KATANINO JOINT FOREST MANAGEMENT AREA, MASAITI DISTRICT. ZAMBIA: CHALLENGES AND OPPORTUNITIES.

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Declaration

I, Bridget Bwalya, do hereby declare that with the exception of quotes and work of other people, which I have duly referenced and acknowledged herein, this thesis, is the result of my own original research work. This work has not been presented to another university in pursuit of a degree before.

Bridget Bwalya

Ås, May 2007.

Dedication

To my family and friends

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Executive Summary

In 1998 a Forest Policy aimed at including people living close to or involved with the forest resource base as a way of securing sustainable forest management was developed in Zambia. This policy culminated in the enactment of the Forests Act of 1999. Popularly known as the JFM Act, the new Forests Act provides for *inter alia* the inclusion of previously excluded communities in forest management; the sharing of forest revenue between the government and the JFM communities; and the establishment of the Zambia Forestry Commission (ZAFCOM) as the new government agency responsible for overseeing the forestry sector in Zambia. The piloting of JFM commenced in three provinces in 2000. However, by 2006, the new Forests Act was still dormant and the ZAFCOM had still not been established. In light of the above, this study set out to investigate the challenges of and opportunities for Joint Forest Management in Zambia, with special reference to Katanino Joint Forest Management Area. The rationale for the study was to obtain information that would be useful for the government and other stakeholders in the design of JFM policy and the anticipated full implementation of JFM in the country.

The study was conducted through the use of household survey questionnaire, key informant interviews, focus group discussions, field observations, and review of existing literature. The data was analysed using the Sustainable Livelihood Framework; the modified 4Rs Stakeholder Analysis; Ostrom's Design Principles; analytical and descriptive statistics.

The results revealed that members of the local community (anyone living in a 5km radius from the edge of the forest) had livelihood portfolios mostly comprised of crop production. Incomes from crop production (maize, sweet potatoes and cassava) accounted for over 65% of annual total household incomes. This figure came to over 90% when trading was included. The contribution of forest cash incomes to annual total household income was only 4%. This small percentage was attributed to the fact that although 58% of the households reported accessing the forest for mushrooms, wild fruits and tubers, most of them did this only for household consumption, not for sale. Although signs of pilfering were evident, Katanino Forest was still in good condition. As stakeholders in JFM, the Forestry Department and the local community had very unbalanced rights, responsibilities, and returns. Their relationship to each other was reported to have improved though the Forestry Department was perceived

to be paternalistic. Among the local people, their heterogeneity resulted in different associations with each other and the forest. Institutions have been formed to deal with JFM at district, area and village level. Most of these were at time of study, largely non functional and were perceived as such by the local community. A large majority of the local community did not know the rules and regulations pertaining to JFM. Local participation was minimal reportedly because of the lack of immediate benefits for individual and household participants. The availability to households of forest products from open areas meant that participation in the joint forest management of Katanino Local Forest was not linked to access to forest resources. Illegal harvesting of forest products from Katanino Forest means that one can still access the forest resources without contributing the time and effort required for community joint forest management activities.

The main challenges of JFM in the area as revealed by the study were weak local institutions; the non promulgation of the New Forests Act; and the Forest Department's general lack of resources which made it difficult for District Forestry personnel to visit the JFM local community. Other challenges were low participation in JFM activities by women; loss of interest in JFM activities by the general community due to a perceived lack of immediate benefit for individuals or households; low education status and capacity among the local people; a lack of political will; and lack of interest in forestry issues by the nation at large. Both local communities and foresters seemed to have lost the initial interest and expectations they had in JFM. The non-establishment of the Zambia Forestry Commission has stalled even the most promising of JFM projects.

The immediate commencement of the new Forests Act would at least provide an opportunity for stakeholders to experiment with and adapt JFM to suit their local conditions. In the planned implementation of JFM in Zambia, stakeholders would do well to take a closer look at the compositions and functioning of the Forest Management, and the Village Resource Management Committees. In their current state, these committees do not seem to have the capacity for full scale JFM. Also, the rationale for JFM for local communities should be based more on the benefit of having a sustainably managed forest than the revenue expected to be derived from these forests.

List of Acronyms

CBFM	Community Based Forest Management
CPR	Common Pool Resource
DANIDA	Danish International Development Agency
FAO	Food and Agricultural Organisation
FD	Forestry Department
FMC	Forest Management Committee
GRZ	Government of the Republic of Zambia
JFM	Joint Forest management
JFMA	Joint Forest Management Area
KJFMA	Katanino Joint Forest Management Area
NGO	Non Governmental Organisation
NORAD	Norwegian Development Agency
NTFP	Non Timber Forest Products
NWFP	Non Wood Forest Products
PFAP	Provincial Forestry Action Plan
PFM	Participatory Forest Management
VRMC	Village Resource Management Committee
ZAFCOM	Zambia Forestry Commission
ZAFFICO	Zambia Forestry and Forest Industries Corporation
ZFAP	Zambia Forest Action Plan

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CHAPTER ONE

1 BACKGROUND

Conservation policy in Africa and in general is nowadays about involving local people in the management of natural resources in their localities. This approach is now dominating after the hitherto hegemonic "fortress conservation narrative" lost ground to the voice advocating the inclusion of communities in natural resource management (Adams & Hulme, 2001) though it is being resurrected with the call to go "back to the barriers" (Hutton et al 2005).

Zambia has not been exempted from the effects of such narratives and counter-narratives of natural resource management. Before independence in 1964, the British colonial administration created 'fortresses' by gazetting areas as protected. These included areas set aside both as national parks and as national forests. After independence, the Government of the new Republic of Zambia continued with the colonial policies of resource management with rather minor and superficial changes in line with the then dominant discourse of excluding people from using natural resources found in areas classified as protected. Gibson (1999) argues that this happened because there was very little political cost to the government and the ruling party in breaking pre -independence campaign promises of allowing people to access natural resources from protected areas and ignoring citizens' demands. This was because of rules that espoused party discipline for parliamentarians (which discouraged Members of Parliament from speaking against their party's unpopular policies) and party identification for the electorate. Members of parliament were voted for based on which party they represented as opposed to their stand on specific issues so there was no political gain in taking strong positions against draconian common pool resource management policies.

With approximately 40% of Zambia's land area covered by forests and about 9% of it (approximately 6.7 million hectares) designated as protected forest areas, the daunting task of policing this large expanse fell to the Forestry Department. Shortages of manpower; lack of resources for law enforcement inside protected forest areas; increasing pressure from a growing population; commercial export production and a changing political environment all combined to effect the failure of this forest management approach. The resulting forest degradation and deforestation (encroachment levels of 55% and 39% in local forests and national forests respectively) prompted the government to prepare the Zambia Forest Action

Plan (ZFAP) and review the forestry legislation to address this problem. This review led to the Forest Policy of 1998 and the concomitant Forest Act of 1999.

The new policy (The Forest Act, 1999) provides for *inter alia,* the participation of local communities, traditional institutions, non-governmental organisations and other stakeholders in sustainable forest management. The Forestry Policy of 1998 advocates for participatory Joint Forest Management in which the local communities collaborate with Government agencies and the private sector in the protection, management and utilisation of forest resources (GRZ, 1999).

