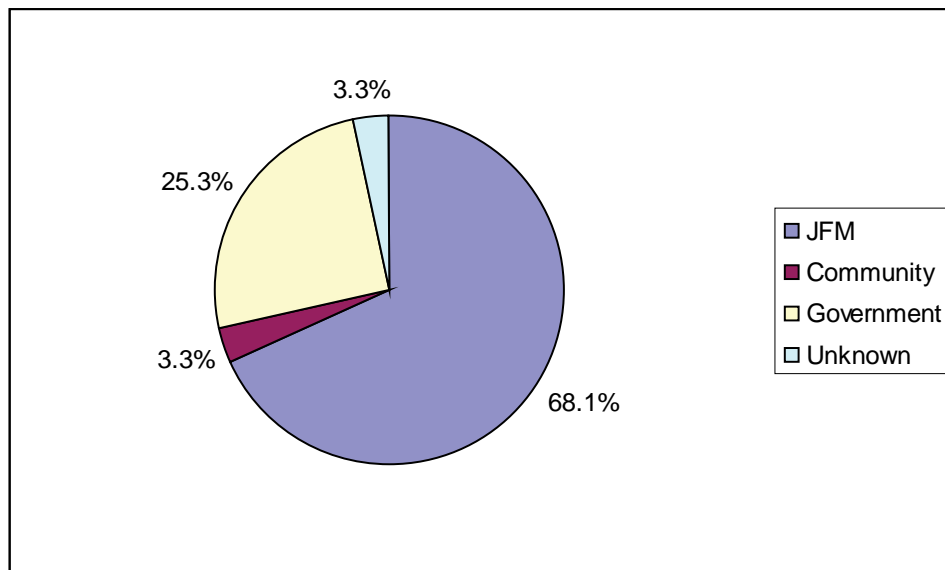


Figure 6: Community Awareness on Joint Forest Management

The survey results showed that 64% of the local people interviewed around Dambwa Forest Reserve participated in JFM programme of which 64% were men and 36% were women. The results further revealed that 69% of men and 57% of women respondents participated in JFM. There was statistically no significant difference in participation between men and women ( $p=0.25289$ ).

When segregated by marital status, the results showed that fewer (38%) single respondents were involved in JFM compared to the respondents who were married or had been married before (Figure 7). However, there was statistically no significant difference between marital statuses and the involvement in JFM ( $p=0.09212$ ).

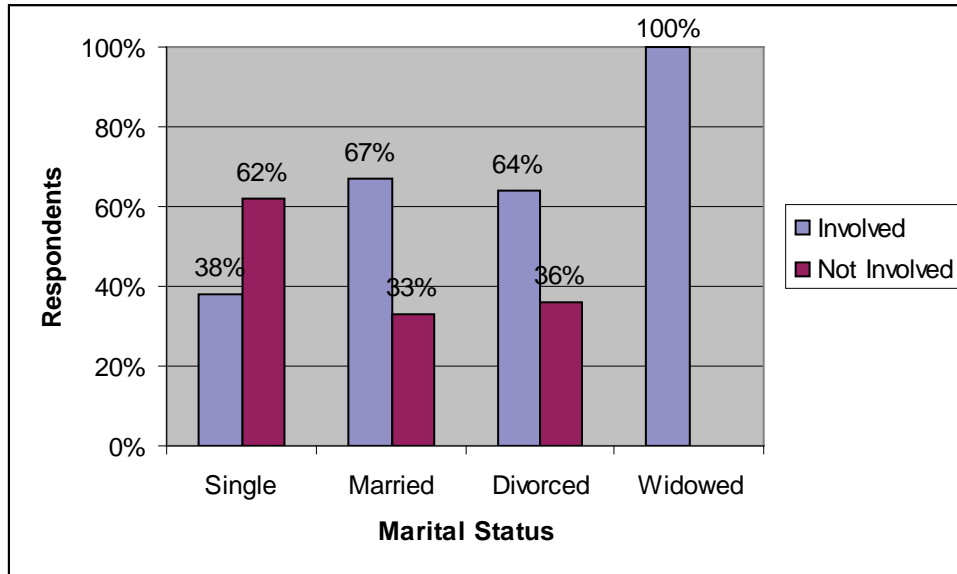


Figure 7: Local People's Involvement in JFM by Marital Status (N=91)

Based on education levels, more local people with higher education standard were involved in JFM programme than those with primary or no formal education (Figure 8). However, there was statistically no significant difference between formal education background and the involvement in JFM programme ( $p=0.06857$ ).

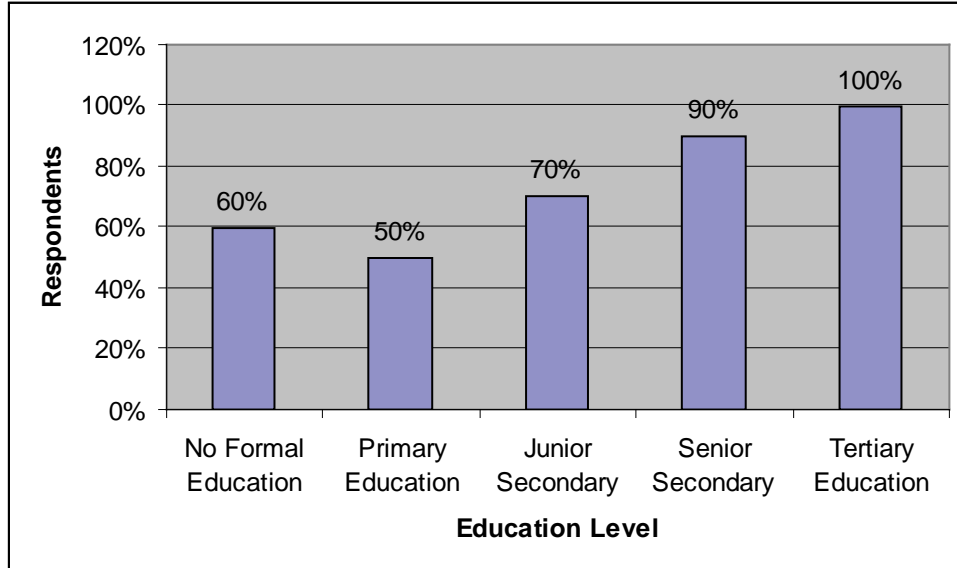


Figure 8: Local People's Involvement in JFM by Education Level

The household sizes were categorized in 4 classes depending on number of occupants: less than 4 occupants; between 4 and 6 occupants; between 7 and 9 occupants; and more than 9 occupants. There was significant difference between the number of occupants in a household and the involvement in JFM. The households with more

than 6 occupants were more involved in JFM than those with less than 7 occupants. The results showed statistically a significant difference between the number of occupants in a household and the involvement in JFM ( $p = 0.03$ ) (Figure 9).

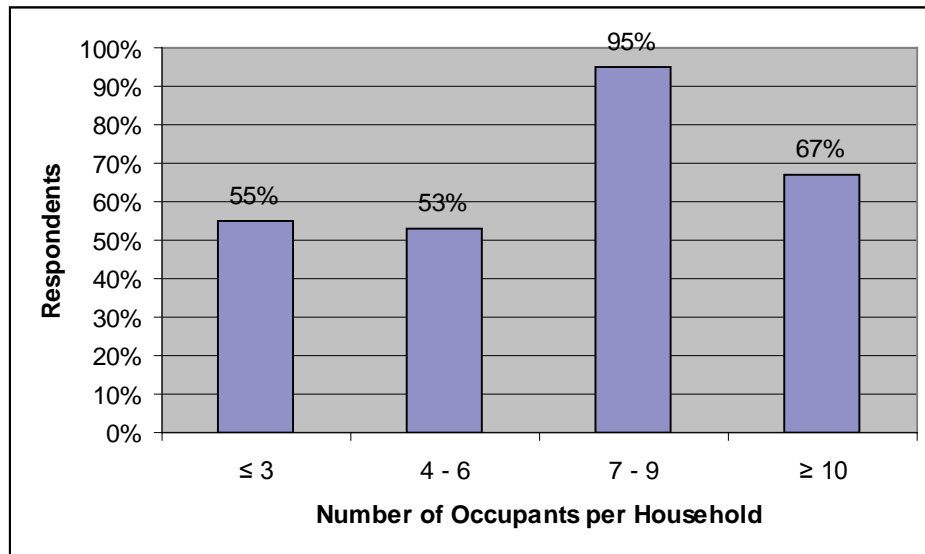
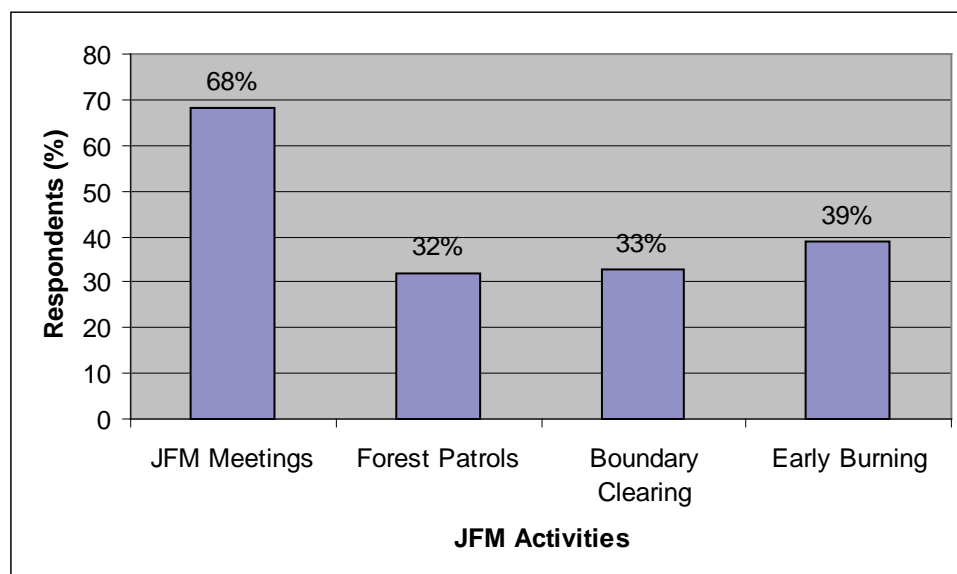


Figure 9: Local People's Involvement in JFM by Household Size (N=88)

#### 4.2.3 Local People's Participation in JFM Activities

The study revealed that local people participated in JFM related meetings, forest patrols, boundary clearing and maintenance, and early forest burning. The results showed that 68% of the respondents attended meetings, 38% participated in prescribed early burning, 33% participated in forest boundary maintenance, and 32% participated in forest patrols (Figure 10).



## Figure 10: Local People's Involvement in JFM Activities

Furthermore, both men (66%) and women (72%) were more involved in JFM related meetings than other JFM activities, though the results showed that more women attended JFM meetings than men. There was statistically no significant difference between men and women in attending JFM meetings ( $p = 0.62048$ ).

The results also showed that married (67%), divorced (75%) and the widowed (100%) respondents attended JFM meetings more than the unmarried respondents (56%). However, there was statistically no significant difference ( $p=0.48529$ ).

In terms of undertaking forestry activities such as forest patrols, boundary clearing and early burning, results showed that more men were involved in forestry activities than women (Figure 11). Forty-two percent (42%) of men and 32% women participated in early burning of the forest, but there was statistically no significant difference between the participation of men and women in early burning ( $p = 0.38790$ ). The results also showed that 38% of men and 21% women participated in forest patrols, but there was statistically no significant difference between men and women ( $p = 0.12537$ ). As regards boundary maintenance, also more men (42%) than women (18%) participated in this activity and there was statistically a significant difference between the participation of men and women, ( $p = 0.02549$ ).

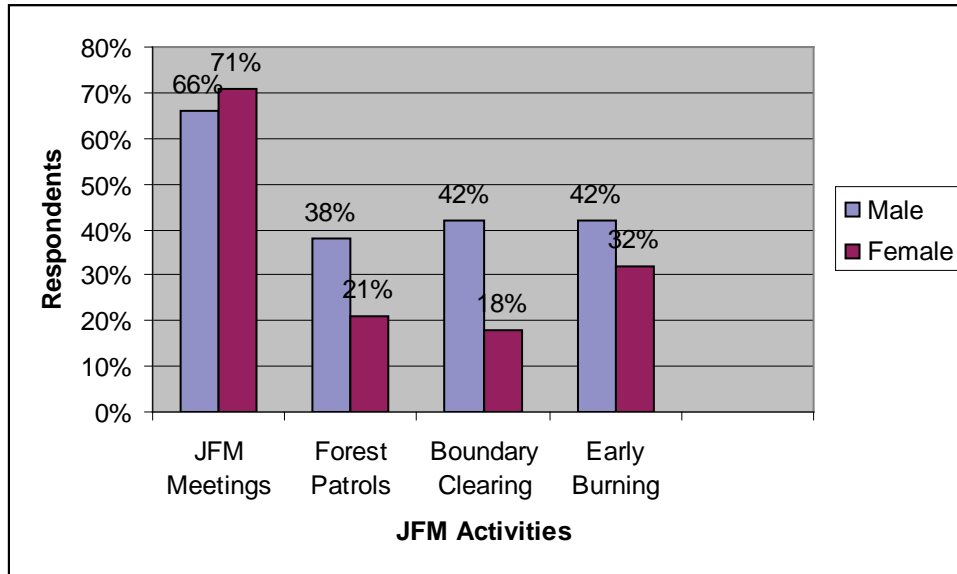


Figure 11: Local People's Participation in JFM Activities by Gender

The social positions of the respondents were determined during the survey. It was found that 10% of the respondents were in traditional leadership positions at the village level, 58% were ordinary community members, 25% were in local forest management committees, and 8% were forest user group members. Therefore, the majority of the local people interviewed were the ordinary community members who constituted 58% of the respondent

The results also showed differences in JFM participation among the respondents, according to social status. For example, 56% of traditional leaders; 52% general community members; 87% members of local management committees; and 86% members of FUGs participated in JFM. The results revealed that FMC members and FUG members participated more than other local community members in different positions (Figure 12). There was statistically a significant difference ( $p = 0.01037$ ) between participation.

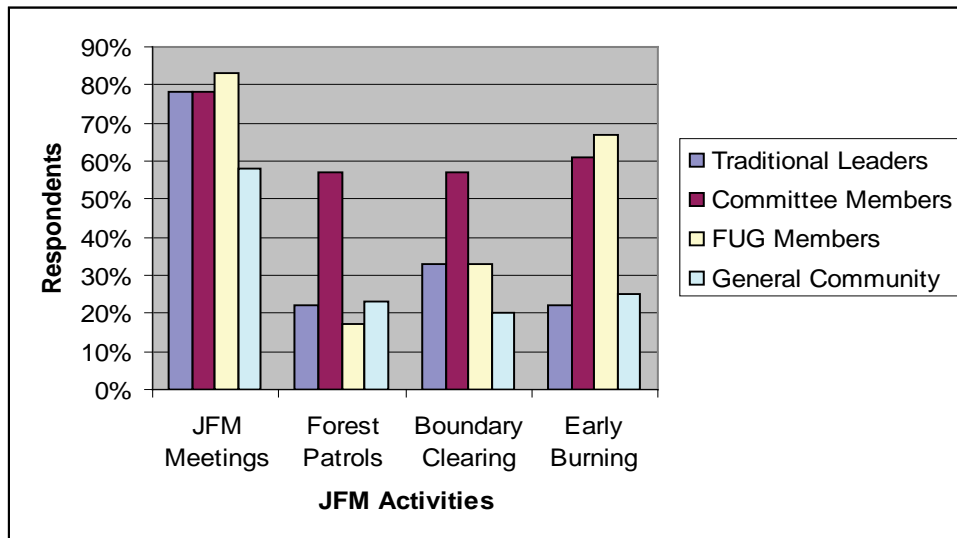


Figure 12: Local People's Participation in JFM Activities by Social Position

The results showed that more local people in influential positions such as FUG members (83%), Forest Committee member (78%) and Traditional Leaders (78%) attended JFM related meetings than the ordinary community members (58%). The results, however, showed statistically no significant difference between social positions of the respondents and attendance of JFM meetings ( $p = 0.23307$ ).

The survey results further showed that the majority of committee members (57%) were involved in forest patrols compared to those in traditional leadership positions (22%), forest user group members (17%), and ordinary community members (23%) (Figure 12). There was statistically a significant difference between social positions of the community members and involvement in forest patrols ( $p = 0.03259$ ).

Similarly, more FUG members (67%) and forest management committee members (61%) were more involved in prescribed early burning than general community members (25%) and those in traditional leadership positions (22%) (Figure 12). There was statistically a significant difference between social positions and involvement in prescribed early burning ( $p = 0.03393$ ).

Furthermore, more local management committee members (57%) were involved in forest boundary maintenance than traditional leadership (33%), forest user groups (33%), and the ordinary community members (20%) (Figure 12). The results showed

statistically a significant difference between social positions of the respondents and involvement in forest boundary maintenance ( $p = 0.01178$ ).

The level of involvement in JFM was assessed among 5 age groups:  $\leq 20$ , 21 – 35, 36 – 50, 51 – 65, and  $\geq 66$  years. The results showed that the age group 36-50 years was more involved in JFM with 36% of participants followed by the age group 21-35 years with 27% (Figure 13). No statistically significant difference was found between the age of respondents and their involvement in JFM ( $p = 0.64$ ).

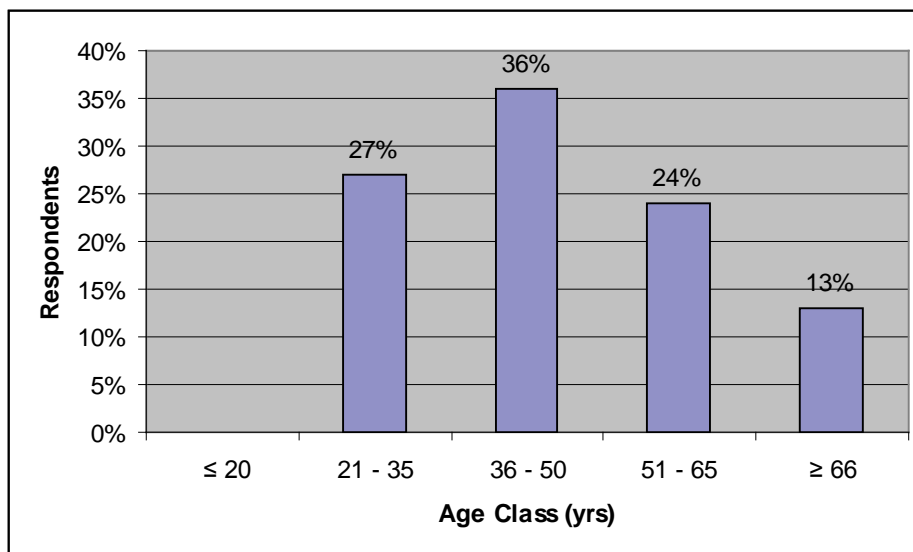


Figure 13: Local People's Participation in JFM by Age Class (N=55)

The results showed that households with more than 6 occupants attended JFM meeting more than households with less than 7 occupants (Figure 14). There was statistically a significant difference between the number of occupants and attendance of JFM meetings ( $p = 0.02$ ).