The development of Joint Forest Management (JFM) in Zambia is still in its infancy but experience so far indicates that it can really improve people's lives in rural areas (GRZ, 1999). The Government of Zambia has established Joint Forest Management Guidelines to be used as the blueprint in setting up joint forest management areas in the country. According to these guidelines, JFM can only be set up in a customary area or a local forest (which is state land) but cannot be set up in a National Forest or a National Park. If local communities want to start JFM in a National Forest, the area must first be reclassified as a local forest. Local Forests cover only 2.8% of the country at present and are intended to be for local use. The land ownership status of an area does not change when it becomes a JFM area (it remains state land or customary land).

Local communities (spatially defined groups of people with common interests, values and shared expectations)[1]; a group of individuals; a non-governmental organisation; or the Forestry Department can start the JFM process. However, the 'Criteria for Selecting a Forest for JFM' must be confirmed before proceeding: viz

- The community is interested in keeping the area **as a forest** and **not for agriculture**.
- If there are **settlements or fields** in the forest, the community and the local chief are willing to discuss the issue of JFM.
- The **community** agrees where the boundaries of the forest are.
- The local Chief supports the idea of JFM in his area

[1] This definition of local communities has increasingly come under attack for assuming that rural community members have common interests, values and expectations. Many scholars have argued that rural areas are made up of individuals and households with diverse and conflicting interests and aspirations; have access to and control over different types of capital and power.

In a JFM area, the money collected from forest products is to be shared between the Forest Management Committee of that joint forest management area and the Government. The Forest Management Committee of a JFMA must have at least:

- Someone representing the local Chief(s)
- Someone representing the Forestry Department
- Someone representing the District Council
- Someone from each Village Resource Management Committee.

The FMC is there to ensure that the forest is properly managed and developed, and that the forest benefits are properly shared in the local community (Forestry Department, 2005).

1.1 Problem Statement

Joint Forest Management is a relatively new concept in Zambia. It was only in 1998 that the New Forest Policy provided a mechanism for the enhancement of participation of local communities and other stakeholders (GRZ, 2002: 39). Before this, the government's approach towards forest management was that of exclusion and fines. The Forestry Department policed the forests while local communities were excluded from forest management and the usual contact between foresters and communities was mostly the foresters inspecting whether rules had been broken and fining offenders. Relationships between the two were characterized by mutual suspicion and antagonism. Attitudes of both parties towards each other therefore need to be changed if cooperation necessary in joint forest management is to be actualized. Despite large tracts of land being under forest (over 40%), as mentioned before only 2.8% are designated as local forests at present. The larger proportion is covered by National Forests, which are still excluded as areas for JFM. The Government, through the Forestry Department is therefore, still solely managing and controlling the bulk of the country's forests despite the "community participation" rhetoric. The processes of making a local forest into a joint forest management area are clearly laid out in the guidelines drawn up by government, but the experiences of the different stakeholders have not been widely documented. There is very limited literature on JFM in the Zambian context, as it has not yet become the dominant approach to forest management. Joint Forest Management is being piloted based on the Forest Policy of 1998, the Forests Act of 1999, and the Local Forests (Control and Management) Regulations, Statutory Instrument No. 52 of 1999, all of which *pre-date* the commencement of pilot JFM activities in Zambia (Jere, 2005). This means that the piloting of JFM in Zambia

commenced solely based on the experiences of other countries and regions. It is inevitable that the experience would be fraught with numerous challenges. It is therefore important to investigate the challenges and opportunities of JFM experienced in the few areas where it has been implemented with a view to seizing the opportunities and strategizing on how to overcome the challenges, not only in the study area but in other areas where JFM is being planned or has already been implemented.

1.2 Aim

To examine the challenges of and opportunities for joint forest management in Katanino Joint Forest Management Area and infer implications for Joint Forest Management in Zambia in general.

1.3 Specific Objectives and Research Questions

The specific objectives and the guiding research questions of the study were to:

1. Assess the present livelihoods and dependence on forest resources by different groups of people living in the villages involved in the joint management of Katanino Forest.

    (i) What are the general livelihood strategies and diversification patterns of community members of KJFMA?

    (ii) To what extent are villages and households of KJFMA dependent on forest resources from Katanino Forest?

    (iii) What kind of direct and indirect benefits and costs do the communities accrue from the forest?

    (iv) How do livelihood strategies and forest dependence vary between and within local communities according to both household internal factors (wealth, income, sex of household head) and household external factors (such as population density, economic and legal institutional frameworks, natural vagaries etc)?

2. Ascertain the various rights, returns, relationships and responsibilities among the stakeholders in Katanino Joint Forest Management Area (KJFMA).

   (i) What are the formal and informal rights of all the stakeholders (forestry department, villages, local municipality etc) over forest resources in KJFMA?
   (ii) What returns (goods and services) do all the stakeholders of KJFMA get from Katanino Forest?
   (iii) What are the relationships (economic, legal, socio-cultural) of stakeholders to each other and to the forest?
   (iv) What are the responsibilities (access to power, rights, authority, duties) of all the stakeholders?

3. Assess the levels of knowledge and perceptions about the JFM among the stakeholders
   (i) What are the attitudes and perceptions of the stakeholders towards the rules, responsibilities, rights, returns and regulations of Joint Forest Management?
   (ii) What do the stakeholders perceive to be the main constraints to effective management of KJFMA?
   (iii) What are the levels of knowledge on JFM among the stakeholders in the study area?

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4. Examine the effectiveness of the local institutions in the villages that are part of KJFM

   (i) What kind of management rules do the local communities have? Do they have specific rules related to management of the forest?
   (ii) How do the actors in committees and other institutions come into position? Are they elected?
   (iii) What powers and responsibilities have been devolved to the communities by Forestry Department as a result of JFM?
   (iv) What institutions have been created in the villages as a result of JFM? How do these new institutions relate with the old institutions?
   (iv) Are the local institutions downwardly or upwardly accountable?

1.4 Justification of Study

This study was significant not only for this current project in Katanino, but also for other projects involving joint management of natural resources by the state with local communities, such as Community Based Natural Resources Management centred on wildlife, fisheries, water, etc. The research findings should prove useful for policymakers and aid in Joint Forest Management related policy formulation at national level (e.g. the proposed repelling of the Forest Act of 1999 once it has been brought into effect). Both the Forestry Department and local communities could also use the results of this study as it has drawn on the experiences and knowledge of several stakeholders. The findings from this study will hopefully also be useful in the expansion of JFM in Zambia and other areas where JFM is implemented.

CHAPTER TWO

2 THEORIES AND LITERATURE REVIEW

2.1 Definition of Joint Forest Management

Joint Forest Management (JFM) is a concept that involves the development of partnerships between forest user groups and the Forest Department (FD) or its equivalent on the basis of mutual trust and jointly defined roles and responsibilities with regard to forest protection and development (TERI, 2001). It is a collaborative management approach, which divides both forest management responsibility and returns between government (local or central) and forest adjacent communities (Bromley and Ramadhani, 2006). In JFM, the user (local communities) and the owner (Government) manage the resource and share the cost equally (TERI, 2001). Though the term 'JFM ' has been supplanted with buzz terms like ' community based forestry management; participatory forestry management; collaborative forestry management, community forestry etc, some authors have argued against this interchange of terms contending that JFM always involves the joint management of forest resources between forest adjacent communities and government with sharing of costs and benefits, whereas the other terms cover a continuum of arrangements from communities managing village forests with powers to make decisions unilaterally to governments inviting communities to take part in some aspect of forest management in protected area with little or no decision making powers. For example in Tanzania JFM is defined as

> A collaborative management approach, which divides forest management responsibility and returns between government (either central or local) and forest adjacent communities. It takes place, on land reserved for forest management such as National Forest Reserves and Local Government Forest Reserves (Bromley and Ramadhani, 2006: 94).

Community Based Forest Management (CBFM) is reserved for village councils managing forests on village land (land surveyed and registered under the provisions of the Village Land Act of 1999). Under CBFM, villagers gain full ownership and management responsibility for an area of forest within their jurisdiction and declared by village and district government as a Village Forest Reserve. Villagers have the right to harvest timber and forest products, collect and retain forest royalties, undertake patrols and are exempted from local government taxes on forest products and are not obliged to remit any part of their royalties to either central or

local government (Bromley and Ramadhani, 2006). This is different from what has been proposed in Zambia where there is to be sharing of revenue from forest products between government and local communities even on revenue earned from forests that are on open lands, which are traditionally under the custodianship of chiefs[2] as long as the land is in a JFM area (Forestry Department, 2005).

According to the Zambian government JFM '*means the participation of stakeholders in the sustainable management of forest resources and the sharing of benefits derived therefrom'* JFM can only take place in an area declared by the Minister responsible for forests as a joint forest management area.

> The Minister may, on the recommendation of the Commission, local community or owners or occupiers of an area in a forest, declare by statutory instrument any local forest, forest plantation or open area, a Joint Forest Management Area (GRZ, 1999).

The forest legislation in Zambia only refers to JFM and has not made any distinction between JFM and Community Based Forest Management, as is the case in Tanzania. Though the need for this distinction has been pointed out by many sources, the proposal has not yet been accepted by the Forestry Department (PFAP, 2005).

An International workshop on Community Forestry in Africa held in the Gambia in 1999 defined community forestry as 'an alternative to the classic, authoritarian and centralist policies of natural resources management; an effective opportunity for the alternative management of conflicts liked to natural resources management; an appropriate means for the rational and sustainable management of natural resources; a tool for decentralised natural resources management and promotion of local development which aims at promoting the transfer of skills in natural resources management from the state and local and regional authorities to the population at the grassroots and at promoting the access of the population to the benefits from the exploitation of natural resources'. It also called on governments to channel sufficient resources into JFM as a sign of commitment as opposed to the prevailing rhetoric.

[2] In Zambia all land is vested in the republican president who holds it on behalf of the people of Zambia. It falls under two categories: state land and customary land. State land includes private land, urban settlements, agricultural land and reserves. Customary land is for human settlement and agriculture, and is under the jurisdiction of chiefs and headmen. Open lands are under customary land and used in accordance with customary practices.

Joint Forest Management has also been said to be the contractually-determined sharing of products, responsibilities, control and decision-making authority over forest lands between Forest Departments and local user groups (www.odi.org.uk)

> JFM is slowly emerging into a form of sustainable forestry, which augments the forestry regime with processes for rapid adaptation to changes in what people need, want, and can do. As an adaptive social process it is striving to create sufficient future forest production opportunity to satisfy potentially competitive/conflicting interests that would diminish the forest if left unresolved (TERI, 2001).

Clearly, it is difficult to generalize the JFM concept and approach in light of the variations with respect to geography, resource base, socio-economic status, cultural diversity and pressures on forests. In this study, the operational definition for JFM is simply the management of any type of forest by the government and communities residing in or adjacent to the forest.

2.2 Rationale for Joint Forest Management

There is some empirical evidence supporting the hypothesis that forest resources are managed more efficiently and in a more sustainable way under JFM than under central management. In an excellent empirical study of such programmes, Edmonds (2002, cited in Datta, 2004) tested the robustness of relatively lower mean levels of resource extraction in Nepalese forests managed by "Forest User Groups" compared to areas managed purely by the central government. Using several different estimation techniques, he finds that the difference is indeed robust, supporting the view that Nepalese JFM is more efficient in managing and preserving forest resources than the central government. Some studies conducted in India reported positive outcomes of increased yields of both timber and Non Timber Forest Products (NTFPs) across some regions in India under JFM (TERI, 2000). Although empirical evidence is scanty and long term ecological monitoring very limited, JFM on Tanzania's reserved forest lands appears to be contributing to sustainable forest management through reported increases in game and wildlife numbers/diversity; reduction in encroachment agricultural land into forest areas; increasing signs of natural regeneration in degraded areas; reduced incidences of fire, and reduced village revenue from fines, due to reduction in illegal activities (Bromley and Ramadhani, 2006).

While the details of JFM vary considerably from place to place, a common characteristic is that local communities often receive somewhat greater property rights, responsibilities and influence over local natural resources than under the preceding regimes. Communities are able to access and control forest resources, and even exclude others from using the forests that hitherto, they were also excluded from. The property regime moves from the *de facto* open access under state management to common property regime under JFM. Some evaluators have gone so far as to say that JFM is a creative and potentially optimal arrangement combining the separate strengths inherent in property regimes of private ownership, direct state control, and communal property so as to help sustain this important natural resource base (Baland and Platteau, 1996 cited in Datta, 2001). As examples from India and Nepal have shown, JFM (or Community Forestry as it is called in Nepal) can increase participation of rural households in decision making and benefits related to environmental resources (Agrawal and Gupta, 2005).

Mckean has shown that individual private property rights often fail to provide the best premise for effective forest management. This, she argued, is because privatisation of forests often leads to forest fragmentation, which negatively impacts upon the proper functioning of the forest ecosystem. She proposed that forests are better suited for management under common property regimes where forests are more likely to be maintained in larger sizes. Such systems are also more efficiently administered (2000 cited in Pacheco *et al*. 2004).

Social, economic, and ecological advantages and impacts of JFM reported include:

- Increased availability of fuel and fodder within few years of JFM being taken up.
- Reduction in incidences of smuggling, fire, and grazing as the proximity of local people to the resource ensured good husbandry practices.
- Generation of adequate employment and reduced rural to urban migration.
- Improvement in natural regeneration of forests and better conservation of biodiversity.
- Increase in water table due to execution of soil and moisture conservation works.
- Increase in Non-Timber Forest Products (NTFP). It creates more income for the local community from the collection of products from the forest such as soap nut, custard apples, etc.
- Those impacted by the management of the resources are involved in the increase in income and, hence, gain a feeling of accomplishment.

- Adequate resources can flow to the community.
- Introduces checks and balances in state services.
- Increases development possibilities (local participation, decentralization, and subsidiarity) (Brown *et al*. 2002)

JFM can have a large effect on the alleviation of poverty if the community is able to maintain control of its resource and if the following conditions are applied: full and enforced legal protection; community leverage to obtain and maintain ownership; adequate organizational skills; and access to finance for the community (Brown & Schreckenberg, 2001). In addition, since the majority of people living around such forest areas are poor and vulnerable populations, their participation will benefit them both socially and economically; socially by education and economically by contracting and establishing agreements with the government (World Bank, 1995).

From a purely ecological standpoint, JFM has the ability to increase vegetative cover and soil moisture, decrease goat and cattle grazing, and increase agricultural yields due to water augmentation strategies (Matta et al. 2005). In regions with largely expanding populations it is necessary with joint management approach to be able to preserve the resources both for their own livelihood and for future generations (World Bank, 1995). JFM has been reported to not only promote quality of life for the rural poor, but to reduce forest degradation. Nevertheless, evidence has not been conclusive as the experience of JFM seems to have varied from place to place, allegedly depending on institutional and other characteristics (Kumar, 2002 cited in Datta, *et al*. 2001).