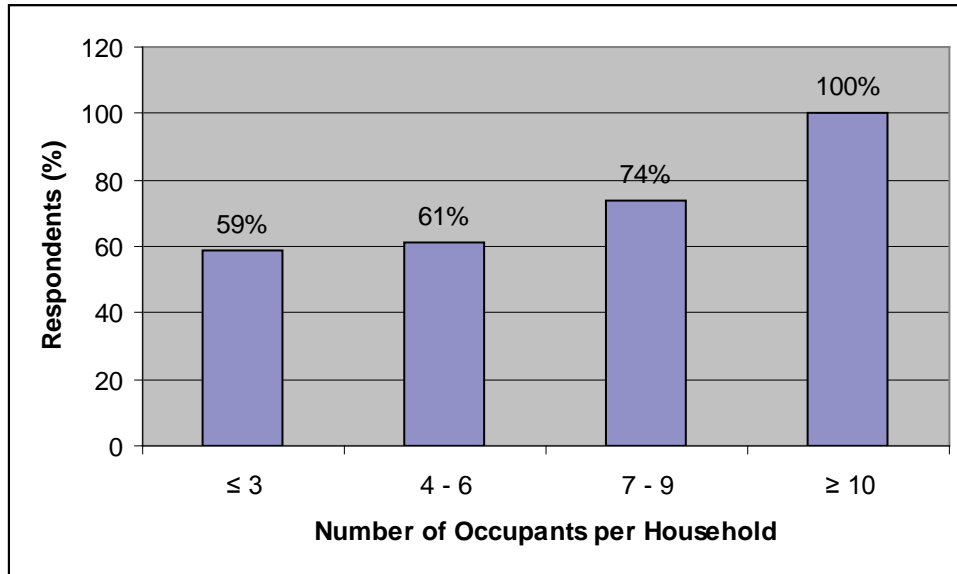


Figure 14: Attendance to JFM Meetings by Household Size (N=75)

Time spent on JFM activities was also assessed to determine further the levels of participation among the local people. The number of days per month were classified into three categories: less than 5 days; between 5 and 10 days; and more than 10 days. The results showed that the majority (75%) of JFM participants spent less than 5 days per month on JFM related activities, while 17% spent between 5 to 10 days, and only 8% spent more than 10 days per month on JFM activities (Figure 15).

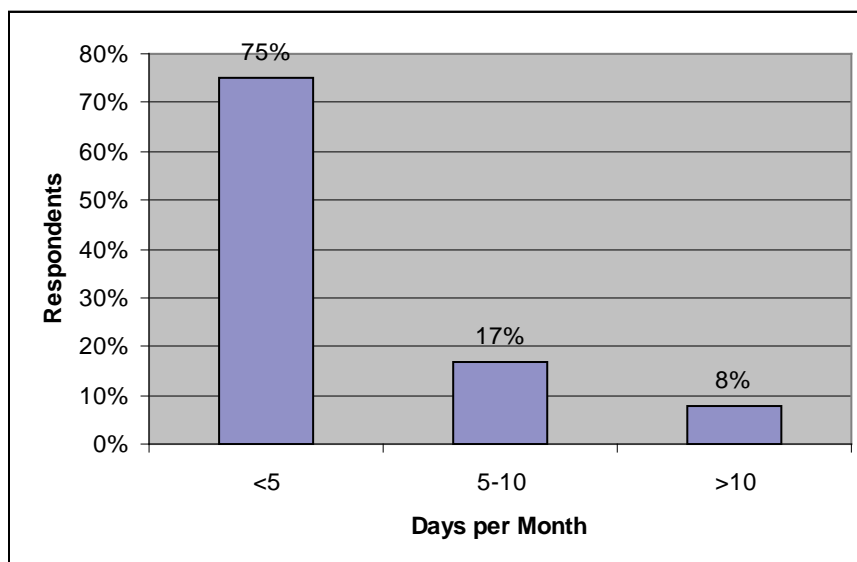


Figure 15: Number of Days Per Month Local People Spent on JFM Activities

The majority (95%) of women spent less than 5 days in a month on JFM related activities and only 5% of women spent between 5 to 10 days in a month. There were



females spending more than 10 days in a month on JFM related activities. As regards men, 63% spent less than 5 days in a month on JFM activities, 25% spent between 5 and 10 days per month; and 13% spent more than 10 days in a month on JFM related activities (Figure 16).

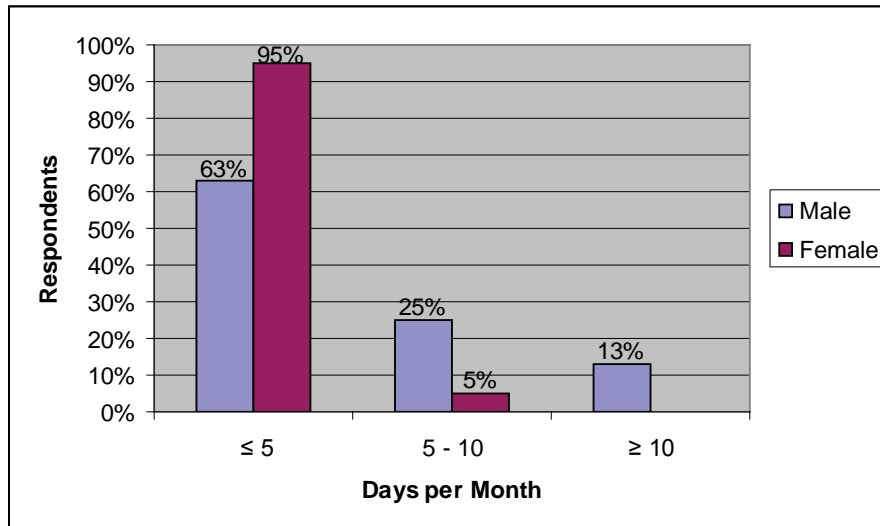


Figure 16: Number of Days per Month Spent on JFM by Gender (N=52)

During the survey the following FUGs were reported to exist in the area: plant oil extraction (Mungongo), sand mining, beekeeping, basketry, wild vegetables and fruits, woodcarving and firewood. However, 56% of respondents did not belong to any user group. Conversely, 9% were registered under sand mining, 9% under beekeeping, 14% under oil extraction (Mungongo) user group, 1% under basketry, 4% under wild vegetables, 2% under wood carving user group, and 4% under fuelwood (Figure 17).

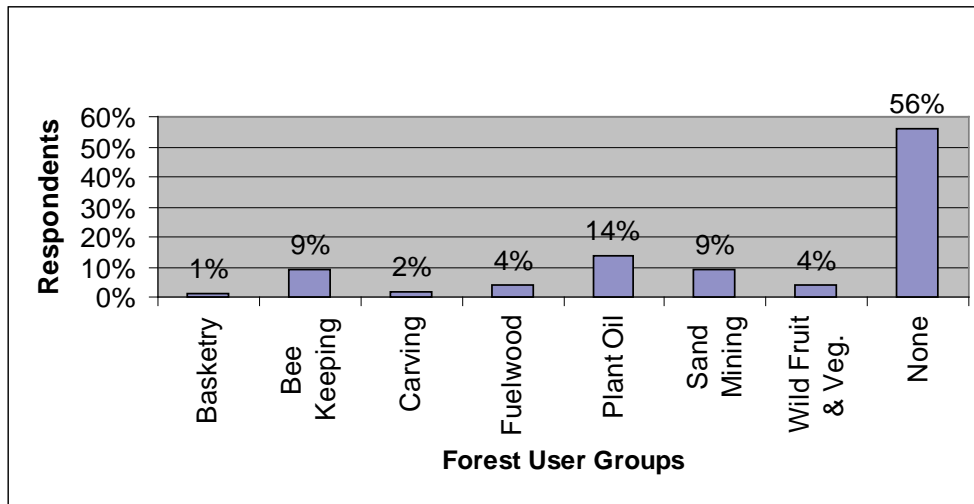


Figure 17: Local People's Involvement in Forest User Groups (N=85)

The results further showed that 31% females and 2% males were registered under plant oil (Mungongo) user group, 16% males were under sand mining, 8% females and 10% males were under beekeeping, and 6% females with 2% males were under wild vegetable and fruit gathering. Only 3% of the females were involved in basketry. Furthermore, only men were involved in fuelwood collection and wood carving user groups and constituted 6% and 4%, respectively (Figure 18). Close to a half (49%) of the females and more than a half (59%) males did not belong to any user group. There was statistically a significant difference between men and women regarding their involvement in FUGs ( $p = 0.0009$ ).

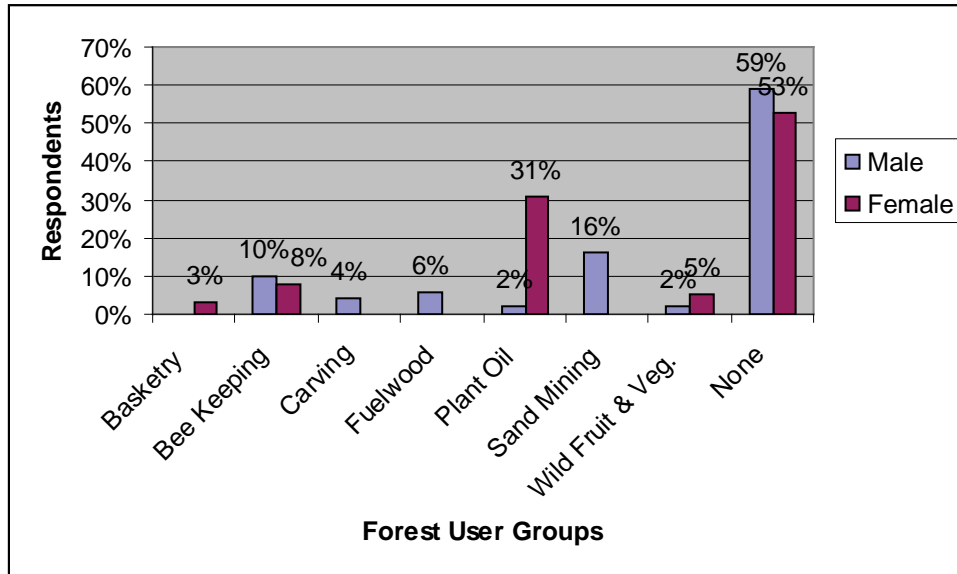


Figure 18: Local People's Involvement in Forest User Groups by Gender (N=85)

The results showed that more (67%) single respondents were not involved in forest user groups than those married, divorced or widowed (55%) (Figure 19). The single respondents involved in forest user group were only registered under plant oil extraction (Mungongo) group (17%), sand mining (8%), and bee keeping (8%). Plant oil extraction, sand mining and bee keeping were also the most preferred FUGs by the married, divorced or widowed respondents (Table 3 and Figure 19). There was no statistically a significant difference between marital status and the involvement in FUGs ( $p = 0.68818$ ).

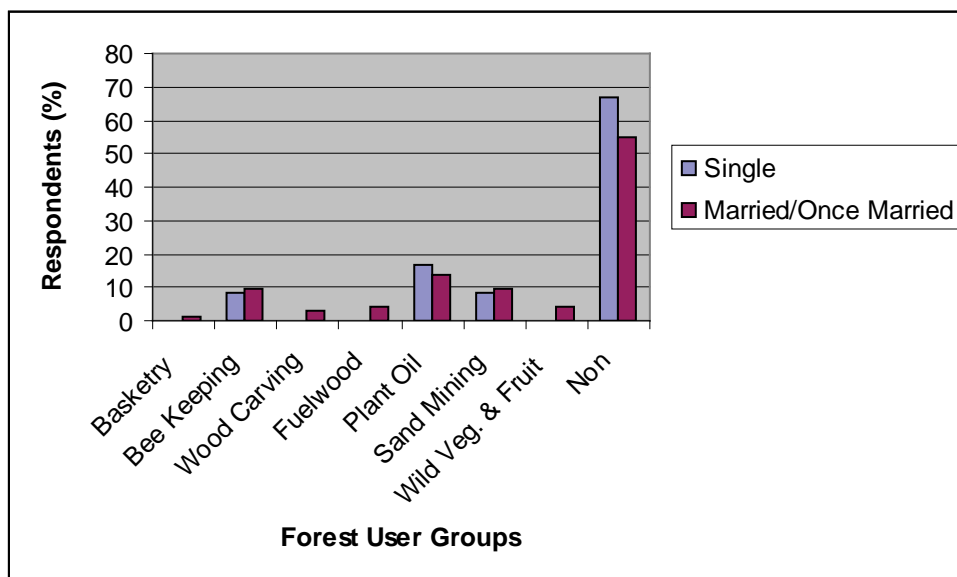


Figure 19: Local People's Involvement in Forest User Groups by Marital Status

Table 3: Community Involvement in FUGs by Marital Status

Marital Status	Forest User Groups							
	Basketry	Bee Keeping	Wood carving	Fuel-wood	Plant Oil	Sand Mining	Wild Veg. & Fruits	Non
Single	0%	8%	0%	0%	17%	8%	0%	67%
Married/ Once Married	1%	10%	3%	4%	14%	10%	4%	55%

As regards different household types, 59% of female-headed households and 40% of male-headed households were members of a FUG. The dominant FUGs among the households that participated were the plant oil (Mungongo) extraction group of which 41% are female-headed and 7% male-headed households; sand mining consisting of 6% female-headed and 10% male-headed households, bee keeping comprising of 6% Female-headed and 10% male-headed households, and finally wild vegetables and fruits group consisting of 6% male-headed and 3% female-headed households.

#### 4.2.4 Community Benefits Arising from JFM

The household survey results showed that 50% of the respondents stated that they had not received any benefit under JFM. However, 35% of the respondents reported having acquired new skills, 12% reported an increase in the availability of forest resources, and 3% reported community infrastructure development through acquisition of building materials to expand a local school.

The results on benefits received under JFM between women and men showed that 33% women and 24% men acquired new skills, and 11% women and 10% men benefited through the increased availability of forest resources. Only 2% of the respondents, which comprised of men, reported community infrastructure as the benefit of JFM following the provision of building materials for expansion of local basic school under JFM arrangement. However, 65% of women and 55% of men reported lack of benefits from JFM arrangement (Figure 20). There was no

statistically significant difference in the received JFM benefits between men and women ( $p = 0.055785$ ).

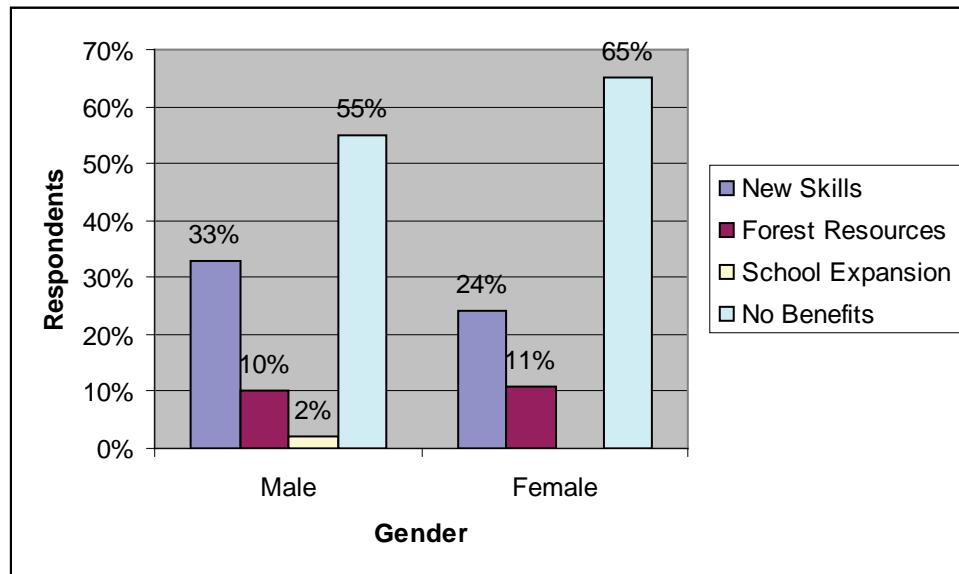


Figure 20: Community Benefits from JFM by Gender (N=88)

The results also showed that respondents of different social status perceived to have received different benefits under JFM. However, a number of respondents from different social positions also reported lack of any benefit under JFM (Figure 21).

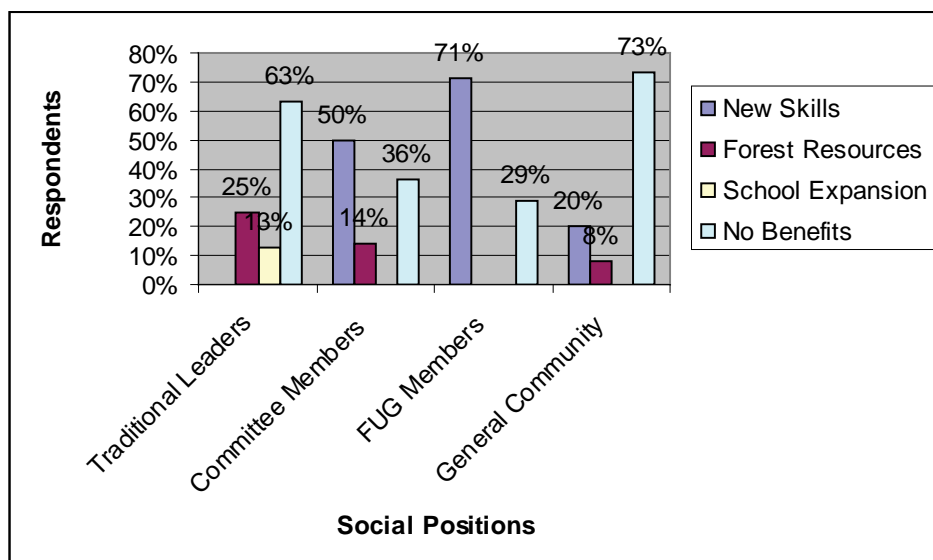


Figure 21: Perception on JFM Benefits Based on Social Positions (N=88)

More FUG members (71%) and half of the forest management committee members

(50%), with few (20%) ordinary community members reported to have acquired new skills. Few traditional leaders (25%), forest management committee members (14%), and ordinary community members (8%) reported to have benefited through increased availability of forest resources. Apparently, only traditional leaders (13%) reported of the expansion of the local school through the acquisition of building materials as the benefit under JFM arrangement. However, more ordinary community members (73%) and traditional leaders (63%), and few forest management committee members (36%) and FUG members (29%) reported no benefits from JFM programme in Dambwa (Figure 21). There was statistically a significant difference between the social status of the respondents and the perceived benefits received under JFM ( $p = 0.00271$ ).

The results on community benefit sharing satisfaction showed that 89% were dissatisfied, while only 11% reported to be satisfied with the JFM benefit sharing arrangement. Nearly 100% of both men and women respondents were discontented with JFM benefit sharing arrangement in Dambwa, and as a result, there was statistically no significant difference between men and women on JFM benefit sharing satisfaction ( $p = 0.16099$ ). Equally, the results showed statistically no significant difference between marital status of the respondents and the dissatisfaction levels with the JFM benefit sharing arrangement ( $p = 0.10188$ ). Furthermore, all (100%) female-headed and the majority (87%) of male-headed households indicated that they were dissatisfied with the JFM benefit sharing arrangement. There was also statistically no significant difference between household types and the JFM benefit sharing satisfaction level ( $p = 0.06806$ ).

Similarly, the results among the local people of different social positions on the satisfaction with the JFM benefit sharing arrangement showed that 78% of traditional leaders, 65% of community members, 59% of committee members and 86% of forest user group members were not contented with JFM benefit sharing arrangements. There was statistically no significant difference between respondents of different position and the JFM benefit sharing satisfaction level ( $p = 0.42449$ ).