2.3 Constraints of Joint Forest Management

Joint forest management has many possibilities for resource conservation, but there are also many constraints that need to be addressed. Issues such as rent seeking, state dominance, unbalanced power relations, lack of accountability, and information asymmetry are amongst the many concerns (Behera and Engel, 2005). Frank (2005) points out that the policy framework does not necessarily solve problems and can in many cases lead to complex socio-political dynamics and different sets of conflict. Amongst the many challenges of policy are: stakeholder differences in valuing resources; poor institutional arrangements; emergence of the local elite; misuse of power; devolution; and the forestry bureaucracy itself. Forestry

administrations in many countries have been implementing state centred forest management for a long time resulting in highly centralised bureaucratic agencies with officers trained to keep people out of forests using military type controls and stiff imposition of rather harsh regulatory measures. Under the new paradigm of including communities in forest management, without any visible reorientation in structure and processes, these same forest agencies are expected to embrace community participation and the culture of mutual understanding and cooperative relationships requisite in community based forest management (Kumar and Kant, 2005). Brown *et al* (2002) agree with this assertion and add that forestry officials have a tendency to attempt to retain control over the resource, which often leads to poor distribution.

> In the name of promoting 'people's participation', village forests joint management being introduced in Uttarakhand is creating space for the Forest Department to intrude on the only existing examples of reasonably autonomous legal space for community forest management in India. …The Uttarakhand Village Forests Joint Management Rules, 1997 enable the department to become the dominant partner in the management of *Van Panchayat*(elected forest councils) and civil forestlands. The decision making autonomy of *Van Panchayats* participating in village joint forest management is now 'subject to the supervision, direction, control and concurrence of the Divisional Forest Officer' (Sarin, 2001).

Brown *et al* (2001) present some additional political constraints:

- Public controls of forest exploitation are still needed;
- Increased security of community tenurial rights is required;
- Significant proportion of forest products' economic values needs to be captured at the local level;
- Communities will only manage their forests if it is in their best interest;
- Communities may not have the capacity to take control of harvesting and processing and may, therefore, still be at the mercy of the forest officers;
- Need to maintain external support until the community becomes self-sufficient;
- Lack of interdepartmental coordination;
- Institutional and policy inconsistencies;
- Top-down management style**.**

In terms of social sustainability in joint forest management, it is clear that there are some differences in the motivation of various stakeholders for initiating such a project. For

example, in many previous cases of failing JFM projects there was a decline in villager interest (Matta *et al*. 2005). Decreasing villager interest may be due to decreased productivity, long gestation periods or uncertainty of the enterprise (hard to visualize the long term benefits)[3]. Different types of conflicts also arise among different types of community members. Contrary to donor notions, communities are highly differentiated socially and economically, and if differences among groups are not well understood and accounted for, conflicts that are difficult to heal surface. Common categories of conflict and contestation include the tendency for the rural elites to hijack benefits through an array of ingenious devices; tensions between traditional authorities and new democratic institutions; conflicts between individuals within the community with entrepreneurial inclinations and members of a collectively organized group; spiritual leaders whose roles are ignored in projects and gender conflicts (Fabricius *et al*. 2004).

Other constraints of JFM are related to community resource management and come about mainly in two ways. Firstly, problems come about when rules for the use and management of forests are set in the community. Who sets the rules for access and management of forests within the community? Do these rules effectively tackle issues of equity and efficiency? The second set of problems linked to community resource management arises from the monitoring and enforcement of rules in the community. Are the rules effectively monitored and enforced? (Behera, 2003).

According to Brown and Schreckenberg (2001) trees come with their own "logistical problems", which need to be taken into consideration when developing a JFM project. These may seem to be superficial problems in relation to the above issues, but they have the ability to greatly hinder any JFM project when not appropriately addressed. These concerns are as follows: They are bulky and indivisible; They compete for space with other resources; They require expert tending over long periods; Harvesting can be capital-intensive; They offer different returns to different people; Rights of them are often insecure; They engage the interest of powerful stakeholders; they attract predators and crop raiding animals.

[3] For example in Tanzania, most early participatory forest management took place on very degraded land (and communities were involved as a last resort rather than a preferred strategy) where potential incentives, returns, and incomes were very minimal in the early stages. With the high poverty levels pervasive in many communities, long term environmental rehabilitation was a cost they could not afford (Bromley and Ramadhani, 2006).

Forests also have many characteristics that make simple policy solutions unworkable. The lack of affordable exclusion mechanisms makes policy making and enforcement a big challenge. Forests also have externalities that are hard to control; generate products that not only mature at different times but that may be managed using consumptive or non consumptive approaches; and can possess attributes of common-pool, private or public goods; and all this while providing services at local, regional or national levels (Pacheco *et al*.2004).

2.4 Recipes for Successful Joint Forest Management

Participatory management requires a complex outline and a strong commitment from the government, various groups of middlemen, and the local people. To be able to manage a project such as this (JFM project), thorough preparation is needed. For example, one needs to survey the knowledge of the different actors. The local people have been utilizing the accessible resources for generations and know how nature acts upon them, therefore, the local community should be regarded and considered highly when ascertaining initial information on that community. Also, researchers from other regions and JFM projects have much experience to offer that could prove to be useful for current projects and should be consulted. All stakeholders need to feel able to communicate and share their ideas and knowledge in order to realize the best possible result (World Bank, 1995).

Malleson (2001) proposes that a number of things need to be done in order to effectively institute a JFM project such as: access to rights and revenue sharing for wildlife and logging needs to be regulated; the local value of NTFPs needs to be increased; and selective logging should be done for commercially important forest products. In addition, conflict resolution should be undertaken between forest users and regulatory systems to ensure that these issues are upheld.

It is also important to note that in order for JFM to be successful, care needs to be taken in increasing public participation and acceptance. All interest groups need to be properly represented and relationships need to be built between government agencies and the public (Matta *et al*. 2005). In order to realize this there needs to be a clear commitment by government for external long term input and support (Brown and Schreckenberg , 2001).

Ostrom proposes what she calls "*Eight Design Principles for Enduring Common Pool Resources"* for describing, explaining and prescribing systems for management of common pool resources, which invariably includes forests (1990 in Vedeld, 2002). A Common-Pool Resource (CPR) is a natural or manmade resource system that is large enough to make it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. The use of the resource by individuals can lead to depletion of the number and quality of benefits the resource can provide. Common pool resources should be differentiated from common property regimes, which are a system of rules, rights and duties that govern the ways in which group members relate to the commons and to one another, whereas common pool resources are as already defined above.

Access to a common pool resource can be limited to a single individual, a firm or to groups of individuals who use the resource system (but not the resource units) at the same time. Though the actual process of withdrawing resource units from the CPR can be undertaken by many people simultaneously or sequentially, the resource units themselves are not subject to joint use. The fish harvested by one boat are not there for someone else. Failure to distinguish between the subtractability of the resource units and the jointness of the resource system has in the past contributed to confusion concerning the relationship of CPRs to public or collective goods (Ostrom, 1990; Ostrom, 2000 cited in Johnson, 2004).

There is a general agreement in literature related to management of Common Pool Resources that communities living close to these resources will only have incentives to manage them sustainably if and when it is beneficial for them to do this through the reaping of long term benefits of conservation and restraint. Individuals compare expected benefits and costs of action prior to action. It is contended that common property gives this assurance by restricting otherwise open access resources to a group that agrees to abide by rules regulating membership and resource utilisation. Framed in this way, environmental problems were understood to be a dilemma of collective action in which individuals depleted resources because they lacked information about the resource system; information about those with whom they share the resource; and rules that would regulate the ways in which they used the resource (Baland and Platteau, 1996; Bromley et al., 1992; Ostrom, 1990; Uphoff et al., 1990; Wade, 1988 cited in Johnson, 2004).

Table 2. 1: Ostrom's Eight Design Principles for Enduring Common Pool Resources

Success Principles	Description
1a. Clearly defined physical boundaries	Clear relative to neighbours or competing uses
1b. Clearly defined membership and rights	Multilayered rights systems and may include the right to physical access to the area, the right to withdraw resources, to manage or decide on use, to exclude others and to alienate others through sales or leasing
2.Congruence between appropriation[4] and provision rules and local conditions	Should be a reasonable balance between what individuals contribute and what they take out
3.Collective choice arrangements	Most of affected people can participate in decision making
4. Effective monitoring procedures	Those who monitor and audit Common Pool Resources (CPR) conditions are accountable
5. Legitimate system for graduated sanctions	There are rules against violation. Sanction depends on the offence. It should be assessed and imposed by fellow users or accountable officials.
6. Cheap/ accessible conflict-resolution mechanisms.	Conflict resolution should be swift, inexpensive and fair.
7. Recognition of rights to organise	No challenge by external government authorities; if they come in and overrule local decisions, local authority is undermined.
8. Nested Enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organised in multiple layers of nested enterprises.

(Vedeld, 2002:18, Ostrom 1997: 7)

[4] Ostrom uses this term for the process of withdrawing resource units from a system, and appropriators for those who withdraw such units. They can be herders, fishers, irrigators, commuters or anyone who appropriates resource units from some type of resource system. Resource unit is what is taken from resource system (1990).

Ostrom continues;

> In all cases in which individuals have organised themselves to solve CPR problems, rules have been established by the appropriators that have severely constrained the authorised actions available to them. Such rules specify, for example, how many resource units an individual can appropriate, when, where, and how they can be appropriated, and the amounts of labour, materials, or money that must be contributed to various provisioning activities. If everyone or almost everyone follows these rules, resource units will be allocated more predictably and efficiently, conflict levels will be reduced, and the resource system itself will be maintained over time (1990:43).

However, not everyone is as optimistic about the potential of collective action to maintain CPR. Scoones (1999 cited in Johnson) criticizes Ostrom and other new institutionists[5] for failing to address the complexity, uncertainty and dynamic qualities that underlie ecological processes and environmental change. He argues that institutional approaches to collective action and conservation of CPRs tend towards a 'balance of nature', in which ecological processes and institutional processes are assumed to approach a state of equilibrium. Drawing upon theories of non-linearity, uncertainty and chaos, he argues that 'new ecological' approaches have demonstrated the limitations of the equilibrium model, concluding that interdisciplinary approaches may help scholars to transcend the 'balance of nature view that has dominated both academic and policy discussions in the past (2004:419-420).

Prakash (1998) argues that the collective action school has circumvented the implications of internal differentiation (e.g. the plurality of beliefs, norms and interests); the effects of complex variations in culture and society; as well as social, political and economic conflict relating to the commons. He goes on to say that the policy analysts may end up reifying concepts, models and strategies through their abstraction from the complexities of field settings (cited in Johnson, 2004). In the same vein Mosse (1997 cited in Johnson, 2004) contends that common pool resource management 'cannot (as is often the case) be isolated from context and viewed as a distinctive type of economic activity'.

Though a strong proponent of collective action, Ostrom is not blind to its limitations. She elucidates that collective action problems related to the provision of CPRs and appropriation from CPRs extend over time as individuals give less value to future benefits compared to

[5] This is the term used for scholars from the school of thought that rules that govern access to CPRs encourage collective action to conserve.

immediate benefits i.e. individuals discount future benefits. The discount rate that an individual uses for any stream of future benefits depends on many factors. This may include whether or not their children are expected to be present in future to reap the benefits and opportunity costs. The discount rate applied to future benefits from a particular CPR may differ greatly across various types of appropriators. Norms of behaviour also affect the way alternatives are perceived and weighed. However in every group there will be individuals who will ignore norms and act opportunistically when given a chance. There are also situations in which the potential benefits will be high enough to make even the most committed individuals to break norms. In some instances, rampant opportunistic behaviour severely limits what can be done jointly without huge investments in monitoring and sanctioning mechanisms (1990:34-36).

Some authors have argued that group homogeneity is also a feature of successful JFM. Datta *et al* (2004) contend that with group homogeneity, JFM could result in a more efficient outcome both in terms of the sustainability of natural resources and income distribution. They explain that shared institutions at the community level minimise moral hazard and adverse selection thereby serving as an important element in the stability of JFM. Homogeneous groups are more likely to have shared common goals and values related to subsistence harvest amounts, enforcement mechanisms and the distribution of benefits. Heterogeneity on the other hand, can undermine these mechanisms and shared norms (Baland and Blatteau, 1997 cited in Datta *et al*. 2004).

Varughese and Ostrom (2001) have however shown with respect to the Nepalese case that even though heterogeneity does make collective action difficult it does not *a priori* eliminate effective local collective action when user groups are able to create rules that account for such heterogeneities (cited in Datta *et al*. 2004).

Another feature of successful JFM is the level of dependence on the resource base of the user groups, according to Kant (2000); Kant and Berry (1998); Cardenas (2003) in Datta *et al*. 2004. Groups highly dependent on Non Timber Forest Products, for example, are likely to have strong incentives to cooperate with government or whichever other entity is involved in managing the forest to achieve and maintain an 'optimal' harvest level.

The particular incentive mechanisms selected by the State can also be cardinal to the success of JFM. Given that a particular forest area is held by the State, the Central Government must decide on the degree of new local ownership or management, and a particular means for rewarding time spent by community members in cooperation and the enforcement of JFM rules of protection (Datta *et al*. 2004: 6-7).

2.5 The Stakeholder Analysis

The Stakeholder Analysis is 'an approach and procedure for gaining an understanding of a system by means of identifying the key actors or stakeholders in the system, and assessing their respective interests in that system' (Grimble and Chan, 1995 cited in Leach and Fairhead, 2001:229). While being a powerful tool for analysing and formulating policies, it has proved particularly useful in natural resources management policy and programme development (Vedeld, 2005).

Grimble and Chan define stakeholders as 'groups of people with common objectives and sets of interests with regard to the resource in question and the environment who are either materially affected by, or can materially affect developments designed to bring about a particular transformation; they can be individuals, communities, social groups or institutions of any size including sections of government, business, and NGOs' (1995 cited in Leach and Fairhead, 2001: 229). The stake could come from a mandate made by an institution; proximity to the resource; dependence on the resource for livelihood; economic interest, and historical associations with the resource (Woodcock, 2002 cited in Vedeld, 2005). Apart from local residents and resource users, other social actors may have an interest in natural resource management. These may be government agencies tasked with managing many resources (fisheries, forests, agriculture); administrative authorities dealing with natural resources as part of their broader mandate; environmental research institutions and NGOs; and local businesses and industries that can be significantly affected by the status of the natural resources in the area. However not all stakeholders are equally interested in a resource, and therefore do not have equal entitlement to roles in resource management (Woodcock, 2002).