The majority of the respondents (79%), however, perceived the Forestry Department to be the major beneficiary under JFM, while 10% perceived the members of the forest management committee to be the major beneficiaries. A further 7% of the

respondents reported that the local community members were the major beneficiaries and 3% perceived outsiders who were not resident in the area to be the main beneficiaries of JFM arrangement in Dambwa.

#### 4.2.5 Factors Affecting Local Community Participation in JFM

A number of factors were reported to discourage local communities from participating in JFM. Though low in proportion, more respondents (27%) reported lack of decision-making powers in JFM as the main factor discouraging their participation, followed by lack of benefits (21%). The other factors reported were workload involved in forestry activities (15%) and low priority to forestry activities (6%). The other 31% of the respondents had unspecified reasons (Figure 22).

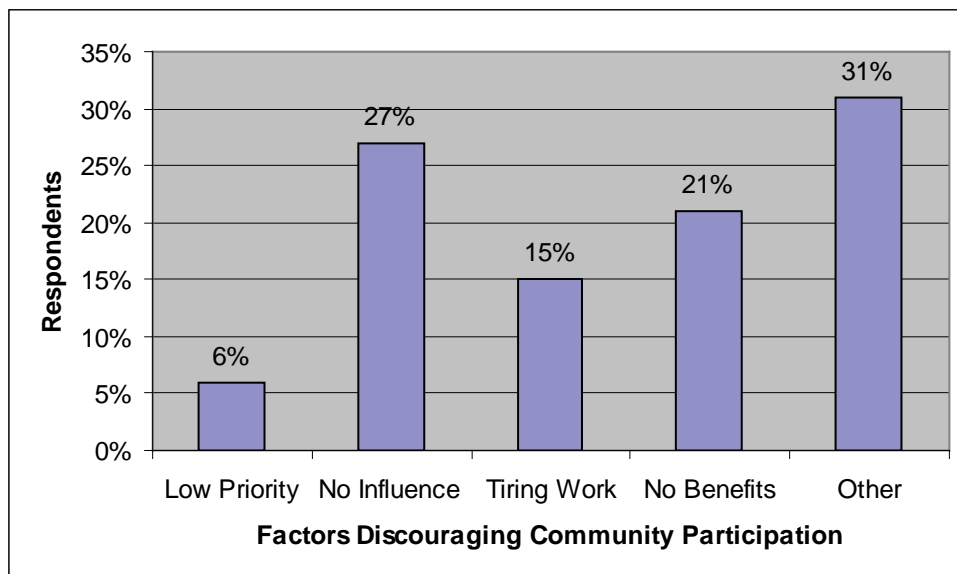


Figure 22: Factors Discouraging Community’s Continued Participation in JFM

A number of factors were also reported to have prevented local people from taking part in JFM programme. Close to a half (44%) of the respondents indicated the lack of support from the Forestry Department as the main hindrance, while 33% reported the laborious nature of forestry activities. Some 5% of respondents reported government bureaucracy in facilitating the implementation of JFM programme as the main factor detracting local people from active participation in JFM. The other 5% of the respondents stated illiteracy among the local people as a factor that discouraged their

participation in JFM, while 13% had unspecified reasons hindering local people's active participation in JFM (Figure 23).

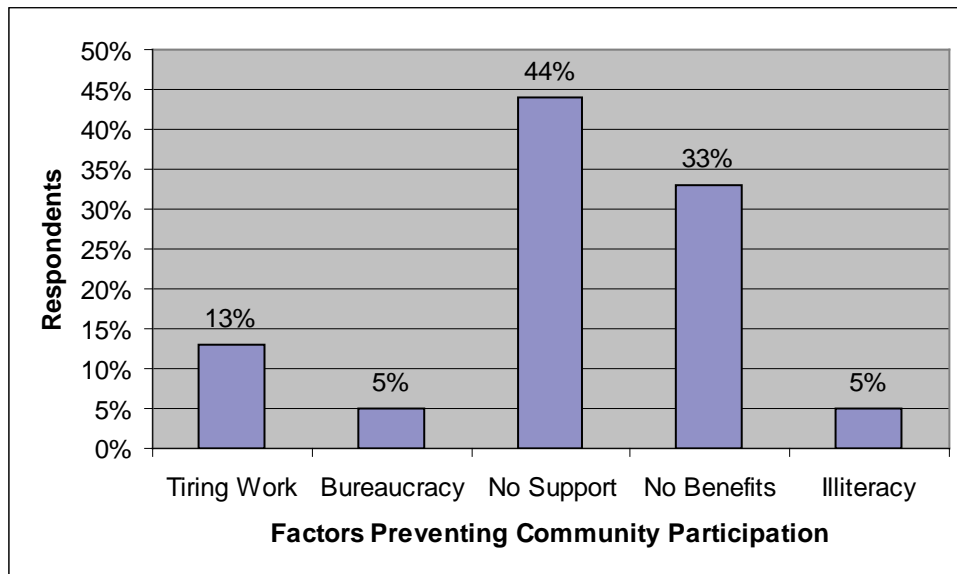


Figure 23: Factors Preventing Community from Participating in JFM (N=78)

#### 4.2.6 Perceived Improvements of Households and Forest Conditions

The surveyed respondents reported no significant improvement in the general household socio-economic conditions. The majority of the respondents (68%) perceived the household conditions to have remained the same following the introduction of JFM programme in the area. Twenty-four percent (24%) reported that the household conditions had worsened, while 8% reported that their household conditions had improved after the introduction of JFM (Figure 24).



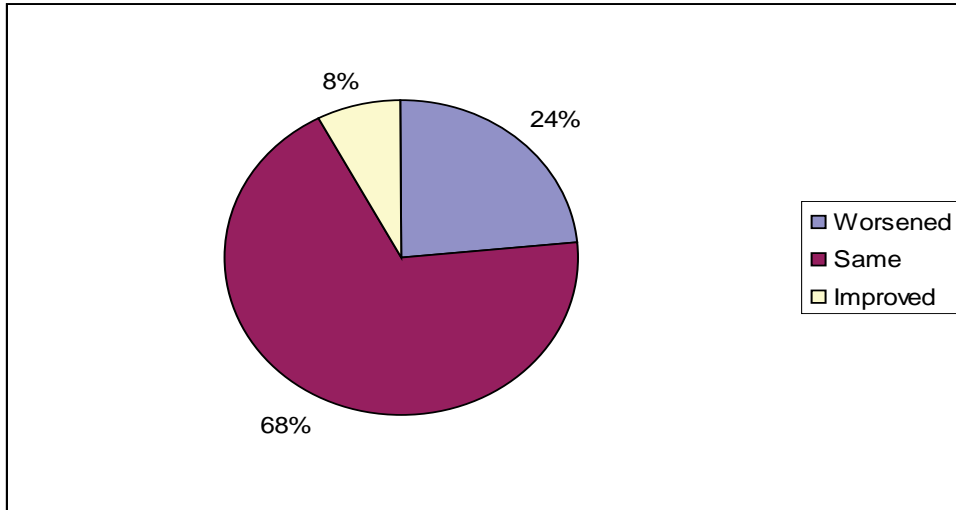


Figure 24: Local People's Perception on Improvement at Household Level

More respondents (75% men and 58% women) indicated that their household economic condition remained the same. Subsequently, 13% men and 39% women reported that their household economic condition had worsened, while 11% men and 3% women reported an improvement in general socio-economic condition at the household level (Figure 25). There was statistically a significant difference in the responses between men and women on the improvement in household socio-economic condition ( $p = 0.02$ ).

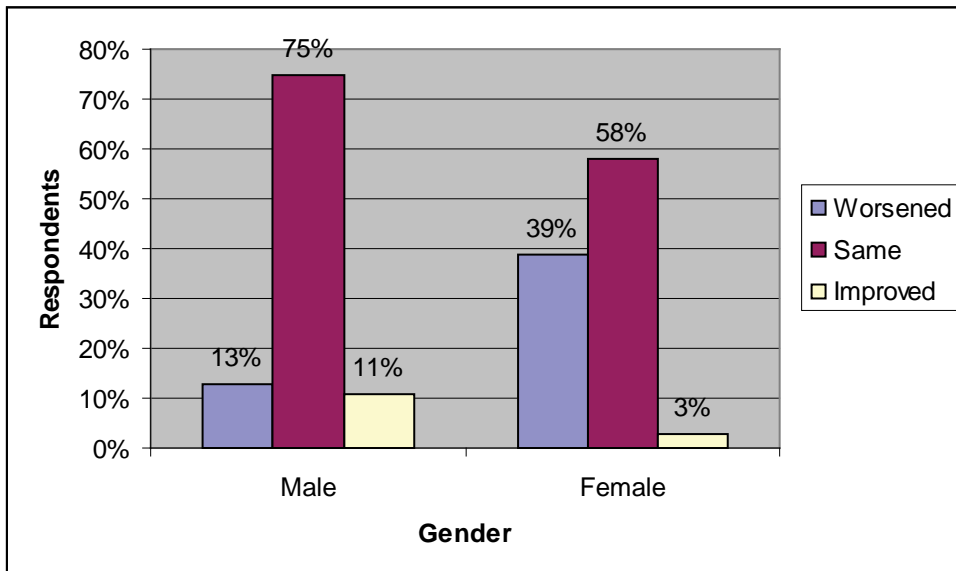


Figure 25: Perceived Economic Changes at Household Level by Gender

During discussions with focus groups and key informants, it was reported that Dambwa Forest Reserve was illegally exploited and encroached prior to the introduction of JFM. The Forestry Department, on the other hand, could not curb the illegal activities. The household survey results indicated that up to 51% of the respondents perceived that the illegal forestry activities had declined following the introduction of JFM. However, 27% indicated that the rate of illegal activities remained the same, while 22% indicated that the rate of illegal activities had increased (Figure 26). However, the results showed no statistically significant difference between men and women in response to the rate of illegal activities in Dambwa Forest Reserve following the introduction of JFM ( $p = 0.75$ ).

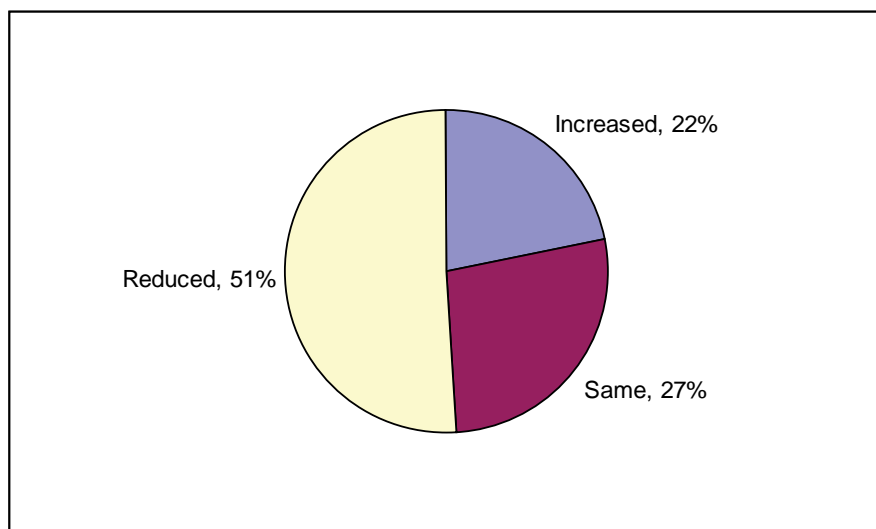


Figure 26: Perceived Levels of Illegal Forestry activities After JFM

The results showed that more than a half (67.4%) of the local people interviewed perceived the condition of Dambwa Forest Reserve to have improved following the introduction of JFM. However, 12.4% indicated that the condition of the forest reserve remained the same, while 20.2% indicated that the forest condition had deteriorated (Figure 27). Among men and women, the results also showed that 73% of the male respondents and 63% of the female respondents perceived improvement in the condition of Dambwa Forest Reserve after the introduction of JFM in the area. On the other hand, 13% men and 11% women indicated that there was no change in the forest condition, and 23% men and 16% women perceived the forest condition to have deteriorated. The results also showed no statistically significant difference between men and women in response to the condition of Dambwa Forest Reserve following the introduction of JFM ( $p = 0.43$ ).

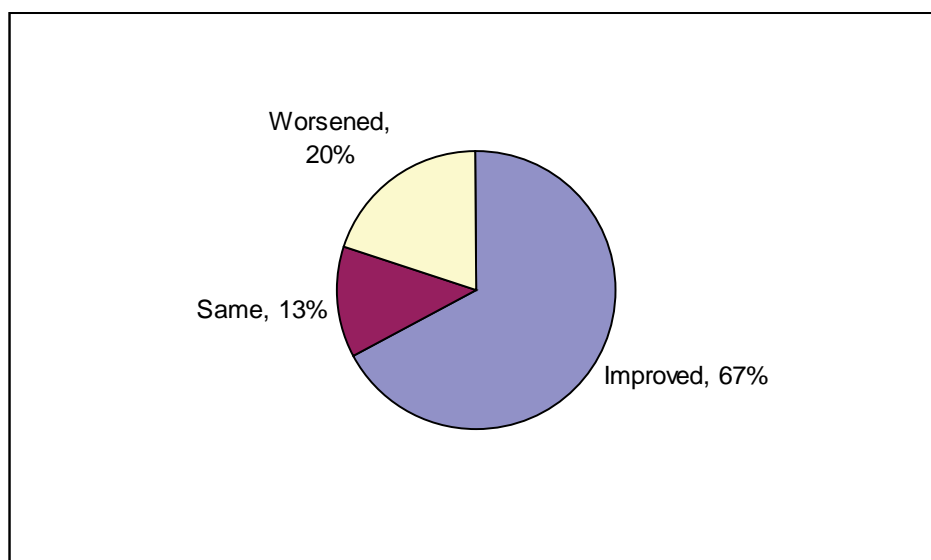


Figure 27: Perceived Condition of Dambwa Forest Reserve After JFM (N=86)

These findings on the perceived condition of Dambwa Forest Reserve after the introduction of JFM conform to the results of forest resource assessment presented in Figure 31.

Most of the local people irrespective of the age class differences perceived that the forest had regenerated after the introduction of joint forest management (Table 4). Similarly, men and women respondents perceived that the condition of Dambwa Forest Reserve had improved following the introduction of JFM in the area. The results showed no statistically significant difference between men and women in their perception on the condition of the forest reserve ( $p = 0.43$ ).

Table 4: Perception of Local People on Forest Regeneration by Age

Age class	Perception of regeneration by age groups				
	Observations	Worse	Same	Improved	Unknown
≤20	2	0	0	50%	50%
21-35	26	27%	15%	58%	0
36-50	28	14%	11%	71%	4%
51-65	19	16%	11%	68%	5%
≥66	11	27%	9%	64%	0

#### 4.2.7 Perceived Overall Performance of JFM project

##### 4.2.7.1 *Forest Management Structures and their Effectiveness*

Two types of local forest management committees were established under the JFM in Dambwa: Forest Management Committee (FMC) and Village Resource Management Committee (VRMC). The major roles were formulation of local rules and regulations, plan forestry activities, manage and resolve conflicts, and represent local community interest.

Close to a half (46%) of the respondents reported that FMC was effective in its operations. In addition, 26% indicated that FMC was very effective; while 28% of the respondents reported that the FMC was not effective. The results showed no statistically significant difference between men and women in response to the effectiveness of the FMC in Dambwa Forest Reserve ( $p = 0.46$ ).

In regard to VRMCs, 43% indicated that they were not effective, but 29% indicated that they were effective, with 28% reporting that the committees were very effective. The results also showed no statistically significant difference between men and women in response to the effectiveness of FMC in Dambwa Forest Reserve ( $p = 0.93$ ).

##### 4.2.7.2 *Forest User Groups and their Effectiveness*

The following forest user groups were also established in the area: plant oil extraction (Mungongo), sand mining, beekeeping, basketry, wild vegetables and fruits, woodcarving and firewood. However, 56% of the local households interviewed did not belong to any user group.

Conversely, 59% of the respondents felt that FUGs were not effective, but 27% felt that the FUGs were effective, and 14% felt that the FUGs were very effective. The results showed no statistically significant difference in response to the effectiveness of the FMC in Dambwa Forest Reserve between men and women ( $p = 0.31$ ).

#### 4.2.7.3 *Local People's Preferred Access to Forest Reserve*

Slightly over a half (54%) of the local people interviewed preferred that the local people should have access to the forest reserve, but outsiders should be controlled. Less than a half (45%) of the respondents, however, preferred controlled access for both local people and outsiders, while 1% indicated that both local and outsiders should have free access into the forest reserve under the JFM arrangement (Figure 28).

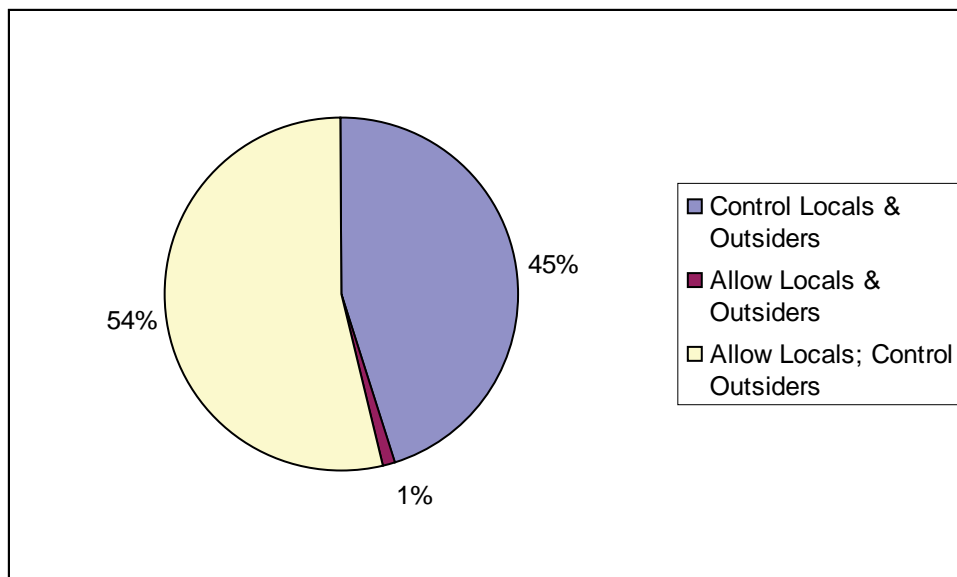


Figure 28: Local People's Preferred Access to Dambwa Forest Reserve

#### 4.2.7.4 *Perception on the Performance of JFM Project*

On overall performance of the JFM in Dambwa, 67% of the respondents perceived that the JFM project performance in Dambwa Forest Reserve was not satisfactory. Furthermore, 61% females and 71% males indicated that the JFM project in Dambwa Forest Reserve was not successful, particularly in improving the general livelihood conditions of the local people. There was statistically no significant difference between men and women on the perceived performance of the JFM programme ( $p = 0.29201$ ).

Among the local communities of different social positions, 78% of traditional leaders, 65% of community members, 59% of forest management committee members, and 86% of FUG members were of the view that the JFM programme as not having succeeded in achieving its intended objective. There was statistically no significant difference between social status of the respondents and the perceived overall performance of the JFM programme basing on Maximum-Likelihood chi-square p-value=0.48520.

### 4.3 Forest Resource Assessment

Dambwa Forest Reserve comprises of indigenous forest dominated by *Munga* and *Miombo* woodlands with open Savannah grasslands. The forest also consists of riverine vegetation, thickets and mopane woodland. It was declared a local forest for the purpose of supplying local population with forest goods and services. Participatory forest resource assessment was carried out to determine stocking levels, regeneration and general condition of the forest after the introduction of JFM.

#### 4.3.1 Forest Stocking

The forest assessment results showed that there were 219 stems per hectare of different tree species of greater than 2 cm DBH. The assessment further showed that 90% of the trees in the forest reserve were less than 30 cm in DBH (Figure 29).

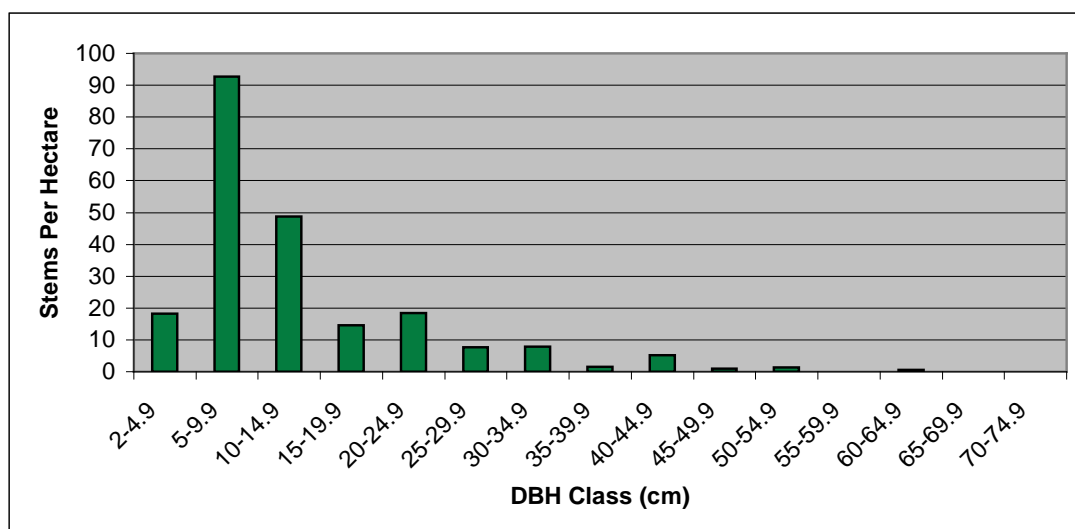


Figure 29: Forest Stocking and DBH Distribution in Dambwa Forest Reserve

The study also focused on five commercial timber species: *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Guibourtia coleosperma*, *Azelia quanzensis*, and *Colophospermum mopane*. Among these selected tree species, *Baikiaea plurijuga* was the most occurring species with 39 SPH, followed by *Pterocarpus angolensis* with 14 SPH, *Guibourtia coleosperma* with 5 SPH, and *Azelia quanzensis* with 3 SPH, and *Colophospermum mopane* with 3 SPH.

#### 4.3.2 Diameter Distribution of Valuable Tree Species

The forest resource assessment results showed that 89% percent stocking of the five selected commercial timber species were less than 30 cm DBH. *Pterocarpus angolensis* and *Colophospermum mopane* had 100% of stems below 30cm DBH, followed by *Baikiaea plurijuga* (90%), *Azelia quanzensis* (67%), and *Guibourtia coleosperma* (57%) (Figure 30).

The forest resource assessment results for *Baikiaea plurijuga* showed more stems in the lower DBH class of 5-10 cm. There was a reduction in the number of trees as DBH classes increased exhibiting an inverse *J*-shaped diameter class distribution. The results further showed absence of trees in larger DBH classes of more than 35-40 cm. Similarly, the results for *Pterocarpus angolensis* showed more stems in the lower DBH class of 5-10 cm and absence of trees in larger DBH classes of more than 25 cm. The DBH distribution exhibited an inverse *J*-shaped diameter distribution (Figure 30).

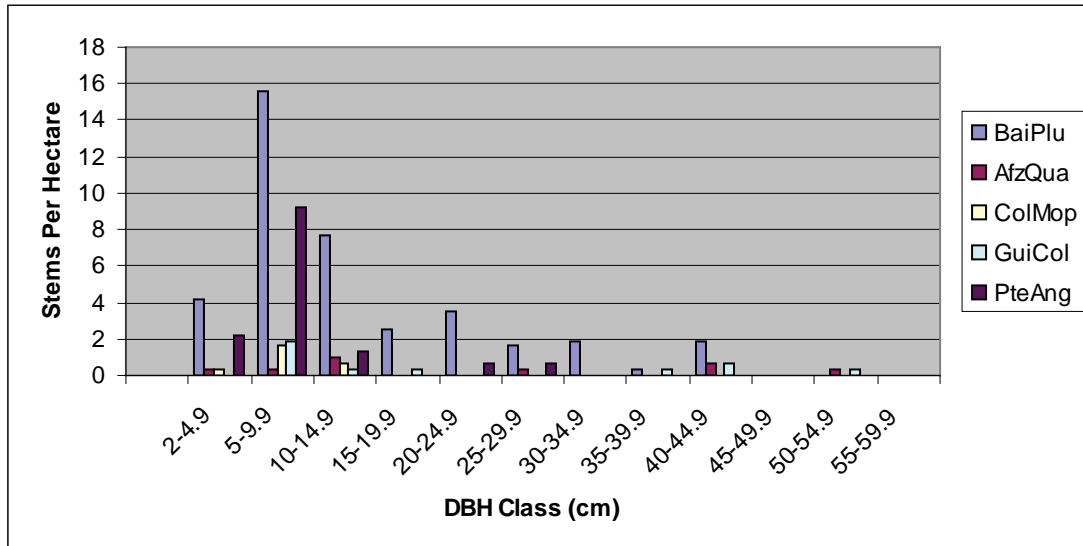


Figure 30: Stocking and DBH Distribution of Selected Valuable Tree Species

Assessment results for *Guibourtia coleosperma* revealed that there were slightly more individuals in the DBH class of 5-10 cm. However, the distribution of stems along the DBH classes was almost static with complete absence of stems in some classes. The largest DBH class recorded was 35-40 cm.

The stocking and DBH distribution results for *Afzelia quanzensis* showed that there were slightly more stems in the lower diameter classes of 5-10cm and 10-15cm. However, the results did not show much change in the number of stems in subsequent DBH classes. The DBH class distribution exhibited a static-shaped diameter class distribution and the largest DBH class recorded was 40-45cm. (Figure 30).

Furthermore, the assessment results for *Colophospermum mopane* showed that there were fewer stems in the smaller and bigger diameter classes of 2-5cm and 10-15cm. However, there were more stems in the middle size class of 5-10cm DBH. There were no stems recorded in larger than 10-15cm DBH class. Therefore, the DBH class distribution exhibited a bell-shape (Figure 30).

#### 4.3.3 Regeneration of Dambwa Forest Reserve

Forest regeneration was regarded as the natural renewal of forest cover through natural seeding or sprouting after the removal of the previous tree cover. During the



forest resource assessment, all trees, seedlings or saplings with DBH below 2cm in the 5m radius circular sample plots were considered as regeneration of the forest and their species and stocking levels were determined.

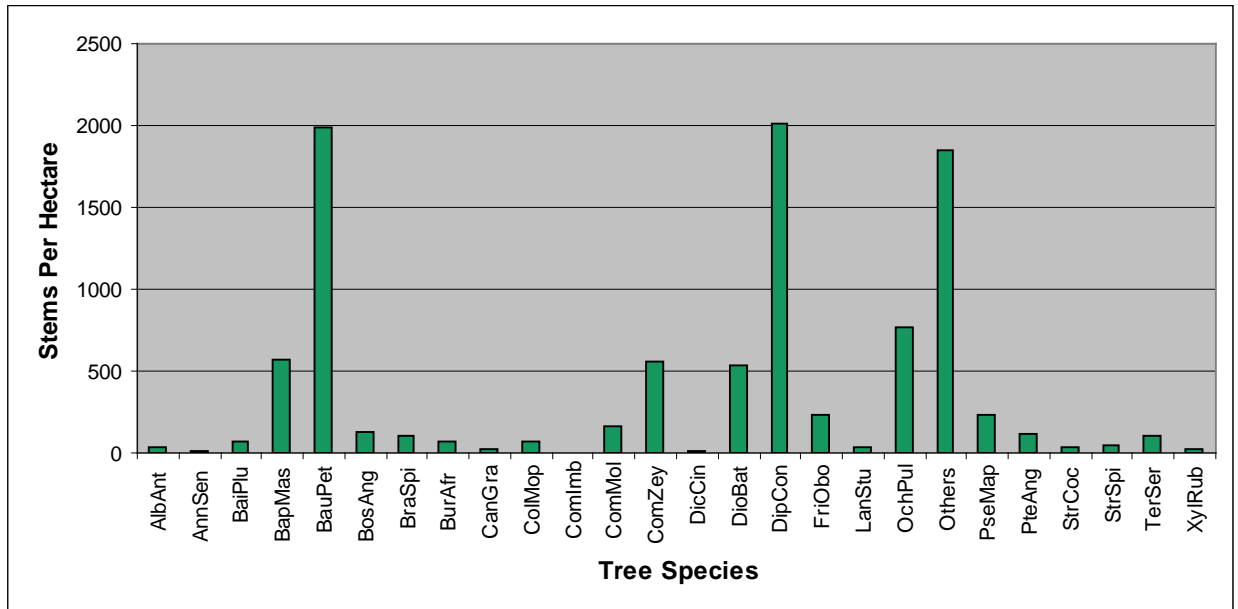


Figure 31: Natural Regeneration in Dambwa Forest Reserve

The results for forest regeneration assessment showed almost 10,000 saplings or seedlings growing per hectare. The most predominant species were *Diplorhynchus condylocarpon* (2,007 SPH) and *Bauhinia petersiana* (1,986 SPH). The other tree species observed included *Ochna pulchra* (764 SPH), *Baphia massaiensis* (571 SPH) and *Pseudolachnostylis maprouneifolia* (230 SPH) (Figure 31).

Regeneration was observed for commercial timber species. There were 118 SPH for *Pterocarpus angolensis*, 72 SPH for *Baikiaea plurijuga* and 67 SPH for *Colophospermum mopane*. No regeneration was observed for *Azelia quanzensis* and *Guibourtia coleosperma* (Figure 31).

## Conclusion

The chapter focused on the results of the household survey and forest resource assessment. It was evident that although the majority of community members were aware of JFM initiative, tangible benefits were lacking. In addition, those in local

management positions were more involved in JFM than ordinary members of the community. The results of forest resource assessment also showed that generally, the forest had regenerated well. However, regeneration was not observed for *Azelia quanzensis* and *Guibourtia coleosperma*. Most of the tree species in the forest were found to be below 30cm DBH. These results are discussed in the next chapter.

## **Chapter 5 - Discussions**

### **5.1 Introduction**

This chapter discusses the results of the household survey and forest resource assessment. The study was an outcome evaluation of a JFM project as classified by Babbie and Mutton (2001). The research study focused on the effects of a JFM project on the livelihoods of the local people and the impact on the condition of the forest. The study also attempted to determine the perceptions of the local people on JFM, their extent of participation in the JFM project activities and factors that affected their participation.

The discussion is based on the perceptions of the local communities in Dambwa and the selected staff from the Forestry Department - the implementing agency. Comparisons are also made with results of similar studies captured in literature. The chapter concludes with the perception on the overall performance of the JFM programme in Dambwa.

### **5.2 Community Livelihoods**

The majority (95%) of the respondents depended on agriculture for their livelihoods, while a minority are dependent on trading, formal employment and casual labour. However, Dambwa Forest Reserve still played an important role in supplementing the household livelihoods. The forest reserve provides a wide range of forest products as supported by Campbell *et al.* (1993: cited in Grundy *et al.*, 2000) such as mushroom, wild tubers, wild fruits, and building materials.

As reported by Arnold (2001), forest products are often important in filling seasonal or cash flow gaps and helps local communities to cope in difficult times. Most of the NWFPs, such as mushroom, fruits, tubers and wild vegetables, collected from

Dambwa Forest Reserve are seasonal and are available during the months of food shortages. The study conformed to this statement in that although agriculture was reported as the main livelihood activity of local people around Dambwa Forest Reserve, the forest reserve was significant in the local people's livelihoods.

### **5.3 Community Involvement in Joint Forest Management**

During the inception of JFM project in the area, local people had high expectations of obtaining immediate benefits from JFM project as opposed to the previous management system where all the revenues from the forest reserve went to the State. As such, they felt there would be improvements in their living conditions arising from the JFM arrangement.

#### **5.3.1 Joint Forest Management Activities**

The main forest protection and management activities reported to have been undertaken by the communities in Dambwa Forest Reserve in collaboration with the Forestry Department were: forest patrols, early forest burning, and forest boundary maintenance. Generally, there was low participation in practical activities such as forest patrols, boundary maintenance and early burning compared to attending meetings.

Lack of tangible economic benefit to the local people from JFM programme was a major factor that resulted in local people participating less in the physical forest protection and management activities. Maskey *et al.* (2003: cited in Behera and Engel, 2006) reported similar findings in a study conducted in Nepal's community forest management, that is, the levels of participation in community forest management were based on socio-economic profile of individual participants and the benefits obtained from the forest. As such most local people lost enthusiasm in JFM.

Furthermore, due to the physical nature of forestry work, men and persons above the age of 21 years dominated these JFM activities. A larger number of women and older persons above the age of 50 years did not participate in these forestry activities. This

may also suggest that as people grow older they depend less on forests as their main source of income or livelihood. Younger persons below the age of 21 years had low participation because of more off-farm or off-forestry activities that were much better rewarding than JFM programme.

More women in around Dambwa attended the JFM meetings despite their numerical disadvantage - being low in number as meetings were less strenuous than physical forest activities. However, some of the participants during meetings are simply onlooker; others sought after material gains such as allowance or food, while others are compelled to attend meetings in order to have access to benefits that may accrue to the community in future. It has also been observed that participation of women in community-based programme activities is low, letting men dominate the decision-making processes (Godbole, 2002). Behera and Engel (2006) made similar observations during their study on the levels of participation in India's JFM programme that mere attendance of meetings did not automatically guarantee an influence on decisions taken.

### 5.3.2 Levels of Community Participation in JFM

The study revealed that on average participation was good where 64% of the respondents comprising of both men and women participated in JFM programme, but men dominated. People embrace new programmes or policy initiatives with a view to improve their livelihood. The study showed that both men and women around Dambwa Forest Reserve were keen in uplifting their livelihoods by accepting to be involved in the JFM project. The participation of the local people in the study area was largely driven by the high expectation of receiving monetary benefits from JFM. But as reported by Behera and Engel (2006), these intended beneficiaries evaluate benefits and opportunity costs as the programme or policy initiative unfolds, and then decide whether to continue with the participation or pull out.

In the study area, almost all (100%) of the respondents indicated that there were no economic benefits accruing to the local people from the JFM arrangement. Consequently, some of the local community members were discouraged from

continued participation in JFM project. This was evident from local people's low participation in practical JFM activities such as early forest burning, forest patrols and forest boundary clearing and maintenance (see Figures 10; 11 and 12).

Participation is critical in developmental programmes (Coralie and White, 1994) and at all levels. Murali *et al.* (2003) were also of the view that inadequate participation can be a drawback to initiatives such as JFM. Lise (2000) acknowledged that forests are better managed if people's participation is secured. But often the concept of participation is misunderstood as attendance of meetings (Ravnborg and Westernmann, 2002), which is not supposed to be the case.

Furthermore, during the study, local people were categorised into four social positions: traditional leaders, committee members, user group members and ordinary community members. The study showed that local people in all these positions participated in JFM project. Participation of traditional leaders in the area was also recognised. Many authors have acknowledged the need for active involvement of traditional leaders in CBNRM (Carter and Gronow, 2005). Shackleton *et al.* (2002) acknowledged the role of traditional leaders as the one factor that was important, particularly in Africa. In case studies conducted in Lesotho, Malawi and South Africa, it was found that where traditional leadership was strong and legitimate, it had positive outcomes in promoting local people's priorities.

Although more than a half (64%) of the sampled population were involved in JFM programme, majority of the sampled population spent a maximum of 5 days in a month on JFM activities (refer Figure 12 and to subsection 4.2.5). But FMC and VRMC members were very much involved in all the activities (see Figure 12). Their involvement could be attributed to commitment as they were elected members of the committee and probably due to some incentives such as access to forest resources and use of bicycles provided for JFM related work activities.

The study also revealed that local community members between the ages of 36 and 65 years were more involved in JFM programme than those below 36 years and those above 65 years of age. The results revealed that younger persons around Dambwa Forest Reserve were preoccupied with other livelihood activities such as education,

formal employment and trading, which were considered more beneficial than JFM activities. Low participation levels of the youth could also be attributed to lack of awareness and sensitisation campaign on JFM, which were mainly targeted at elderly persons. While low participation of older members of the community in JFM activities was attributed to their advanced age and they could not bear the workload.

### 5.3.3 Factors Affecting Community Participation in JFM

There are many factors that affect community participation (Coralie and White, 1994). The factors which affected community participation that emanated from the study, among others, are: household demographic information - age, gender, educational levels, household size, and marital status, knowledge and skills, value of the resource, proximity to the resource, expected benefits, and policy and legislative framework. The study revealed that some of these factors influenced both the local community members already involved and those not involved in the JFM programme.

#### 5.3.3.1 *Demographic Information of the Respondents*

##### Age group of the respondents

The most active age groups involved in JFM programme were 36 to 50 years followed by 21 to 35 years (see Figure 13). The study showed that the age of respondents had an effect on community participation in JFM. The older persons in the age groups above 50 years did not participate actively in JFM activities that were of physical and strenuous nature compared to the other age groups.

Similarly, more men (72%) than women participated in forestry activities due to the physical nature of forestry activities. As discussed under section 5.3.1.1, men and persons older than 21 years participated more in JFM activities because forestry activities were considered strenuous and only capable of being undertaken by men and the energetic members of the community.

Young people below the age of 21 years had also low participation level in JFM because of more and better off-forest opportunities. The other factor that discouraged young people from participating in JFM programme was the greater likelihood of older persons involved in the JFM to make decisions unilaterally. African rural society has greater respect for elderly members of the community (Behera and Engel, 2006). When elderly people get involved in programmes they often assumed leadership positions and would easily influence decisions. In such cases, young persons often fail to challenge decisions made by elders due to the respect they have for elders. As such, younger people would be reluctant to be involved or participate in the programme because they will have little or no influence in decision-making.

#### Marital status of the respondents

The married, divorced and widowed persons were also more involved in JFM than the unmarried respondents (see Figure 7). The single respondents were mostly below the age of 21 years signifying that the youth in the community were less involved in JFM. The low participation of the youth in JFM could be attributed to their involvement in other activities such as education, formal employment, and trading that were regarded as high priority and more rewarding than JFM project.

The results conform to the factor of age indicated above where the younger respondents, who were generally single, were less involved in JFM. The young and single respondents seemed to be preoccupied with other socio-economic ventures that appear to be more profitable. In addition, this group is rarely targeted for awareness and sensitisation campaigns, and consequently are less involved in planning and implementation of developmental programmes. Most developmental programmes concentrate more on older members of communities and overlook the younger people, therefore, making them to have less or no interest in the programmes.

#### Educational levels of the respondents

More local people with higher education participated in JFM than those with lower or no formal education. Their high participation was likely due to increased understanding of the importance of forest conservation. The study also showed that



local people with formal education held key positions in the local forest management committees. The more literate members of the community are more likely to influence decisions as they were expected to have better information on the programme and are also better able to speak in public compared to community members with low or no education. Jumbe and Angelsen (2007) made similar observations in the community around Chimaliro Forest Reserve in Malawi that people with formal education held key positions in local forest committees.