The Stakeholder Analysis is no longer as it was when first developed by business management scientists. After receiving a lot of criticism for *inter alia* being narrow; only giving a snapshot of the range of people and groups concerned with a given resource issue; it

has been broadened and deepened to do more than just present a list of names of stakeholders and their supposed interests. An adaptation of the Stakeholder Analysis which tries to give more operational clarity to stakeholders' relative roles and capacities and a deeper socio-cultural analysis is the 'Four R (4R) approach' by Dubois, 1997. This approach defines stakeholders by their respective **r**ights, **r**esponsibilities, **r**eturns from a given resource, and **r**elationships (Leach and Fairhead, 2001: Vedeld, 2005).

2.5.1 The 4Rs

Rights

A right is a recognised social institution by which one actor has a disposition right over a certain resource or a vector from a resource. The individual that holds the right can stop others from accessing, using, withdrawing or managing of the resource. He may also be able to dispose of the resource if he so desires. In natural resources management, various types of property and usufruct rights exist, sometimes simultaneously, but legitimised by different institutions. Rights can be weak or strong. Four types of property rights are commonly distinguished: private, common, state and open access. Two physical characteristics of a particular natural resource play a big role in determining which type of property right exists- excludability and rivalry in consumption. Excludability is the ability of an individual or group to prevent others from accessing a resource. If an individual's consumption of a resource reduces the possible access to that same resource of another, then there is rivalry in consumption. Resources where there are high levels of rivalry in consumption are likely to be managed as private if it is possible to exclude others and exclusion costs are not prohibitive.

The focus of the 4Rs approach on rights is important as it brings to the fore the significance of tenure issues in shaping people's differentiated concerns with and capacities to manage land and trees (Vedeld, 2005).

Responsibilities

These are the duties of the rights holding stakeholders towards the resource. They emerge from a combination of power, rights, necessary competence, and economic interest. In natural resources management, overall distribution of responsibility is usually between the state and the local communities living close to the resource (Vedeld, 2005).

Relationships

Two types of relationships are analysed in Stakeholder Analysis: (i) the relationship of the stakeholders to the resource in question (ii) the relationships among stakeholders relative to the resource. Different stakeholders relate to various resources differently depending not only on the type of the resource but also historical systems of access and resource use, socio-cultural issues etc. People living adjacent to forests have a relationship with forests borne from experience and history (typified by tacit knowledge and skills based competence). The relationship may also be one of identity (e.g. the forest people) with high levels of use of forest resources.

The relationships among stakeholders involve issues of rights and responsibilities among them with regard to tenure regimes. These relationships may be harmonious or conflict ridden. Conflicts occur when stakeholders are competing for scarce resources; there are ambiguities over who has what rights over the resource; severe imbalances among stakeholders between appropriation and provision; ineffective mechanisms for monitoring and conflict resolution; nested systems of authority where different agents with various interests (including outsiders) try to not only access but control the resource; and when there are disagreements among groups (Ayling and Kelly, 1997: Ostrom, 1990:Bromley,1989:Dubois, 1997 cited in Vedeld, 2005).

Returns

These are the goods and services stakeholders can get from a resource. The return can be material (e.g. herbs from a forest) or non-material (a quiet place where one can commune with nature). The type, quantity and frequency of returns a stakeholder can obtain from a resource depend on the type and magnitude of power that he has[6].

While a variety of approaches exist for identifying the four Rs for the stakeholders of a particular resource issue, determining who the stakeholders are is very complex and can be very contentious. The set of stakeholders can change depending on the criteria used. Borrinists-Feyerabend (1996) proposed possible criteria for defining stakeholders (Box 2.1)

[6] Typology of power : (i) power over; (ii) power to ;(iii) power with ;(iv) power from within

An inescapable fact of live is that stakeholders have many and often conflicting interests, even within a household. These different interests can be spatial or temporal. All this contributes to making the defining of stakeholders a major challenge (Vedeld, 2005).

Box 2.1 Possible Criteria for Defining Stakeholders

- Existing rights to land or natural resource
- Degree of effort and interest in management
- Degree of economic and social reliance on such resources.
- Losses and damages incurred in the management process
- Present or potential impact of the activities of the stakeholder on the resource base
- Compatibility of the interests and activities of the stakeholder with national conservation and development policies.
- Continuity of relationship (e.g. residents versus visitors/tourists)
- Equity in access to the resources and the distribution of benefits from their use
- Relationships between actors relative to the resource.
- Unique knowledge and skills for the management of the resources at stake.

(After Borrini-Feyerabend, 1996 in Woodcock, 2002:19)

Stakeholders may also be categorised as primary, when they have a high degree of interest or stake, and secondary, when the degree of interest or their stakes are lower than those classified as primary stakeholders. Borrini-Feyerabend contends that in collaborative management processes, primary stakeholders would assume an active role, possibly involving decision making while secondary stakeholders would be involved in a less important way (cited in Woodcock, 2002).

2.5.2 Limitations of the Stakeholder Analysis

(i) The traditional approach has a rationalistic and reductionist approach to social phenomena. The definitions of stakeholders and returns, rights, responsibilities and relationships often become simplistic and do not cater for the complex realities and local heterogeneity that features socio-cultural analysis of the same issues.

(ii) It is 'relatively unconcerned about the longer term dynamics of ecological and social systems'. There may be a lack of focus on how peoples' adaptations affect the ecological resource over time

(iii) It gives a static picture of the range of people and groups concerned with a given resource issue that assumes that interests are clear and pre-formed.

(iv) It does not attempt to address the social relationships amongst stakeholders or the power relations that shape how certain perspectives come to prevail.

(v) It does not address the relative capacities of different stakeholders to be involved in management, as shaped by their social or institutional positions.

Usefulness of the Stakeholder Analysis

(i) It provides a useful 'snapshot' of the range of people and groups concerned with a given resource issue.

(ii) Provides a more systematic basis on which to characterise different stakeholders and their relationships with each other and the forest, and thus tries to explicitly identify imbalances between the four Rs.

(iii) It could be used as a tool to track changes in the four Rs and their imbalances in the context of a particular planning or management approach.

(iv) It focuses on the plurality of perspectives within a given natural resource/forest setting, and in the context of a particular intervention, while examining the positions of a wide range of different stakeholders in a fairly static and time bound sense (Leach and Fairhead, 2001:229-230).

2.6 Livelihood Analysis Framework

A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000: 10).

Livelihood and income are not synonymous but are inextricably linked as the composition and level of individual or household income at a given point in time is the most direct and measurable outcome of the livelihood process. Income comprises both cash and in-kind contributions to the material welfare of the individual or household deriving from the set of livelihood activities in which household members are engaged (Ellis, 2000:10).

In his book *Rural Livelihoods and Diversity in Developing Countries*, Ellis does an excellent work of explaining the Livelihood Analysis Framework, its usefulness and limitations etc. The following review of the framework is based on this book.

A framework for Livelihood Analysis is an analysis that is used for thinking through diversified rural livelihoods. It is a version of the 'assets-mediating processes-activities' framework that in its various forms is popular with researchers concerned with poverty reduction, sustainability and livelihood strategies. Like other similar approaches, the Livelihood Analysis Framework considers the asset status of poor individuals or households to be critical to understanding the options open to them, the strategies they adopt for survival, and their vulnerability to adverse trends and events.