Lise (2000) in the study conducted in India also found that when education level was significantly high among the local participating community, it stimulated participation. They also motivate other community members to participate (Lise, 2000; Wabash *et al.* (2001: cited in Dolisca, *et al.*, 2006)), as they act as role models in the society and inspire others with lower or no formal education. But in cases where wage employment opportunities are available outside forests, people with higher education levels are less interested in forestry activities (Jumbe and Angelsen, 2007) where returns are low or non-existence.

Similarly, Thakadu (2005) reported that a community with low literacy level was expected to take more time to assimilate, adopt and adapt new policies and concepts. Conversely, literate members of the community often tend to be more vociferous than illiterate members in expressing their views and are also more influential in decision-making. Behera and Engel (2006) also found that the more educated members of the community, the greater were the bargaining powers they possessed. However, the culture of elitism ought to be controlled because the elite in leadership positions may want to accrue more benefits to themselves at the disadvantage of other members of the community.

#### Social position of the respondents

Four social positions were recognised in the community during the study: the traditional leaders, forest committee members, forest user groups and ordinary community members. The results showed that members of the local forest management committees (FMC and VRMCs) participated more in JFM activities than traditional leaders and ordinary members of the communities.

These members of FMC and VRMCs in Dambwa were democratically elected from the local community for a two-year term (FD, 2004; GRZ, 2006). The higher involvement of committee members in JFM activities could be attributed to their commitment to JFM project and to fulfilment of their obligations as elected members of the management committees. Local management committee members had other privileges such as project bicycles, allowances during off-site meetings, authority and prestige. These incentives seemed to have compelled them to be more involved in JFM activities in order to retain their elected positions. Conversely, holding of free and fair elections in the community for local management committee members discourages social elites or economically and socially dominant groups to control the JFM activities. Social elites are reported to work towards their own interest and disadvantage economically and socially weaker members of the community (Arnold, 2001).

#### Household size of respondents

The average size for households surveyed was six (6), which indicated a family size of two parents and children or grand children. Household sizes had an effect on the local people's participation in JFM activities. It was revealed that households with less than 6 members did not participate fully in JFM compared to households with more than six occupants (see Figure 9).

Among the rural communities, the top priority is food security. Households with fewer occupants therefore will prioritize food security to JFM activities, while those with large numbers of occupants can afford to participate in forestry activities. Larger households were able to allocate labour and time among the occupants and participate in JFM activities to diversify their livelihoods strategies unlike the smaller households. Behera and Engel (2006) also found that smaller household sizes have difficulties to find time for JFM activities because of family responsibilities such as domestic or other chores.

### 5.3.3.2 *Knowledge and Awareness of JFM*

More than a half (68%) of the local community interviewed were aware of the joint forest management concept at the time of the study and that the forest reserve was supposed to be managed in collaboration with the local community and the government. The increased awareness was a good sign of successful sensitization and awareness campaigns conducted by the Forestry Department during the initial stages of the JFM project under the Provincial Forestry Action Programme (PFAP).

The Forestry Department personnel involved in implementing the programme also seemed to have fully understood the JFM concept and were able to discuss and interact with local communities and other stakeholders. The good rapport created between local communities and the local Forestry Department personnel fostered trust, understanding and cooperation. The increase in knowledge and awareness therefore enhances community participation

### 5.3.3.3 *Stocking and Value of the Forest*

According to the forest resource assessment results (see Figure 30), there were less than 100 stems per hectare of the five selected commercial timber species. Low stocking of commercially valuable timber species mostly could have been as a result of over exploited of these valuable timber species in the past, rendering Dambwa Forest Reserve to be of low economic value. The local people also had the perception due to low value of the forest reserve, the forests was not a major contributor to their household income compared to agriculture (see section 4.2.1). Olson (2007) obtained similar results during the evaluation of agriculture and forest programmes in the Eastern province of Zambia where agriculture contributed more to household income than forest activities. The local people were therefore found to be more involved in agricultural activities than forest protection and management for their livelihoods.

When forest was regarded as of low value, be it economically, socially, ecologically or culturally, it becomes less attractive for local people to participate in JFM for their sustenance. Jumbe and Angelsen (2007) also found that high dependence on forest

induces higher rates of participation, meaning that low dependence on forest inhibits higher rates of participation. This study, however, revealed that despite the low value of the forest, the local people accepted the JFM programme in order to restore the forest reserve and derive more benefits.

All (100%) the households interviewed appreciated a forest reserve in their vicinity though they did not have tangible benefits to improve their household conditions. Conversely, more than a half of the households interviewed participated in JFM programme in order to regenerate the forest and derive some tangible benefits (see sections 4.2.2 and 4.2.4). Similar observations were made in India and Nepal where local communities accepted to be involved in forest protection and conservation so as to regenerate these degraded forest areas and in turn receive benefits and other incentives (Damodaran and Angel, 2003; Odera 2004; Behera and Engel, 2006).

#### 5.3.3.4 *Local People's Proximity to the Forest*

There were a number of villages located in the immediate vicinity of Dambwa Forest Reserve. The proximity of the local community to the Dambwa Forest Reserve made them better placed to protect and manage the forest reserve than those who are not residents in the area. However, lack of tenure rights for the local communities around Dambwa Forest Reserve threatened sustainability of community participation in JFM.

The district forestry office was also found to be very close to Dambwa Forest Reserve. The proximity of district forestry office to the forest reserve and to local community enabled regular interactions and creation of good rapport between local communities and the Forestry Department personnel. But the relationship between local people and the Forestry Department seemed not balanced as the Forestry Department assumed a lot of authority and decision-making powers, while the local communities were given management responsibilities for the forest reserve.

#### 5.3.3.5 *Ethnic Differences*

The ethnic composition around Dambwa Forest Reserve is largely heterogeneous. The main ethnic groups consist of the Tonga, Subiya, Leya, Toka, Totela, Lozi, Kololo

and the Ndebele (IUCN, 2007; FD, 2003). The villages on the western and northern part of Dambwa Forest Reserve are dominated by the Toka-Leya. Some Tonga and Luvale also live in these villages. The villages on the eastern side are more mixed and comprise Mbunda, Luvale, Tonga, Ngoni and Toka-leya (FD, 2003).

Literature states that conflicts usually occur in heterogeneous social structures, which may negatively affect local people's participation in developmental programmes. However, no conflicts were reported in programme implementation in the area as a result of the differences in ethnic composition around Dambwa Forest Reserve. The local Forestry Department personnel were found to be also familiar with local languages and culture, which enhanced the flow of information and understanding.

#### 5.3.3.6 *Equitable Sharing of Costs and Benefits Under JFM*

The reported tangible benefits accruing to local communities in Dambwa under JFM were mainly NTFP such as firewood, building materials, food and medicines, while the intangible benefits were the acquisition of skills, soil conservation and sustenance of hydrological cycle. The participating local communities are also supposed to receive economic benefit from the participation in JFM. More than a half of the respondents indicated that there were no economic benefits accruing to local people in Dambwa since the introduction of JFM programme in 2000. Furthermore, the forest legislation did not even stipulate benefit sharing mechanisms and ratios as in other sectors such as wildlife. Therefore, under the present arrangements, the local community members bear most of the cost of forest protection and management.

As for the wildlife sector in Zambia, local communities are involved in co-management of wildlife resources in Game Management Areas (GMA) and receive a share of revenue arising from consumptive utilisation of wildlife in their respective areas for their participation. The agreed ratios from hunting fees are: the community 50% (Community Resource Board (CRBs) 45%, and the chief 5%), ZAWA 40% and the Central government receives 10%. Conversely, from concession fees the agreed ratios are: community 20% (CRBs 15% and chief 5%) and ZAWA 80%. The financial benefits received by the communities are used on community projects such as

schools, health facilities, maintenance of roads and bridges, and empowering women through women clubs, among others (ZAWA, 2009).

A similar arrangement was reported in Chimaliro forest in Malawi where the government received 70% and the local community 30% of the revenue generated from sale of the forest products. In addition, the local community harvested NTFPs such as dry firewood, thatch grass, reeds, bamboo, caterpillars, wild fruits and cattle forage from the forest, but harvesting of live trees for firewood or construction was prohibited (Carter and Gronow, 2005).

In most countries, it has been reported that communities have not received the expected economic benefits from CBNRM. Shackleton *et al.* (2002) reported that the share of economic benefits for the local people often reached the community after some undue delays under CAMPFIRE in Zimbabwe. Equally, in India it was reported that the Forestry Department often claimed more than a half of the income from timber even though the Forestry Department played little or no role in protecting the harvested trees. Chobe Enclave Trust in Botswana, however, was the exceptional case where communities are reported to have received around US\$200,000 per year from wildlife utilization and tourism, and the income trickled down to 45 households, which shared about US\$125,000 per annum.

Distribution of benefits between the state and local communities is a critical factor in PFM successes (Jumbe and Angelsen, 2007). As observed by Bwalya (2004) and Behera and Engel (2006), local community would normally reject projects where opportunity costs of their participation are higher than the benefits. This is true with the local communities around Dambwa JFM area who are seemed discouraged from active participation in JFM activities due to lack of equitable sharing of economic benefits.

Local people forego some of their time and activities to participate in JFM activities. Participation of local community in JFM is considered as an investment from where they expect a reward (Coralie and White, 1994; Dolisca *et al.*, 2006; and Jumbe and Angelsen, 2007). The benefits accruing to the local community from their

participation in JFM activities are therefore expected to be higher than opportunity costs in order to compensate for the costs of their involvement.

In cases where there are no tangible benefits accruing to the local people, their participation may be considered as a cheap and simple labour force. However, there is a risk under these circumstances in that the local people's commitment and motivation will be low compared to cases where they have decision-making powers and genuinely benefit from their participation. According to Murali *et al.* (2003), benefit sharing was one of the strongest reasons for acceptance and success of JFM in India.

## **5.4 JFM Legal and Institutional Framework**

### **5.4.1 Policy and Legal Framework**

Involvement of communities in forest management is now a significant feature of national forestry policy and practice and of internationally supported programmes throughout the world (Fisher, 1999; Shackleton *et al.*, 2002). Participatory approaches to developmental programmes can be impossible if the policy and legal framework is not supportive and appropriate. It is important therefore that the policy and legal frameworks are supportive at national and local levels (Jumbe and Angelsen, 2003).

In Zambia, the Forestry Policy was appropriate and supportive of JFM (GRZ, 1998; PFAP, 2005) but the revised Forests Act of 1999 which is supposed to support the PFM is not yet operational (PFAP, 2005). Delays in the establishment of Forestry Commission as contained in the Forests Act of 1999 seemed to have contributed to hindering the implementation of legal framework supporting JFM in Zambia.

A Statutory Instrument No. 47 of 2006, which is a subsidiary legislation, was put in place based on the Forests Act of 1973 as the principal legislation in order to facilitate the implementation of JFM as advocated by the National Forestry Policy. The subsidiary legislation was also limited in supporting JFM as it did not provide for the transfer of forest tenure rights to the local communities, was not specific on sharing of economic benefits, and its application was limited to specific JFM pilot areas.

## 5.4.2 JFM Institutional Framework

### 5.4.2.1 *Government Institutions*

The institutional framework is one of the most supportive components of participation in development programmes (ADB, 2003). The institutional framework exists at national and local levels. Government's involvement as an institution exists at national, regional and district levels. Its involvement at all these levels is to ensure that policy and legal environment are appropriate and also it remains central to successful implementation of developmental programmes.

Prior to the introduction of JFM in Zambia, the Forestry Department by law was mandated to protect and manage the forest resources in the country. However, the department employed policing approach in protecting and conserving the forests. This approach created a hostile relationship with the local people.

The discussions with the Forestry Department staff based at the Livingstone district forestry office revealed that there has been a tremendous improvement in the relationship between the Forestry Department and the Dambwa local community. This was evident from the fact that local communities freely visited the District Forestry Office for consultation or to report illegal activities. Equally significant is the availability of transport in the form of motorcycles and a vehicle at the district forestry office that enabled the local staff to make solicited and unsolicited visits to the JFM area and meet with the local people. The trend enhanced creation of a good rapport between the two parties. The presence of the Forestry Department at the local level was a good indication of increased capacity of the Forestry Department in participatory approaches.

The Forestry Department also collaborated with a number of other stakeholders such as traditional leaders, other government agencies and local authorities in the JFM area in awareness raising campaigns. The collaboration also existed during the participatory rural appraisals (PRAs) in the area and in the general sharing of resources such as transport through combined visits into the communities (FD, 2002).



#### 5.4.2.2 *Local Forest Management Structures*

The local communities under JFM are represented through local forest governance structures. There are structures at the village level and are known by different names in different countries. They are known as Village Resource Management Committees (VRMCs) in Zambia and are also commonly referred to as Forest Protection Committee (FPC) in India and Village Natural Resources Management Committees (VNRMCs) in Malawi. In Zambia, Forest Management Committees (FMCs) are established at forest area level to oversee and coordinate operations of VRMCs.

Viable local institutions are required in the effective management and use of forest resources. Local institutions are supposed to regulate the use of the local natural resource and contribute to meaningful decision-making. In Zambia, the legislation supports the establishment of and gives mandates to the local governance structures.

FMC, VRMCs and FUGs were reported to have been established and strengthened in Dambwa JFM area through capacity building following the introduction of joint forest management in the area (PFAP, 2004; PFAP, 2005). The purpose of establishing FMC and VRMCs was to promote community participation, liaison with the Forestry Department and other stakeholders, and to assist the general community reach consensus in decision-making. The requirement, composition and the roles of FMC and the VRMCs are prescribed in the Forests Act of 1999, JFM guidelines of 2004, and the Statutory Instrument No. 47 of 2006.

The major roles of these local management structures were to plan forestry activities, formulate local rules and regulations, resolve and manage conflicts, and to represent local communities at various forums (PFAP, 2005). Members of the FMC and the VRMCs are elected from the local communities on a 2-year term. The traditional chief in the areas is an ex-officio member of the FMC (FD, 2005). This arrangement allows good representation and governance at local level, and increases understanding and coverage of the joint forest management concept. Campbell (2003) concluded that the inclusion of traditional leaders in decision-making was important for the success of participatory forest management in Africa.

Most of the respondents (72%) reported that the FMC was effective in carrying out its duties and about a half (57%) of the respondents reported that the VRMCs were effective in the implementation of their work. This perception conforms to the finding on the greater involvement of committee members (FMC and VRMC) in forestry activities. The effectiveness of the FMC and VRMCs could be attributed to commitment and dedication of these elected members to the success of the JFM project. In addition, there would have been other benefits and privileges to the committee members. The only de-motivating factor was the lack of economic benefits accruing to the local communities. However, some respondents could not evaluate the effectiveness of these committees because they were not actively involved in JFM programme and lacked understanding and knowledge on the roles of FMC and VRMCs.

#### 5.4.2.3 *Forest User Groups*

The research showed that local people belonged to forest user groups (FUGS): Mungongo/Manketti (*Schinziophyton rautanenii*) oil extraction, sand mining, beekeeping, basketry, wild vegetables and fruits collection, wood carving, and firewood collection. However, this only accounted for less than the half (44%) of the respondents, as more than a half (56%) of the respondents did not belong to any forest user group. The oil extraction (Mungongo) user group was the most popular FUG albeit a small proportion of the population, followed by the sand mining and beekeeping FUGs. The low involvement in FUGs (56%) was attributed to the lack of support and monetary benefits from these user groups.

In the African context, particularly in rural areas, men are considered as the head of the house and the provider or a breadwinner in a home. The study showed that female-headed households were much involved in all the FUGs on the premise of trying to diversify their livelihood strategies and for their sustenance. The study further showed that women dominated Mungongo oil (Photo 4) extraction, wild vegetable and fruit collection, and basketry groups (Figure 18), while men dominated beekeeping, sand mining, woodcarving, and firewood collection. It seemed men preferred more to engage in high cash return activities, which tended to be labour intensive and hence are not suitable for women.



Photo 4: Fruits of *Schinziophyton rautanenii* (Mungongo) for Oil Extraction

Oil (*Mungongo*) producer/user group was dominated by women also due to the nature of the activities which involved picking of the fruits from the wild, cracking the nuts, removing the seed and pressing seed to extract plant oil (Storrs, 1995; Palgrave, 1983; Hailwa, 1998) (see Photo 4). All these activities were considered feminine and were generally performed by women even before the introduction of JFM in the area. But the activity has good potential for commercialization with high cash rewards prompting the involvement of men in the user/producer group.

In rural communities, more powerful groups consistently attempt to seize any opportunity to increase authority or benefits (Shackleton *et al.*, 2002). These powerful groups in rural communities include men, the rich and educated members from within and outside the local community. However, as acknowledged by Behera and Engel (2006), dominance of richer, elite or educated members of community in the decision-making process exists despite the fact that policies stipulate the inclusion of the poor

or the marginalized members of the community. In most cases, women's involvement is just symbolic as decision-making by tradition in the African set up lies with men.

Oil (*Mungongo*) extraction, bee keeping, and sand mining were most prominent user groups among the local community in Dambwa. These user groups are regarded as more lucrative income generating activities than the rest. According to the survey results, membership of all FUGs involved married respondents, but single respondents were only members of the sand mining, bee keeping and oil (*Mungongo*) extraction user groups.

The results further showed that the single respondents, who were mostly below the age of 30 years, preferred high cash return forest user groups and were registered for the three most lucrative forest user groups: oil (*Mungongo*) extraction, bee keeping, and sand mining. The research finding showed that youths, like male members of the local community, preferred to engage in highly rewarding economic activities. As such, the participation of the youths in JFM was limited in the absence of benefits.

Sand mining FUG was a profitable income generating activity in the area due to its proximity to Livingstone urban town where there is an increase in housing construction and the demand for sand as a major construction material was high. However, poor participation in the FUG was attributed to the lack of legal backing for local community members to get fully involved in the activity. Lack of legal provision also resulted in illegal sand mining by both local people and outsiders. Sand mining activity, however, was a threat to the environment and the activity therefore required guidance and approval from the Forestry Department and other government agencies.

In rural areas of developing countries, it is mostly women who are involved in collection of firewood for home use. Involvement in firewood collection as an income generating activity is labour intensive because it requires collection of the wood in bulk and transport to the urban market. Consequently, as a FUG, firewood collection was male dominated. However, the firewood collection FUG was not fully functional in the study area at the time of the study.

The operation of firewood user group in Dambwa JFM area was not yet formalized by the Forestry Department although there was ready market for firewood in Livingstone town. As a result, few incidents of illegal firewood collection in Dambwa Forest Reserve were observed (Photo 5) and these cases were mainly attributed to demand for firewood in Livingstone town and proximity of Dambwa Forest Reserve to Livingstone town where there was ready market.



Photo 5: Illegal Firewood Collection in Dambwa Forest Reserve

More than a half (59%) of the local people interviewed was of the opinion that almost all FUGs were not functional. Some of the FUGs such as bee keeping, plant oil extraction (Mungongo), sand mining, and firewood collection were supposed to be very viable income generating activities to supplement household income, if appropriately developed. The only FUG that was reported and also observed to be operational was oil (*Mungongo*) extraction user group. Though the product was mainly for household consumption, sales to the nearby urban market to supplement household income in times of need were reported (see Photo 6).



Photo 6: FUG Member with *Schinziophyton rautanenii* (Mungongo) Edible Oil

The perceived ineffective FUGs hinges on the lack of support to these groups by the Forestry Department as the implementing agency. The FUGs were supposed to be provided with legal backing, material support, market information, and guidance by the Forestry Department and other developmental agencies. As indicated under section 4.2.5 and in Figures 22 and 23, some local community members had cited lack of support and benefits as some of the factors that negatively affected their participation in the JFM.

#### 5.4.3 Institutional Incentives

Local communities valued NTFPs from the forest reserve, which also acted as safety net in times of scarcity or need. Consequently, the local people around Dambwa were allowed to collect NTFPs from the forest reserve under the JFM, and almost all the

respondents regarded harvesting of non timber forest products (NTFPs) from the forest reserve as a benefit of their involvement in JFM. However, harvesting of NTFPs from the JFM area was not regarded as a major benefit for their involvement in JFM. The local people interviewed were mainly concerned about economic benefits accruing from JFM given that prior to JFM the local people still accessed NTFPs from the forest reserves and forested areas outside Dambwa Forest Reserve.

The FMC for Dambwa JFM area was subsequently registered under the Registrar of Societies as a community trust, and as such recognised as a legal entity. However, the Forestry Department have not transferred legal rights to the ownership of the forest reserve to the local communities despite recognising the FMC as a trust. Tenure rights over a protected forest area create long-term interest and motivation among local people towards protection and sustainable use of the forest. But unclear user rights and tenure rights results in uncertainties among the participating local communities about their involvement and sustainability (Murali *et al.*, 2003).

## **5.5 Socio-economic condition of local livelihood after JFM**

More than a half (68%) of the local people interviewed had the perception that there was no change in the socio-economic conditions of the local households following the introduction of JFM. In fact, 24% of the respondents stated that the household socio-economic conditions worsened after the introduction of JFM in the area. These assertions were made mainly because of the absence of tangible benefits accruing to the local participating communities in contrast to their initial high expectation of high economic benefits from JFM project. The perception was similar for male and female respondents. It was also similar between male-headed and female-headed households. The majority (75%) of the men and more than a half (58%) of the female respondents indicated that economic conditions at the household level had not improved, following the introduction of JFM.

Notwithstanding, 8% of the households interviewed claimed that there was an improvement in the household socio-economic conditions following the introduction of JFM. The improvement in the household condition was mainly associated with

FMC, VRMC and FUG members who seemed to have access to project resources such as information, materials, allowances in case of meetings or trainings outside the community area, and other privileges. The improvement could also be attributed to some households' involvement in profitable forest-based income generating activities or were engaged in illegal forestry activities such as charcoal production.

## **5.6 Condition of Dambwa Forest Reserve under JFM**

### **5.6.1 Forest Stocking and Diameter Distribution**

It was found that there were few bigger trees according to the stem size distribution for the forest area (see Figures 28 and 29). According to Peton (1994: cited in Ndayambaje, 2002), size class distribution and density are indicators of the impact of exploitation. The sparse distribution of large trees had also negative impact on regeneration. Absence of stems in larger size classes of the selected tree species could be attributed to selective harvesting of preferred tree species, which were mostly harvested for timber. The study also revealed that species preference and single species selection in tree harvesting had an impact on the overall population structure of the preferred species. It negatively impacted on the Dambwa Forest Reserve to an extent that the occurrence of stems in higher diameter classes was so low that their exploitation was not economical (see Figures 29 and 30). Similarly, studies conducted in Tanzania on the utilization of woodlands showed low levels of mature *Pterocarpus angolensis* trees due to past selective harvesting methods (Luoga *et al.*, 2002).

The analysis of size class distribution was limited to the selected commercially valuable tree species. The selected commercially valuable tree species were: *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Azelia quanzensis*, *Guibourtia coleosperma* and *Colophospermum mopane*. In general, three DBH class distribution models have been recognized: inverse *J*-shaped, bell-shaped and static-shaped models (DWAF, 2005).

The study showed that there were more stems in smaller diameter size classes than the larger diameter size classes for *Baikiaea plurijuga* and *Pterocarpus angolensis* exhibiting a negative exponential or inverse *J*-shaped size-class distribution (see Figure 30). The inverse *J*-shaped size class distribution is regarded as an indicator of



adequate regeneration and population maintenance (Zagt and Weger, 1998; DWAF, 2005). Tree species that present a negative exponential distribution curve are also said to be fire tolerant and regeneration was certain if regular fires (Geldenhuys, 1993).

The stocking per hectare for *Afzelia quanzensis* and *Guibourtia coleosperma* was very low and the two tree species exhibited a static-shaped diameter size class distribution. A static shaped size class distribution indicates that there was no regeneration, but existing tree increase in size (DWAF, 2005). The results, therefore, showed that *Afzelia quanzensis* and *Guibourtia coleosperma* were heavily exploited and regeneration was absent.

The stocking for *Colophospermum mopane* was also very low with few stems in the smaller diameter class sizes and the large diameter class sizes, but more stems in the middle diameter size classes. The exhibited diameter size class distribution was a bell-shaped (DWAF, 2005) with 15cm DBH as the largest diameter size class.

The results also confirm that these tree species were heavily harvested, as it was evident from no or fewer stems per hectare in upper diameter classes greater than 30cm DBH. The over-exploitation of these tree species could be attributed to their valuable timber and multiple uses. These species have long been used for building houses and fences, as railway sleepers, and as sawn timber.

Important wood products derived from the forests and woodland include timber, poles, firewood and materials for farm and household implements. It is essential that there is adequate representation of all diameter classes. It has been observed that the common DBH for poles is between 5 and 20cm and for sawn timber is above 30cm. But the study showed that not all diameter classes were represented as such it was deduced that the forest reserve was not able to provide the desired range of forest products.

### 5.6.2 Forest Regeneration

Regeneration plays a critical role in the renewal and perpetuation of forest or woodland ecosystems. Good regeneration of trees means that there is continuous growth of saplings sufficient for growing into tree sizes. It also determines which species will be common in the tree layer in the future.

Forest regeneration may occur from coppice, root suckers or seeds, but during this study no distinction was made as to whether regeneration was through coppice, root suckers or seed germination. However, it has also been reported that the majority of Miombo tree species regenerate largely through coppice re-growth and root suckers than through seed germination (Chidumayo and Frost, 1996). Therefore, the ability of tree species to coppice and the presence of a seedling pool in the forest ground layer guarantees quick forest recovery.

A high presence of saplings was observed in Dambwa Forest Reserve with almost 10,000 saplings per hectare. The predominant species were *Diplorhynchus condylocarpon* (2,007 SPH), *Bauhinia petersiana* (1,986 SPH), *Ochna pulchra* (764 SPH), *Baphia massaiensis* (571 SPH) and *Pseudolachnostylis maprouneifolia* (230 SPH). According to Carol *et al.* (2005), most of the observed predominant saplings species are common in shrub layer of the forest. Regeneration was also observed for three of the five selected commercially valuable tree species. The highest regeneration among the selected tree species was observed for *Pterocarpus angolensis* (118 SPH), followed by *Baikiaea plurijuga* (72 SPH) and *Colophospermum mopane* (67 SPH). *Azelia quanzensis* and *Guibourtia coleosperma* did not show any signs of regeneration through absence of saplings. The presence of more trees in lower DBH classes indicates effective succession of young trees for adequate forest regeneration.

Wood production in Miombo woodlands is affected by the way the tree species respond to harvesting or disturbance. The response is dependent on phenological state, degree of resistance to fire, ability to re-sprout, seeding pattern, and seed germination characteristics (Chidumayo and Frost, 1996). Hence, some of the factors that limit natural regeneration of most tree species are erratic fruiting, consumption of

seeds and seedlings by animals and birds, and competition with undergrowth for moisture and nutrients (DFSC, 2001).

Chidumayo and Frost (1996) reported that seeds of most Miombo trees germinate immediately after dispersal if there was adequate water supply, particularly after heavy rains. Higher precipitation, adequate supply of nutrients, full light, absence of uncontrolled forest fires, and absence of root competition are factors that have been reported to promote rapid regeneration (Caro *et al.*, 2005).

Fire is a major threat to forest regeneration. It has been reported that 1,600 hectares of *Baikiaea* (Zambezi teak) forests are destroyed by fire each year in Zambia (DFSC, 2001). The primary causes of forest fires are uncontrolled fires started by farmers, honey gatherers and hunters. Although browsing or grazing of sapling by game or domesticated animals was also another factor that could influence regeneration, this aspect was not assessed.

Regeneration of species such as *Pterocarpus angolensis* is enhanced by its shade intolerance and fire tolerance (Geldenhuys, 1993). Joint management of the forest reserve, however, might have been the most likely contributing factor that led to increased number of observed samplings, particularly for *Pterocarpus angolensis* and *Baikiaea plurijuga* in the forest. It is therefore possible with proper forest protection and management to have sufficient natural regeneration in forest reserves.

Evidence of larger number of saplings per hectare in Dambwa Forest Reserve suggests that the forest protection and management activities conducted by the Forestry Department in collaboration with the local communities was effective in reducing competition and subsequently promoting forest regeneration. The forest protection and management activities as reported under section 4.2.3 included: forest patrols, early burning and boundary clearing and maintenance. The study has, therefore, shown that natural regeneration of tree species in Dambwa Forest Reserves could be enhanced with effective forest protection and management through participation of local communities under JFM.

During the development of JFM in West Bengal, the Forestry Department organised the local communities into Forest Protection Committees (FPCs) to protect forests from illegal harvesting, overgrazing, fires and encroachment in return for incentives, which included share in the final crop. Subsequently, the forest areas rapidly regenerated after protection from continuous illegal harvesting, overgrazing and uncontrolled fires (Damodaran and Engel, 2003).

Higher presence of seedlings or saplings is associated with reduced competition. Therefore, distribution of smallest diameter trees in the forest reserve suggested that with proper management the forest may have the potential to regenerate, permitting trees to grow into biggest diameter class. However, in areas where other tree species remained in the canopy layer, saplings under canopy may remain suppressed or eventually die (Werren *et al.*, 1995).

The regeneration assessment seems to agree with the perception of 67% of the respondents who reported that the forest reserve had regenerated following the introduction of joint forest management in Dambwa. The majority of the older respondents above the age of 35 years perceived the forest reserve to have regenerated. The respondents in the age groups above 35 years were generally older and were able to relate adequately the present condition of the forest reserve to that prior to the introduction of JFM compared to the younger respondents.

Non-occurrence of *Azadirachta indica* and *Guibourtia coleosperma* saplings can be attributed to low stocking per hectare of these tree species. As observed by Cruz (2002) tree regeneration occurs from coppice of stumps, root suckers and seed germination. Similarly, few or absence of larger trees of more than 30cm DBH per hectare, that were left standing in the Dambwa Forest Reserve for production of large number of seeds to enhance regeneration, had a negative effect on forest regeneration.

### 5.6.3 Forest and Woodland Disturbances

Deforestation and forest degradation are the concerns of most governments, resource managers, resource users and donor communities. Most important factors contributing

to forest degradation and deforestation are human pressure, weak government institutions and poor implementation of policies. Cultivation practices, fires, and felling trees for timber, firewood and charcoal production are some of the main disturbances of *Miombo* woodland (Boaler, 1966; Chidumayo, 1993).

Cruz (2002) affirms that clearing of original vegetation for agriculture expansion, timber harvesting, firewood collection, charcoal production, and expansion of human settlement due to rapid human population growth have a negative impact on natural vegetation under the *Miombo* woodland. The impact of these disturbances varies and is differentiated by the type, size, intensity, duration and the vegetation type. In Malawi, subsistence collection of firewood by local people from *Miombo* woodlands is likely to have less impact on the woodland than harvesting of firewood on a commercial level (Cruz, 2002).

Local communities participated in various hands-on forest protection and management activities in conjunction with the Forestry Department following the initiation of JFM in Dambwa (see Figures 7, 8 and 9). About a half (51%) of the respondents perceived that illegal forestry activities had reduced following the introduction of JFM in Dambwa Forest Reserve, but 27% of the respondents thought that illegal activities had remained the same, while 22% indicated an increase. However, the study showed that the involvement of local communities in forest protection activities assisted in reducing the occurrence of illegal activities in the forest reserve, such as encroachment, late wild fires, charcoal production, and timber harvesting.

Furthermore, the majority of the respondents had the perception that the state of the Dambwa Forest Reserve had improved after the introduction of JFM. The perception on improved condition of the forest conforms to the results of forest resource assessment above on forest regeneration. The improvement was attributed to the involvement of the local community in forest protection and management. The collaborative management and protection of the forest reserve resulted in reduced late wild fires, elimination of encroachment, and control of illegal and unsustainable harvesting of major forest products, which subsequently enhanced natural regeneration of the forest (Carter and Gronow, 2005).

## 5.7 Performance of Joint Forest Management Project

Programme evaluation, as stated by Bless and Higson-Smith (2000), assists to have objective information about the programme performance and how it can be improved. Frechtling (2002) also indicated that evaluation was essential in assessing whether goals are met. Furthermore, according to Bellamy *et al.* (2001), evaluation of a programme was essential in identifying changes and also provides learning at all levels. There should be change over time after the introduction of an intervention in order to evaluate the performance (Babbie and Mouton, 2001).

The objectives of joint forest management pilot programme in Dambwa were to enhance the livelihoods of the local people and to improve the condition of the forest (PFAP, 2005). These objectives were supposed to be achieved through capacity building for the Forestry Department in participatory forest management, strengthening of local community and local institutions, and creation of an enabling environment for participatory forest management.

Provincial Forestry Action Programme (PFAP) and Cooperative League of United States of America (CLUSA) had made tremendous positive impacts by being the pioneers in initiating participatory forest management in Zambia. Capacity was built among the participating local communities and in the Forestry Department. The introduction of JFM also resulted in the establishment and strengthening of local governance structures, particularly the FMCs and the VRMCs in pilot areas (PFAP, 2005; Olson, 2007). Shackleton *et al.* (2002) and Olson (2007), also confirmed that the introduction of JFM improves the relationship between local communities and the Forestry Department.

Almost all respondents irrespective of age, gender, marital status, educational level, social position and household type, were not contented with the performance of the JFM programme in Dambwa. The main reason for the discontent was lack of full implementation of the JFM plan due to lack of adequate legal provisions to support local people to collect and share the revenues derived from the joint management of Dambwa Forest Reserve. Therefore, the perception of most local people and the

interviewed Forestry Department personnel was that the programme was not successful, particularly in improving the living conditions of the local people.

The study showed that the Forestry Department was reluctant to devolve power and some responsibility such as revenue collection and sharing to the local people in Dambwa which subsequently frustrated local communities' efforts in joint forest management. Nearly all (100%) of the local communities interviewed claimed that the major beneficiary of the JFM arrangement was the Forestry Department. The claim was based on the fact that the Forestry Department had reduced forest management costs following the involvement of local communities in forest protection and management. In addition, the Forestry Department unilaterally collected all fees and fines and retained all revenues without sharing with local communities.

It has been acknowledged that devolution is a challenge to government as it entails giving up powers in the way forests are managed (Matose, 2006). It has been reported that governments often fail to empower institutions at the lower level to which they devolve responsibilities with enough authority and support to enable them to effectively exercise their rights and manage the local resource (Arnold, 2001). Governments perceive the institutions at lower levels as not having competence to manage forests, licence and enforce the laws (Odera, 2004), consequently the reluctance to devolve power.

The failure by the government to devolve power and authority to community levels is also attributed to the fear by government bureaucrats of losing jobs, authority, and influence. However, Anderson (2000) observed that unless they are given some authority, local communities could not prove their ability. Often failure of government to trust local communities in decision-making and to devolve power and access rights to local communities has been known to result in the failure of community-based natural resources management (CBNRM) programmes.

On the contrary, as this study has shown, the impacts of JFM programme in Dambwa have not been all negative as there was improvement in forest regeneration. Natural forest regeneration can be achieved with the participation of local communities, especially where there is a staff shortage and reduced budgetary allocation in the

Forestry Department for forest protection, conservation and monitoring activities. It was proved that promotion of community participation in forest protection and management through an intervention such as JFM can contribute greatly to natural regeneration of tree species in the forest reserve, including the selected commercially valuable tree species (see section 4.3.1.3 and Figure 31). After all, Carter and Gronow (2005), confirmed the existence of sufficient evidence that indicate that community-based forest management approaches can result in improved ecosystems functions and quality. The improvement is primarily through enhanced protection of the resources from unregulated open access, destructive practices, and exclusion of outsiders.



## **Chapter 6 - Conclusions and Recommendations**

The study was conducted to evaluate community participation in a JFM programme, effects of the JFM programme on local people's livelihoods and to determine the impact of JFM on the condition of the forest reserve. This chapter is divided into two parts: the first part presents concluding remarks drawn from the study and the second part is made up of recommendations based on the findings of the study. The findings in this study are specific to Dambwa JFM area, but some of the findings are applicable to the general performance of the JFM in Zambia and any collaborative natural resources management initiatives elsewhere.

### **6.1 Conclusions**

#### **6.1.1 Awareness, Perception and the Extent of Participation in JFM**

The main stakeholders in the joint management of Dambwa Forest Reserve are the local communities around the forest reserve and the Forestry Department. All the local people interviewed valued the forest as a source of livelihood and more than a half of interviewed local people were aware of JFM and participated in JFM programme. Accordingly, it can be concluded that the increased understanding and awareness on participatory or joint forest management influenced participation of the local people in JFM and brought about change of attitude between the local people and the Forestry Department.

Local community members were involved in forest patrols, forest boundary maintenance and early forest burning. Local people's participation in JFM was generally low, although FMC, VRMCs and FUG members were more involved than the general community members. Most local community members lost enthusiasm in the JFM programme due to lack of remuneration in cash or in kind for their involvement in JFM activities and the inability of the Forestry Department to devolve enough power and decision-making authority to the local communities. It can be

stated that individuals with membership in certain groups had greater involvement in JFM, but their involvement may not be sustainable in the continued absence of tangible benefits.

#### 6.1.2 Factors Influencing People's Participation in JFM

The study revealed that the Forestry Department still owns and controls Dambwa Forest Reserve, while local people are given the responsibilities to protect and management the forest reserve. The current legislation does not also clearly define access rights, user rights and equitable benefit sharing mechanisms. This implies that local people did not have decision-making power and tangible benefits, and their continued participation in JFM was not guaranteed.

Demographic variables such as age; gender; educational level; household size; and social position of the local people were found also to influence community participation in JFM programme. The results showed that older respondents did not participate in physical forest protection and management activities. The results also showed that women and younger respondents did not contribute to the JFM planning and implementation, implying that men and middle-aged community members dominated the programme. In addition, there was more involvement of individuals with formal education, implying that they may have better understanding of the developmental issues. However, this arrangement may lead to elitism, resulting in dominance and differential distribution of benefits that may be realized in a JFM project. On the other hand, the number of occupants in a household was also a factor that affected local people's participation in JFM. Many households with fewer occupants did not participate in JFM programme as they preferred to utilize their scarce labour and time on other livelihood activities that would bring immediate benefits in comparison to JFM.

#### 6.1.3. Performance of Local Management Institutions

The study showed that FMC and VRMCs were established at the forest area and village level, respectively, as local forest management and governance structures in

Dambwa JFM area. These institutions were established to coordinate the implementation of JFM activities. The role of traditional leaders was also recognized under the JFM arrangement - the local traditional chief was an ex-officio of FMC.