The Framework is particularly useful as a guide to micro policies aimed at reducing rural poverty, although it may also be employed in the tracing of local level impacts of macro policies, which may be highly significant for livelihood strategies at local level. It also helps in organising ideas into manageable categories; identify entry points and critical processes; and prioritising catalysts for change that can improve people's livelihood chances. The Livelihood Analysis Framework also works in thinking through the livelihood circumstances of individuals, households, villages, communities, districts or larger scale geographical zones that have some important features in common.

It is however limited in that it fails to capture the dynamics of livelihood systems that in practice involve innumerable feedbacks and complex interactions between components. In effect, it is difficult for any two-dimensional diagram to represent a process as complex as rural livelihood formation. The Framework is also very scale dependent as it loses sensitivity to variation within the chosen domain when used for large-scale perspectives

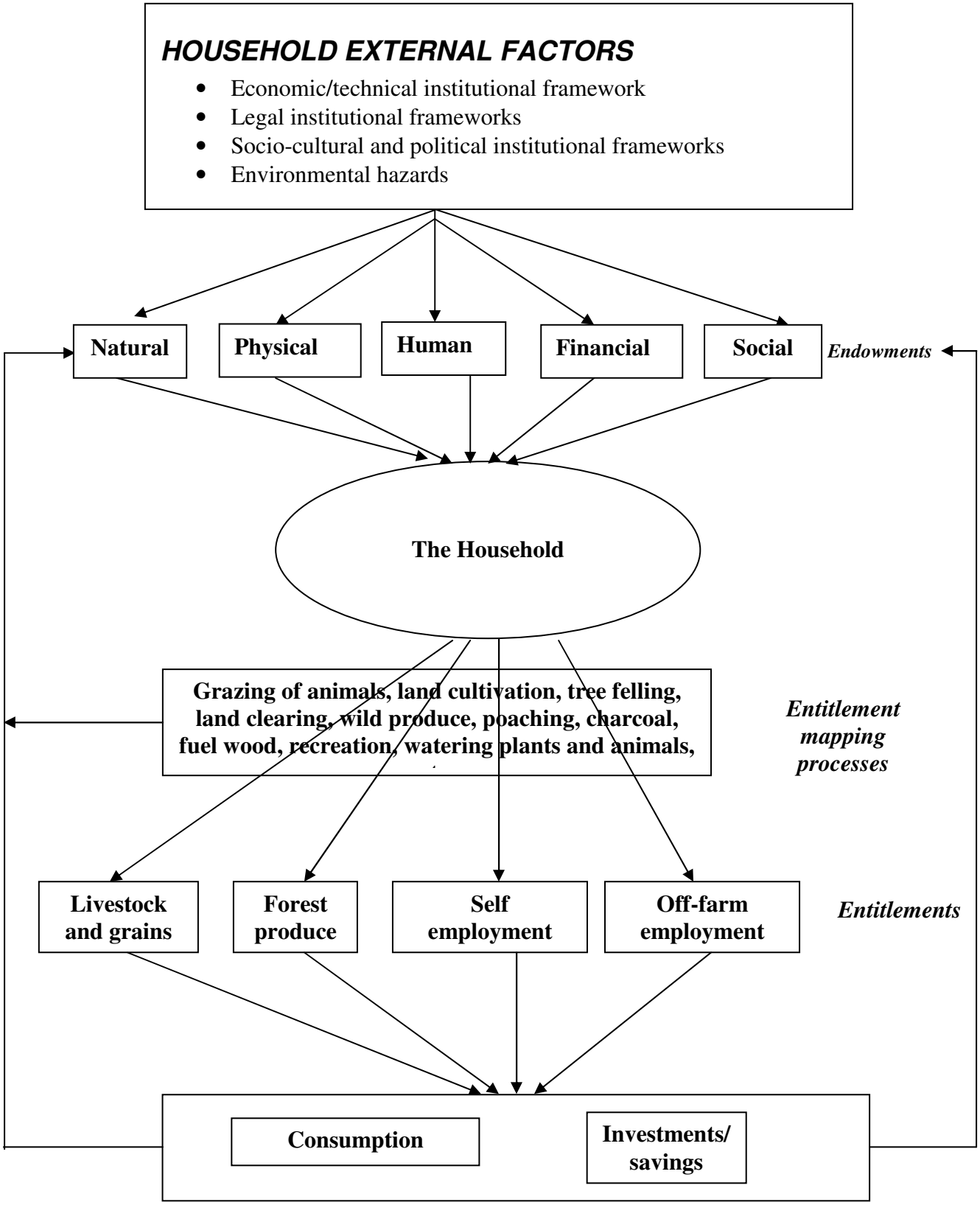

Fig. 2.1 Household Economic Model. (*After Vedeld, 1995)*

The assets owned by a household are the logical starting point when utilising this framework. This is because assets (whether owned, controlled, claimed or in some other means accessed by the household) are the basic building blocks upon which households are able to undertake production, engage in labour markets, and participate in reciprocal exchanges with other households. Assets are stocks of capital that can be directly or indirectly utilised to generate the means of survival of the household or to sustain its material well being at differing levels above survival. Different researchers have categorised assets based on various distinctions, which have been argued as being able to capture strategically important distinctions between the different types of capital. Here the classification used categorises them into five: Natural, Physical, Human, Financial and Social Capital.

2.6.1 The Five Capitals

2.6.1.1 Natural Capital

This is the land, water and all biological resources that are utilised by people to generate means of survival. Also sometimes referred to as 'environmental' resources and thought of as comprising the environment, natural capital is not static, but can be enhanced when brought under human control that increases its productivity.

A crucial distinction within natural capital is between renewable and non-renewable resources. Renewable resources are resources that replenish themselves over time e.g. fishery stocks. These are more important in rural settings. Non-renewable resources are resources extractive resources, which can be permanently, depleted in a particular location by human action e.g. metals.

2.6.1.2 Physical Capital

This is capital that is created by economic production processes. It is a producer good, purchased in order to create a flow of outputs into the future. Physical capital can substitute for natural capital, and thus help to take the pressure off natural capital that is being depleted in local contexts. Examples of physical capital include road, tools, and machines.

2.6.1.3 Human Capital

This is the labour available to the household. It includes education, skills and health. It can be increased by investments in education and training, and by the skills acquired through the pursuance of one or more occupations. Labour is often the chief asset possessed by the poor. The significance of labour as a resource is made evident in situations where there are no labour markets, as large households have the advantage of reduced risk to livelihood security of illness and permits more diverse occupational strategies to be pursed (Toulmin, 1992 in Ellis 2000:34).

2.6.1.4 Financial Capital

This is stock of money that is accessible to the household. It is mostly savings but also includes access to credit in form of loans. Monetary savings and loans owe their role in the asset portfolio of households to their convertibility into other forms of capital. Fungibility i.e. the ease of switching between uses is an important characteristic of cash. In rural sub-Saharan Africa, where financial institutions are absent, livestock keeping plays a cardinal role as a store of wealth. While livestock is not as fungible as cash in a rural financial institution, it has the same attribute when sold of being convertible into other forms of capital or consumption.

2.6.1.5 Social Capital

These are the claims on which individuals and households can draw by virtue of their belonging to social groups of varying degrees of inclusiveness in society at large. Moser defines social capital as 'reciprocity within communities and between households based on trust deriving from social ties' (1998 in Ellis, 2000: 36). Swift argues that social capital 'is made up of both networks of ascriptive and elective relationships between individuals which may be vertical as in authority relationships, or horizontal as in voluntary organisations, and of the trust and expectations which flow within those networks (1998 cited in Ellis 2000).