FMC was perceived to be more effective than the VRMCs. FMC leadership was considered to be stronger and committed compared to that of the VRMCs and this contributed to the effectiveness of FMC. However, all the user groups in the JFM area were not functional at the time of the study except the Mungongo oil group. Most of the user groups were expectant of support and regulation from the Forestry Department. It can be concluded that user groups are not yet fully empowered through the provision of regulations and support by the Forestry Department to enable different user groups to obtain economic benefits from JFM.

#### 6.1.4 Effects of JFM on Local People's Livelihoods

The study confirmed that agriculture was the most important livelihood activity among local people around Dambwa Forest Reserve, which involved crop farming and keeping livestock for home consumption and for sale. The Forest Reserve was also highly valued as it contributed significantly to local livelihoods through the provision of food, medicines, construction materials, firewood and other non-timber forest products. However, the study concluded that the JFM programme in Dambwa could not improve socio-economic conditions of local people, as the JFM arrangement did not provide sufficient and tangible benefits for households to improve their livelihoods.

#### 6.1.5 Impact of JFM on the Dambwa Forest Reserve

The study showed that stocking in the forest reserve was low (219 SPH) and nearly all (90%) the stems were below 30cm DBH. The results signify that the forest area was heavily exploited in the past, prior to JFM, especially for the commercially valuable tree species of *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Guibourtia coleosperma*, *Azelia quanzensis* and *Colophospermum mopane*. However, the high number (almost 100,000) of saplings per hectare in Dambwa Forest Reserve, including some of the

selected commercial timber tree species seems to suggest that there is improved natural regeneration of the forest with increased forest protection activities due to the introduction of JFM.

#### 6.1.6 Perceived Performance of the JFM Programme

The perception among local people was that JFM programme was not successful. This assertion among the local people was because there was no improvement in their livelihoods that could have been attributed to the JFM programme. However, the JFM programme managed to improve the conditions of the forest reserve through reduction in illegal forestry activities and improvement in natural forest regeneration. This implies that community participation in forest protection and management contributed to the improvement in general forest condition, but not the livelihoods at the household level.

## 6.2 Recommendations

Recommendations are also made based on the study that was conducted.

- The Forestry Department should continue with and increase dissemination of information on participatory forestry management to the local community in the area and to other stakeholders.
- There should be an immediate commencement and amendment of the Forests Act of 1999 to legally support participation of various stakeholders in JFM and to formalize access rights, user rights and the sharing of benefits.
- JFM should not be initiated or replicated in areas where it cannot be sustained or where the chances of success are low. Failure to sustain the JFM initiative would undermine both local community confidence and future donor cooperation. Thus, scarce resources should be targeted at areas where chances of attaining the intended results are high.

- Community-Public-Private Partnerships should be encouraged in JFM areas to increase economic benefits to the local communities in order to improve their livelihoods and ensure long-term forest conservation. However, measures should be taken to reduce conflicts of interest among different stakeholders.
- Focus should be changed from forest-based ventures to other products and services in the JFM area so as to increase benefits for the participating stakeholders and also to shift demand away from forest resources.
- During the planning of participatory/joint forest management, consideration should be made on quality and extent of forests; types, quality and quantity of forest products to be derived; possible and available market linkages; and potential markets for forest products for it to be sustainable and to ensure long-term forest resource conservation.
- The overall performance of JFM pilot programmes in the country should be evaluated and their performance and lessons learnt documented so that information is readily available and shared.
- NGOs to support involvement of local communities in participatory forest management, and advocate and lobby for communities' access rights, user rights, and benefits.
- The government to provide an enabling environment for private sector involvement in eco-tourism and other forest-based business activities in JFM areas, and subsequently create employment for the local communities to enhance their livelihoods.
- Promote extraction, processing, packaging and marketing of plant oil from *Schinziophyton rautanenii* (Mungongo), which is readily available in Dambwa JFM area to enhance the livelihood of the local people.

## References

- Abbot, J. I. O. and Homewood, K., 1999.** A history of Change: Causes of Miombo Woodlands Decline in a Protected Area in Malawi. *Journal of Applied Ecology* 36: 422-433.
- Anderson, J., 2000.** Four Considerations for Decentralized Forest Management: Subsidiarity, Empowerment, Pluralism and Social Capital. In Enters, T., Durst, P.B., and M. Victor (eds). 2000. *Decentralization and Devolution of Forest Management in Asia and the Pacific*. RECOFTC Report N.18 and RAP Publication 2000/1. Bangkok, Thailand.
- Appiah, M., 2001.** Co-partnership in Forest Management. The Gwira-Banso Joint Forest Management Project in Ghana. *Environment, Development and Sustainability* Volume 3. Number 4 (2001) pp 343-360. Kluwer Academic Publishers.
- Arnold, J.E.M., 2001.** Community Forestry: 25 years in Review. FAO Rome. pp 1-128
- Babbie, E. and Mouton, J., 2001.** The Practice of Social Research. Oxford University Press. 674 p.
- Babbie, E. R., 2002.** The Basics of Social Research. Second Edition. Wadsworth. Thomson learning.
- Babbie, E. R., 2004.** The Practice of Social Research. 10<sup>th</sup> Edition. Thomson, Wadsworth. Belmont, California.
- Bailey, J. M. and Slater, T. F., 2005.** Finding the Forest Amid the Trees: Tools for Evaluating Astronomy Education and Public Outreach Projects. *The Astronomy Education Review*, Issue 2, Volume 3, 2005.

- Behera, B., and Engel, S., 2006.** Who Forms Local Institutions? Levels of Household Participation in India's Joint Forest Management Program, *ZEF – Discussion Papers On Development Policy* No. 103, Center for Development Research, Bonn. 37 p.
- Bellamy, J. A., Walker, D. H., T. McDonald, G. T. and Syme, G. J., 2001.** A Systems Approach to the Evaluation of Natural Resource Management Initiatives. *Journal of Environmental Management* (2001) 63, 407–423.
- Bless, C. and Higson-Smith, C., 2000.** Fundamentals of Social Research Methods. An African Perspective. Third Edition. Juta Publication.
- Blomley, T. and Ramadhani, H., 2006.** Going to Scale with Participatory Forest Management: Early Lessons from Tanzania. *International Review* Volume 8 (1) 2006 pp 93-100.
- Boaler, S. B., 1966.** Ecology of Miombo Site, Lupa North Forest Reserve, Tanzania II. Plant Communities and Seasonal Variation in the Vegetation. *Journal of Ecology* **54** 465-479
- Burkey, S., 1993.** People first. A guide to Self-reliant Participatory Rural Development. Zed Books Ltd, London.
- Bwalya, S. M., 2004.** Rural Livelihoods and Collective Action in Joint Forest Management in Zambia. <http://www.saga.cornell.edu/images/cau-bwalya.pdf>  
Accessed on February 13, 2007
- Campbell, B. M., Shackleton, S. and Wollenburg, E., 2003.** Overview: Institutional Arrangements for Managing Woodlands. In Kowero, G., Campbell, B. M., and Sumaila, U. R. (Ed.) *Policies and Governance Structures in Woodlands of Southern Africa*. Center for International Forestry Research (CIFOR), Indonesia. pp 9-15

- Carney, D., 1998.** Implementing the Sustainable Livelihoods Approach. In D. Carney (ed.) *Sustainable Rural Livelihoods: What Contribution Can We Make?* London, UK, Department for International Development.
- Caro, T. M., Sungula, M., Schwartz, M. W., and Bella, E. M., 2005.** Recruitment of *Pterocarpus angolensis* in the Wild. *Forest Ecology and Management* 219 (2005) 169-175
- Carter, J. and Gronow, J., 2005.** Recent Experience in Collaborative Forest Management. CIFOR Occasional Paper No. 43. A Review Paper. Center for International Forestry Research. Jakarta 10065, Indonesia
- Castrol, A. P. and Nielsen, E., 2001.** Indigenous People and Co-management: Implementations for Conflict Management. *Environmental Science and Policy* (4): 229-239.
- Central Statistics Office (CSO), 2003.** Summary Report for the 2000 Census of Population and Housing. Republic of Zambia. Lusaka
- Chidumayo, E and Frost, P., 1996.** Population Biology of Miombo Trees. In Campbell, B. 1996 (ed.). *The Miombo in Transition: Woodlands and Welfare in Africa*. Center for International Forestry Research. Bogor, Indonesia. pp 59-72.
- Chidumayo, E. N., 1997.** Miombo Ecology and Management. An Introduction. Intermediate Technology Publications in Association with the Stockholm Environment Institute. London, UK. 166 p.
- Clewer, A. G. and Scarisbrick, D. H., 2006.** Practical Statistics and Experimental Design for Plant and Crop Science. John Wiley and Sons, New York.
- Coralie, B. and White, L. G., 1994.** Managing Rural Development with Small Farmer Participation. Kumarian Press Inc.



- Cruz, M., 2002.** The impact of plant harvesting on Derre Miombo woodland. Mozambique. Master of Science Thesis. University of Stellenbosch. Unpublished
- Cunningham, A. B., 2001.** Applied Ethno Botany. People, Wild Plant Use and Conservation. Earthscan Publications, London. 300p
- Dalal-Clayton, B., Dent, D., and Dubois, O., 2003.** Rural Planning in Developing Countries. Supporting Natural Resource Management and Sustainable Livelihoods. International Institute for Environment and Development (IIED), Earthscan Publications Ltd, London.
- Damodaran, A. and Engel, S., 2003.** Joint Forest Management in India: Assessment of Performance and Evaluation of Impacts. *ZEF-Discussion Papers on Development Policy* 77.
- DFID (Department for International Development), 2001.** Sustainable livelihoods guidance sheets. Department for International Development. Victoria Street, London, UK.
- DFSC (Danida Forest Seed Centre), 2001.** Conservation Plan for Genetic Resources of Zambezi teak (*Baikiaea plurijunga*) in Zambia. DFSC Case study No. 2. Danida Forestry Seed Centre, Humlebaek, Denmark.
- Dolisca, F., Carter, D.R., McDaniel, J. M., Shannon, D.A., and Jolly, C. M., 2006.** Factors Influencing Farmer's Participation in Forestry Management Programs: A Case Study from Haiti. *Forest Ecology and Management*, Volume 236, Issues 2-3, pp 324-331.
- Dunn, O.J. and Clarke, V. A., 1987.** Applied Statistics: Analysis of variance and Regression. (2<sup>nd</sup> Edition). John Wiley and Sons, New York
- DWAF (Department of Water Affairs and Forestry), 2004.** Policy and Strategic Framework for Participatory Forest Management. RSA

- DWAF (Department of Water and Forests), 2005.** Sustainable Resource Use. DANIDA, Ramboll. RSA
- Fabricius, C., 2004.** The Fundamentals of Community-Based Natural Resource Management. *In* Fabricius, C., Koch, E., Magome, H. and Turner, S. (ed.). *Rights, Resources and Rural Development: Community-Based Natural Resources Management in Southern Africa*. Earthscan, London. pp 3-43
- FAO (Food and Agriculture Organisation of United Nations), 2005.** State of the World's Forests. Food and Agriculture Organisation of United Nations. Rome. 153 p.
- FAO (Food and Agriculture Organisation of United Nations), 2007.** Forests and the forestry sector in Zambia. <http://www.fao.org/forestry/site/32228/en/zmb>. Accessed on August 14, 2008
- FBD (Forestry and Beekeeping Division), 2003.** A report on lessons learnt. National Forest Programme, Ministry of Natural Resources and Tourism, Tanzania.
- FD (Forestry Department), 2002.** Dambwa Local Forest Participatory Rural Appraisal Final Draft Report. Forestry Department, Zambia.
- FD (Forestry Department), 2003.** Final Draft Joint Forest Management Plan for Dambwa Local Forest, Forestry Department, Zambia.
- FD (Forestry Department), 2005.** Joint Forest Management Guidelines, Forestry Department, Ministry of Tourism, Environment and Natural Resources, Lusaka, Zambia.
- Ferguson, G. A., 1987.** Statistical Analysis in Psychology and Education. (5th Ed.) McGraw Hill International Editions. Auckland.

- Fisher, R. J., 1999.** Devolution and Decentralisation of Forest Management in Asia and the Pacific. *Unasylva*. Vol. 50, No. 99, 1999. pp 3-5.
- FOSA (Forestry Outlook Studies in Africa), 2001.** Country Report – Zambia, Forestry Outlook Study for Africa. FAO, Rome.
- FRA (Forest Resource Assessment), 2005.** Global Forest Resource Assessment 2005. 15 Key Finding. Food and Agriculture Organisation of the United Nations. Rome.
- Frechtling, J. and Sharp, L., 1997.** User-Friendly Handbook for Mixed Method Evaluations. National Science Foundation. Arlington, VA.
- Frechtling, J., 2002.** The 2002 User-Friendly Evaluation Handbook for Project Evaluation. National Science Foundation. Arlington AV.
- Geldenuys, C. J., 2004.** Analysis of Inventory Data and Evaluation of Existing Inventory Design for Provincial Level Forest Inventories. Forestwood, Report Number FW-02/04
- Geldenuys, C. J., 1993.** The Use of Diameter Distributions in Sustained Use Management of Forests: Examples from Southern Africa. *In: Pearce, G. D., and Gumbo, D. J. (eds.). The ecology and management of indigenous forests in Southern Africa. Proceedings of an International Symposium, Victoria Falls, Zimbabwe. Zimbabwe Forestry Commission and SAREC, Harare. p 154-167.*
- Grundy, I. M., Campbell, B., Balebereho, S., Cunliffe, R., Tafangenyasha, C., Ferguson, R. and Parry, D., 1993.** Availability and Use of Trees in Mutanda Resettlement Area, Zimbabwe. *Forest Ecology and Management* 56: 243–266
- Grundy, I., Turpie, J., Jagger, P., Witkowski, E., Guambe, I., Semwayo, D., and Solomon, A., 2000.** Special Section: Land use Options in Dry Tropical Woodland Ecosystems in Zimbabwe. Implications of Co-management for

Benefits from Natural Resources for Rural Households in North-western Zimbabwe. *Ecological Economics* 33 (2000) p 369–381

**GRZ (Government of the Republic of Zambia), 1973.** Forests Act Cap 199 of the Laws of Zambia, Government Printers, Lusaka, Zambia.

**GRZ (Government of the Republic of Zambia), 1998.** National Forestry Policy, Ministry of Environment and Natural Resources, Lusaka, Zambia

**GRZ (Government of the Republic of Zambia), 1999.** Forests Act, Government Printers, Lusaka, Zambia.

**GRZ (Government of the Republic of Zambia), 2003.** Poverty Reduction Strategy Paper: 2002- 2004. Lusaka, Zambia.

**GRZ (Government of the Republic of Zambia), 2006.** Statutory Instrument No. 47 of 2006. The Local Forests (Control and Management) Regulation. Government Printers, Lusaka, Zambia

**Hailwa, J., 1998.** Non-Wood Forest Products in Namibia. Forestry Statistics and Data Collection - AFDCA/TN/05. EC-FAO Partnership Programme (1998-2000). FAO Corporate Document Repository.

**Ham, C., Chirwa, P., and Theron, F., 2008.** The Forester as a Change Agent – From Trees Between the People to People Between the Trees. *In* Theron, F., (ed.). *The Development Change Agent. A Micro-level Approach to Development.* Van Schaik Publishers, South Africa. p 193-201

**Hobley, M., 1996.** Participatory Forestry: The progress of Change in India and Nepal. Rural Development Forestry Study Guide No. 3. Rural Development Forestry Network, ODI, London.

**Holmes, T. N., 2007.** Contribution of Participatory Forest management (PFM) Intervention to the Socio-economic Development in the Southern Cape

Forests: A Retrospective Approach. Masters of Philosophy Thesis (Social Science Methods). University of Stellenbosch, South Africa.

**IUCN (World Conservation Union), 2007.** Climate Change and Development Project, Phase II. Climate Change Vulnerability Assessment in Zambia. IUCN Forest Conservation Programme.

**Joshi, A., 1999.** Progressive Bureaucracy: An Oxymoron? The Case of Joint Forest Management in India. Rural Development Forestry Network Paper 24a. London: Overseas Development Institute

**Jumbe, C. B. L. and Angelsen, A., 2007.** Forest Dependence and Participation in CPR Management: Empirical Evidence from Forest Co-management in Malawi. *Ecological Economics* (62): 661-667.

**Kajembe, G. C., Monela, G. C. and Mvena, Z. S. K., 2003.** Making Community-Based Forest Management Work: A Case Study of Duru-Haitemba Village Forest Reserve, Babati, Tanzania. In Kowero, G., Campbell, B. M., and Sumaila, U. R. (ed.). *Policies and Governance Structures in Woodlands of Southern Africa*. Center for International Forestry Research (CIFOR), Indonesia. pp 16-27.

**Karki, M., Karki, J. B. S., and Karki, N., 1994.** *Sustainable Management of Common Forest Resources: An Evaluation of Selected Forest User Groups in Western Nepal*. International Centre for Integrated Mountain Development. (ICIMOD). Kathmandu, Nepal

**Kayambazinthu, D., Matose, F., Kajembe, G., and Nemarundwe, N., 2003.** *Institutional Arrangements Governing Natural Resources Management of the Miombo Woodland*. In Kowero, G., Campbell, B.M., and Sumaila, U.R. (eds.) *Policies and Governance Structures in Woodlands of Southern Africa*. Center for International Forestry Research, Indonesia. pp 45-64

- Kumar, S., 2002.** Methods for Community Participation. A Complete Guide for Practitioner. ITDG Publishers, London.
- Lise, W., 2000.** Factors Influencing People's Participation in Forest Management in India. *Ecological Economics* (34): 379-392.
- Luoga, E. J., Kajembe, G. C., and Mohamed, B.S., 2006.** Impact of Joint Forest Management on Handeni Hill Forest Reserve and Adjacent Communities in Tanga, Tanzania. [www.indiana.edu/~iascp/bali/paper/luoga-e-impact.pdf](http://www.indiana.edu/~iascp/bali/paper/luoga-e-impact.pdf)  
Access of 20<sup>th</sup> July 2007
- Luoga, E.J., Witkowski, E.T.F., and Balkwill, K., 2002.** Harvested and Standing Wood Stocks in Protected and Communal Woodlands of Eastern Tanzania. *Forest Ecology and Management*, 164, 15-30.
- Matose, F. and Wily, L., 1996.** Institutional Arrangements Governing the Use and the Management of Miombo Woodlands. In Campbell, B. 1996 (ed.). *The Miombo in Transition: Woodlands and Welfare in Africa*. Center for International Forestry Research. Bogor, Indonesia. pp 195-219
- Matose, F., 2006.** Co-management Options for Reserved Forests in Zimbabwe and Beyond: Policy Implications of Forest Management Strategies. *Forest Policy and Economics* 8 (2006): 363– 374
- Mukherjee, N., 1993.** Participatory Rural Appraisal: Methodology and Applications. Concept Publication Company. New Delhi.
- Murali, K. S., Rao, R. J., Sudha, P., Sangeetha, G., Murthy, I. K., and Ravindranath, N. H., 2003.** Evaluation studies of joint forest management in India: Social and Institution implications. *International Journal of Environment and Sustainable Development* Vol. 2 No.1 pp 19-35.

- Ndayambaje, J. D., 2002.** Potential for Joint Management and Multiple Use of Nyungwe Forest, Rwanda. Unpublished. MSc Thesis. University of Stellenbosch, South Africa.
- Neumann, W. L., 1999.** Social Science Research Methods. Qualitative and Quantitative Approaches. 4<sup>th</sup> Edition. Allyn and Bacon. USA. 558p
- Obiri, J., Lawes, M., and Mukolwe M., 2002.** The Dynamics of Sustainable Use of High-Value Tree Species of Coastal Pondoland Forests of the Eastern Cape Province, South Africa. *Forest Ecology and Management* 166 Issues 1-3. pp 131-148
- Obua, J., Banana, A. Y. and Turyahabwe, N., 1998.** Attitude of Local Communities Towards Forest Management Practices in Uganda: The Case of Budongo Forest Reserve. *Commonwealth Forestry Review* 77: 113-118.
- Odera, J., 2004.** Lessons Learnt on Community Forest Management in Africa. A Report Prepared for the Project: Lessons Learnt on Sustainable Forest Management in Africa. Kenya
- Olson, G. K., 2007.** Forests and farming: An Analysis of Rural Livelihood Programs for Poverty Reduction in Eastern Zambia. MSc Thesis. University of Montana, Missoula, Montana USA. Unpublished.
- Palgrave, K. C., 1983.** Trees of Southern Africa. Struik Publishers, Cape Town.
- PFAP (Provincial Forestry Action Programme), 1998.** Social Economic Aspects of Forest Sector in Zambia. An Overview. Forestry Department, Ndola, Zambia
- PFAP (Provincial Forestry Action Programme), 2000.** Programme Document, Provincial Forestry Action Programme. Lusaka, Zambia
- PFAP (Provincial Forestry Action Programme), 2004.** 2004-2005 Annual Work plan and Budget. Provincial Forestry Action Programme. Lusaka, Zambia.

- PFAP (Provincial Forestry Action Programme), 2005.** Lessons Learnt from Joint Forest Management in Zambia. The Experience of Provincial Forestry Action Programme (PFAP II). Provincial Forestry Action Programme. Lusaka, Zambia.
- PHAC (Public Health Agency of Canada), 1996.** Guide to Project Evaluation: A Participatory Approach. Population Health Directorate. Ontario, Canada
- Philip M. S., 1994.** Measuring Trees and Forests. Second Edition. CABI Publishing. Wallingford. 310p
- Puustjärvi, E., Kokwe, G. M., and Chakanga, M., 2005.** The contribution of the Forest Sector to the National Economy and Poverty Reduction in Zambia. Consultancy Report to Indufor Oy for the Zambian Forestry Department and Ministry for Foreign Affairs of Finland. Savcor Indufor Oy, Helsinki, Finland
- Ravnborg, H. N. and Westernmann, O., 2002.** Understanding Interdependencies: Stakeholder Identification and Negotiation as a Precondition to Collective Natural Resource Management. *Agricultural Systems*, 73(1): 493-504
- Rishi, P., 2007.** Joint Forest Management in India: An Attitudinal Analysis of Stakeholders. *Resources, Conservation and Recycling* 51: 345 – 354.
- SADC (Southern African Development Community), 2002.** Southern African Development Community Protocol on Forestry. Gaborone
- Saxena, N. C., 1992.** Joint Forest Management: A New Development Bad-Wagon in India. Social Forestry Network. London: Overseas Development Institute
- Shackleton, S., Campbell, B., Wollenberg, E. and Edmunds, D., 2002.** Devolution and Community Based Natural Resource Management: Creating Space for Local People to Participate and Benefit. Natural Resource Perspective. No. 76. Overseas Development Institute (ODI). London. UK.



**Stanley, J. and Sedlack, R. G., 1992.** Social Research. Theory and Method. Allan and Bacon.

**StatSoft Inc., 2007.** STATISTICA (Data Analysis Software System), Version 8.  
[www.statsoft.com](http://www.statsoft.com)

**Storrs, A. E. G., 1995.** Know Your Tress. Regional Soil Conservation Unit, Lusaka, Zambia.

**Thakadu, O. T., 2005.** Success Factors in Community-Based Natural Resources Management in Northern Botswana: Lessons from Practice. *Natural Resources Forum* 29 (2005) 199 - 212

**UNCED (United Nations Conference on Environment and Development), 2008.**  
Encyclopædia Britannica. 2008. Encyclopædia Britannica Online.  
<<http://www.britannica.com/EBchecked/topic/616390/United-Nations-Conference-on-Environment-and-Development>>. Accessed on December 1, 2008

**USDJ (United States Department of Justice), 1997.** Urban Street Gang Enforcement. Monograph. Bureau of Justice Assistance.  
<http://www.ncjrs.gov/pdffiles/161845.pdf> Accessed on July 17, 2007

**USDJ (United States Department of Justice), 2006.** Guide to Programme Evaluation. [www.jrsa.org/holding/guide/ru3.html](http://www.jrsa.org/holding/guide/ru3.html). Accessed on July 14, 2007

**Vandergeest, P., 1996.** Property Rights in Protected Areas: Obstacles to Community Involvement as a Solution in Thailand. *Environmental Conservation* 23: 259-268.

**Wallace, M. G., Cortner, H. J., and Burke, S., 1995.** Review of Policy Evaluation in Natural Resources. *Society and Natural Resources*, Vol. 8(1): 35-47

- Warner, K., 2000.** Forestry and Sustainable Livelihoods. *Unasylva* 51. 202: 3-12pp
- Wily, L. A. (2001).** Forest Management and Democracy in East and Southern Africa: Lessons from Tanzania. Gatekeeper Series no. 95. Sustainable Agriculture and Rural Livelihoods Programme. International Institute for Environment and Development (IIED), London.
- Wily, L. A., 2002.** Participatory Forestry Management in Africa. An overview of Progress and Issues. Community-Based Natural Resource Management Net.
- World Bank, 1998.** Findings. African Region. West Africa: Community Based Natural Resource Management. Findings Report No. 107 March 1998. [www.worldbank.org](http://www.worldbank.org). Accessed on August 22, 2007
- World Bank.** <http://www.worldbank.org/AYEN4L9EN0>. Accessed on August 22, 2007
- Zar, J. H., 1998.** Biostatistical Analysis (4<sup>th</sup> Edition). Prentice Hall, Upper Sadle River, New Jersey.
- ZAWA (Zambia Wildlife Authority).** Information Department – ZAWA. <http://www.zawa.org.zm/cbnrm.htm>. Accessed on 23 July 2008
- ZFAP (Zambia Forestry Action Programme), 1998.** Zambia Forestry Action Plan, Ministry of Environment and Natural Resources, Lusaka, Zambia

## Appendix

### Appendix 1: Household Questionnaire

#### 1.0 General Information

	Question	Response	Code	
1.	Name of Interviewer			
	Pre-tested date			
	Interview date			
	Village Name			
	Respondent Number/Name			
	Gender of Respondents	Male		
		Female		
	Household Type	Male Headed		
Female Headed				
2a.	What is your age?			
2b.	What is your marital status	Single		
		Married		
		Divorced		
		Widowed		
2c.	How many people live in your home?			
3.	What is your highest level of education?	No formal education		
		Primary School		
		Junior Secondary School		
		Senior Secondary School		
		College/University		
4.	What position do you hold in the community?	Ordinary community member		
		Traditional leader		
		Committee member		
		Forest user group member		
5.	What is your main means of livelihoods?	Crop farming		
		Keeping livestock		
		Trading		
		Formal employment		
		Casual work		
6.	What major income generating activities are you involved in?	Farming		
		Charcoal production		
		Oil extraction		
		Beekeeping		
		Other (Specify):		

## 2.0 Forest resources and use

7.	Question	Response	Code
	Where do you get your wood, wild fruits and tradition medicines requirements?	Dambwa Forest Reserve	
		Forest areas outside the reserves	
		Open Agriculture fields	
8.	Rank five (5) most important tree species in the Dambwa Forest Reserve?  <i>(On a scale of 1 to 5, 5 being most important)</i>	<i>Baikiaea plurijuga</i> (Mukusi)	
		<i>Pterocarpus angolensis</i> (Mulombe)	
		<i>Schinziophyton rautanenii</i> (Mungongo)	
		<i>Colophospermum mopane</i> (Mopane)	
		<i>Afzelia quanzensis</i> (Mukamba)	
		<i>Brachystegia boehmii</i> (Mubomba)	
		<i>Guibortia coleosperma</i> (Muzauli)	
9.	What other four (4) important tree species are found in Dambwa Forest Reserve (Specify)		
10.	Rank the five (5) common tree species in the forest?  <i>(On a scale of 1 to 5, 5 being most common)</i>	<i>Baikiaea plurijuga</i> (Mukusi)	
		<i>Pterocarpus angolensis</i> (Mulombe)	
		<i>Schinziophyton rautanenii</i> (Mungongo)	
		<i>Colophospermum mopane</i> (Mopane)	
		<i>Afzelia quanzensis</i> (Mukamba)	
		<i>Brachystegia boehmii</i> (Mubomba)	
		<i>Guibortia coleosperma</i> (Muzauli)	
11.	List five (5) important Non-Wood Forest Products found in the Dambwa Forest Reserve, according to your priority.		
12.	Who is allowed to harvest forest products from the forest reserve?	Entire local community	
		Forest User Group members	
		Committee members	
		Anyone	
13.	Why is it important to manage and conserve the forest reserve?	Source of wood fuel	
		Source of traditional medicines	
		Source of building materials (poles, grass)	
		For foods (mushroom, fruits, tubers & honey)	
		Source of raw materials for trade	
14.	Who manages the Dambwa Forest Reserve? ( <i>Choose one</i> )	Environmental services e.g. increased rainfall	
		Government	
		Chief	
		Communities	
		Communities & Government	

		No Idea		
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15.	What are the main products do you obtain from the Dambwa Forest Reserve?	Timber & Poles		
		Traditional Medicine		
		Honey		
		Oil Seeds		
		Fruits & tubers		
		Others (specify)		

16.	Who uses the forest most? ( <i>Choose one</i> )	Local community members		
		People from nearby town		
		Committee members		
		Traders from outside		
		Forest User Groups		

17a.	Are there markets for the main forest products from the forest?	Yes		
		No		
17b.	If yes, where do you sell you products?	To nearby town		
		Within the village		
		To traders from town		

### 3.0 Joint forest management and its implementation

18a.	Do you participate in protection and management of the Dambwa Forest Reserve?	Yes		
		No		
18b.	If yes, why do you participate in joint management of the forest? ( <i>Choose most important reason</i> )	To alleviate household poverty		
		Take part in benefit sharing		
		Have decision-making powers		
		Free access to forest reserve		
		Others (specify):		

19.	If you do not participate in joint forest management, Why? ( <i>Choose most important reason</i> )	Lack of benefits		
		Forest work too strenuous		
		Limited decision making powers		
		Not a priority		
		Others (specify):		

20.	Who initiated joint forest management in your area? ( <i>Choose one</i> )	Forestry Department		
		Traditional Leaders		
		Individuals within the area		
		NGO		

21.	How did you come to know about joint forest management?	Forestry Department		
		Traditional Leaders		
		Committee Members		
		Community Members		

22.	What joint forest management (JFM) activities are you involved in?	Attending forest meeting		
		Conducting forest patrols		
		Clearing forest boundaries		
		Forest fire protection		
		Others (specify)		

23.	How many days in a month do you spend on joint forest management activities?	< 5days		
		5 – 10 days		
		11 – 15 days		
		>16 days		

24.	To what extent were you involved in the formulation of the joint forest management plans? ( <i>Choose one</i> )	Fully involved		
		Partially involved		
		Not involved		

25.	What is the most important factor preventing your active involvement in JFM? ( <i>Choose one</i> )	Low education level		
		Lack of tangible benefits		
		Government bureaucracy		
		Inadequate support from FD		
		Forest work very laborious		

#### 4.0 Forest management structures

26.	What local institutions are in place for coordinating the management and protection of the forest reserve? ( <i>Indicate their effectiveness as well, 3 = most effective; 2 = moderate; 1 = ineffective</i> )	<i>Institutions</i>	<i>Choice</i>	<i>Effectiveness</i>
		Forest Management Committee		
		VRMC		
		Forest User Groups		
		Area Development Committee		
	Others (specify)			

27.	Are you satisfied with the performance of forest committees in the area?	Yes		
		No		
28.	If not, why? ( <i>Indicate most important reason</i> )	Roles of committees not clear		
		Lack of coordination		
		Selfishness among members		
		Other (specify)		
29.	What is the main role of the Forestry Department in JFM programme? ( <i>Choose one</i> )	Advisory		
		Conflict resolution		
		Forest patrols		
		Organise and facilitate meetings		
	No roles			
30.	What was your role as local community member in formulation and implementation of JFM plans?	Advisory		
		Providing information		
		Involved in forest resource assessment		
		No role		

31a	Which Forest User Group do you belong to? ( <i>Choose one</i> )	Bee keeping		
		Mungongo seed oil extraction		
		Firewood trading		
		Basketry		
		Wood carving		
		Mushroom & wild vegetable collection		
		Other		
		None		
31b	If you belong to a forest user group, what is the role of your forest user group in forest protection and management?	Forest Patrols		
		Fire protection		
		Licensing		
		None		
31c	Where does your Forest User Group report to? ( <i>Choose one</i> )	Forestry Department		
		Forest Management Committee		
		VRMC		
		Village Head		
		Other (Specify)		
	No one			
31d	How many members are in your Forest User Group?	Males:		
		Females:		

31e	Where do you sell your product?	Roadside		
		Market place		
		Middlemen		
		Homestead		
		Other (specify):		
31f.	Do you keep records of your sales?	Yes		
		No		

32.	Where do you get advice on forest protection, management and used	Traditional Leader		
		Forest Management Committee		
		VRMCs		
		Forestry Department		
		None		
33.	Where do you get most support for joint forest management implementation? (Choose one)	Forestry Department		
		Forest Management Committee		
		VRMC		
		Traditional Leader		
		Area Councillor		
34.	How do you resolve problems or conflicts related to the use and protection of Dambwa Forest Reserve?	Report to Forest Department		
		Report to FMC		
		Report to VRMC		
		Report to Village head/Chief		
		None		

35a.	Are women represented in local JFM structures?	Yes		
		No		
35b.	How actively are women involved in local JFM structures?	Active		3
		Average		2
		Not Active		1
35c.	What interventions are in place to encourage women participation in JFM?	Local Constitution		
		National Forest policy		
		JFM Guidelines		
		Forest Legislation		
		No interventions		

### 5.0 Access to Dambwa Forest Reserve

36a.	Who is allowed to harvest forest produce from the forest reserves? (Choose one)	Only Local community		
		Local community and outsiders		
		Committee members only		
		Forest user group members only		
		None		
36b.	Do you pay fee to collect forest produce from the forest reserve?	Yes		
		No		
36c.	If yes, who collects the fees?	Forestry Department		
		Forest Management Committee		
		VRMC		
		Village Headman		

37.	In case of penalties for forest offences, who collects fines and penalty fees? (Choose one)	Forestry Department		
		Forest Management Committee		
		VRMC		
		Traditional Leaders		

38a.	Has JFM Bank Account been opened?	Yes		
		No		

38b.	If not, what are the main reasons?		
39.	What kind of access to forest reserve would you prefer? ( <i>Choose one</i> )	Free access for both local communities and outsiders	
		Controlled access for Outsiders	
		Controlled access for both local communities and outsiders	

**6.0 Relationship between community participation and the derived benefits**

40.	What benefits do you derive from JFM?	Provision of resource base for income generation	
		Increased availability of forest products	
		Employment opportunities	
		Others (Specify):	

41a.	How are monetary benefits shared between government and local communities, if any? ( <i>Choose one</i> )	Govt 60%: Communities 40%	
		Govt 40%: Communities 60%	
		No sharing mechanism in place	
		Others (Specify)	
41b.	How is the monetary benefit shared among local communities? ( <i>Choose one</i> )	Chief 5%; FMC35%; Community 60%	
		Chief 10%; FMC 40%; Communities 50%	
		No sharing mechanism in place	
		Others (Specify):	

42a.	Are you satisfied with benefit sharing ratios?	Yes	
		No	
42b.	If not, why?		

43.	In your own opinion, who benefit most from JFM? ( <i>Choose one</i> )	Forestry Department	
		Traditional Leaders	
		Committee Members	
		Forest User Groups	
		Entire Local Community	

44a.	Do you regard non-timber forest products from the forest reserve as benefits from JFM?	Yes	
		No	
44b.	If not, why?		

45.	What new skills have been acquired through joint forest management initiative?	Leadership Skills	
		Forest Protection & Management	
		Entrepreneurship & Record keeping	
		Beekeeping	
		Others (Specify):	

46.	What have you benefited as a community member from your participation in joint forest management?	Increased household income	
		Provision of social infrastructure (roads, schools, clinics & water)	
		Sustainable supply of basic needs (woodfuel, food, construction materials, and traditional medicine)	
		Acquired various new skills	
		No benefits	



**7.0 Effects of joint forest management project on the forests and people's livelihoods**

47.	What was the condition of the forest reserve before JFM? ( <i>Choose one</i> )	Deforested		
		Forest encroached		
		Forested		
		Free of encroachments		
48.	What have been the noticeable changes in the status of the forest reserve since the introduction of JFM?	Increased forest stocking		
		Regeneration of valuable species		
		Reduced illegal forestry activities		
		No significant changes		
49.	How would you compare the status of the forest reserve since the introduction of JFM?	Improved		
		Remained the same		
		Deteriorated		
50.	What changes have you noticed in the way Dambwa Forest Reserve is managed following the introduction of joint forest management?	Improved attitude of FD towards local people		
		Increased restriction to access forest resources		
		Increased and fair access to forest reserve		
		No significant changes		

51a.	How has the availability of forest produce changed due to JFM?	Increased		
		No Change		
		Decreased		
51b.	What could have caused this change or no change? ( <i>Choose the most important one reason</i> )	Increased restrictions		
		Joint forest protection and management activities		
		Increased access to the forest		
		Others (Specify):		
52a.	What are the levels of illegal activities in forest reserve after the introduction of JFM?	Increased		
		Same		
		Decreased		
52b.	What could be the main reason?			

53.	What have been the noticeable changes among the households after the introduction of JFM?	Increased household income		
		Increased Household assets		
		Increased cash flow		
		No significant changes		
54.	What is the level of your household economic condition after the introduction of JFM?	Improved		
		No Change		
		Worsened		
55a	In your opinion, has JFM project been a success?	No		
		Yes		
55b.	Give reason.			

Appendix 2: Forest Inventory Enumeration Forms

**TRANSECT FORM 1.**

ENUMERATOR:.....

Province:.....	Code Number:.....	
District:.....		Code
Number:.....		
Forest Area:.....		Code
Number:.....		
Information:.....		

Transect	No.:.....
Date:.....	
Altitude (m) .....	Bearing ( °)
.....	
GPS_x (m), E .....	SD (m)
.....	
GPS_y (m), S .....	TD (m)
.....	
Coordinate zone .....	

SD - Single Distance  
 TD - Total Distance

Total number of plot tally sheets:.....

**ENUMERATION FORM 2a**

Sheet. .... / .....

**MAIN PLOT**

Enumerator:.....

Time Start .....

District	
Plot No.:	
Date	
Altitude (m) .....	Bearing ( °) .....
GPS_x (m), E .....	SD (m) .....
GPS_y (m), S .....	TD (m) .....
Land use .....	Intensity of fire .....
Vegetation type .....	Soil type .....
Forest condition .....	Undergrowth type .....
Potential land use .....	Previous treatment .....
Grazing .....	Treatment suggestion .....

No.	Species	DBH (cm)	Use	Bole Character.	Health Status
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

Observations: .....

ENUMERATION FORM 3

**REGENERATION PLOT**

Enumerator: ..... Time End: .....

District .....
Forest Area .....
Date .....
Plot Number .....

No.	Species	Count (n)	DBH (cm)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			