Social capital means that there are aspects of social structure and organisation that act as resources for individuals, allowing them to realise their personal interests. Such institutions are effective because ' they permit us to carry on our daily lives with a minimum of repetition and costly negotiation' (Bromley, 1993 cited in Pretty and Ward, 2001:5).

Since social capital lowers the costs of working together, it facilitates cooperation. People have the confidence to invest in collective activities, knowing that others will do so. They are also less likely to engage in unfettered private actions that result in negative impacts, such as resource degradation. Four central features of social capital are identified: (1) relations of trust (2) reciprocity and exchanges (3) common rules, norms and sanctions (4) connectedness, networks and groups.

(1) Relations of Trust

Trust lubricates cooperation and reduces the transaction costs between people as instead of investing in monitoring others, individuals are able to trust them to act as expected. This saves time and money, and liberates resources. It also creates social obligation- by trusting someone this begets reciprocal trust.

(2) Reciprocity and Exchanges

These also increase trust. Coleman (1990) and Putnam (1993) articulated two types of reciprocity. Specific Reciprocity, which subsumes all simultaneous exchanges of items of roughly the same value; and Diffuse Reciprocity which refers to a continuing relationship of exchange that at any given time may be unrequited but is repaid over time and balanced. According to Platteau (1997) this contributes to the development of long-term obligations between people, an important part of achieving positive environmental outcomes

(3) Common Rules, Norms and Sanctions

These are mutually agreed norms of behaviour that place group interest above those of individuals. They give confidence to individuals to invest in collective actions or group activities knowing that others will do so too. Individuals can take responsibility and ensure their rights are not infringed. Mutually agreed sanctions ensure that those who break the rules know they will be punished. Rules are stipulations of behaviour with positive and/ or negative sanctions. Formal rules are those set out by authorities like rules and regulations. Informal rules, on the other hand are those individuals use to shape their own everyday behaviour. Norms are preferences and they indicate how individuals should act.

(4) Connectedness, Networks and Groups

These are an important aspect of social capital. There may be many types of connections between people (trading of goods, exchange of information, mutual help, provision of loans,

common celebrations etc). They may be one-way or two-way, and may be long established and not responsive to current conditions, or subject to regular update. Connectedness displays itself in different types of groups at local level e.g. sports clubs, credit groups, mutual aid societies, forest, fishery or pest management groups. (Pretty and Ward, 2001: 5-6; Pretty and Smith, 2004: 632-633)

To what extent are social and human capital necessities for long-term improvements in natural capital? Clearly natural capital can be improved in the short term with no explicit attention to social and human capital. The social and human capital needed for sustained equitable solutions to natural resource management is composed of a mix of existing endowments and that, which is externally facilitated. External agencies or individuals can act on or work with communities to create conditions for the emergence of new local associations with appropriate rules and norms for resource management. If these then lead to the desired natural capital improvements, this has a positive feedback on both social and natural capital

However, not all forms of social capital are good. A well organised society with strong institutions and rooted reciprocal mechanisms may have these because of fear and not trust e.g. feudal, hierarchical, racist and unjust societies. Formal rules and norms can also trap people within harmful social arrangements. A society may seemingly have high social capital with strong families and religious groups but have some individuals with severely depleted human capital through abuse or conditions of slavery. Some associations may also hinder the emergence of sustainable livelihoods through the encouraging of conformity, perpetuation of adversity and inequality, and allowing a select few individuals to get others to act in ways that only suit them (Knight, 1992; Olson, 1965; Taylor, 1982 cited in Pretty and Ward, 2001).

2.6.2 Livelihood Strategies and Livelihood Diversification

Livelihood Strategies are a collection of activities made possible by the interaction of assets and opportunities that generate the means of household survival. Whether natural resource or non- natural resource based, livelihood strategies have one thing in common- they represent potential contributions to the survival portfolio of rural households. They are also dynamic, respond to changing pressures and opportunities and they adapt accordingly (Ellis, 2000).

Ellis (2000:15) defines Rural Livelihood Diversification as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living. Livelihood diversification is widespread and is found in all locations, across farm sizes and ranges of income and wealth. It is pervasive and enduring in many of the poor countries that make up sub-Saharan Africa.

Programmes aimed at community based sustainable management of natural resources should encompass the livelihood strategies and dependence on the resource of the surrounding communities. Poor people depend more on forests than their better off fellow community members. A study by Vedeld *et al* (2004) reported mean annual forest environmental income equivalent to 22% of total household income, a significant source of income of particular importance to households living close to the survival line. The study also revealed that dependence on forest environmental income, measured as its share of total income, declined with increasing total income when analysed across households. Forest income was seen as part of rural households' diversification strategies. High total forest income was associated with less income diversification, indicative of specialisation in one or a few high return activities

An important characteristic of livelihoods that is subsumed under assets is the access that individuals or households have to different types of capital, opportunities and services. Access is defined by the rules and social norms that determine the differential ability of people in rural areas to own, control, or otherwise claim or make use of resources such as land and common property. It is also defined by the impact of social relations, for example gender or class, on this ability. Access also refers to the ability to participate in, and derive benefits from, social and public services provided by the state such as health and education (Ellis, 2000:9). Within the household, access to and control over forest resources may be differentiated based on age and gender. This differentiated relationship to the forest may be a result of social norms and customs e.g. in some communities, only older women are allowed to harvest certain medicinal plants. A household's use of the forest may also be directly affected by the endowments that it has. A household with serious labour or capital constraints may be unable to expropriate forest resources even when legal, socio-cultural and political institutional frameworks allow it to do so. However, the household may be able to make use of its social capital and get community members to help it meet its labour or financial

constraints e.g. relatives and friends go to help a female headed household in felling trees to clear a piece of land for cultivation**.**

As reported by Vedeld *et al* (2004), households diversify their sources of income. While poor households may earn up to 22% of their total household incomes from forests, this is invariably from a wide range of forest resources. These forest environmental incomes are supplemented by land cultivation, off-farm employment, non-farm employment, remittances, rural trade, livestock rearing etc. the produce or income from all these livelihood strategies is either consumed or invested.

At rural community level, access to forests and forest resources is modified by social relations (gender, class, ethnicity, age,), institutions (rules and customs, land tenure, markets), associations, Non Governmental Organisations, local administrations and state agencies. The results of this modified access include livelihood strategies. These livelihood strategies are composed of forest-based activities (collection of herbs, roots, tubers, leaves, honey, fuel wood; cultivation of food and non-food produce, harvesting of timber etc. The importance of a particular forest based activity to community is affected by such factors as the legal institutional framework (e.g. timber harvesting may be banned by the state); socio-cultural institutional framework (e.g. certain sections of the community not allowed to harvest specified forest resources because of local customs, taboos); natural vagaries and economic/technical institutional frameworks (harvesting a resource may not be economically viable due to lack of appropriate technology or markets too distant). It is therefore important that a livelihood analysis where all these issues are investigated is done to determine how dependent households and communities are on forests being considered for JFM as this would greatly impact on the direction of the JFM.

2.7 A Brief Look at JFM in India

Wikipedia, the free Internet encyclopaedia defines Joint Forest Management as ‘the official and popular term in India for partnerships in forest management involving both the state forest departments and local communities’. This could be seen as indicative and maybe justifiable for a country with the largest JFM programme in the world to have its name as part of the definition of JFM in an encyclopaedia. But how did it all begin?

According to the Wikepedia encyclopaedia, JFM in India began in West Bengal accidentally at the Arabari Forest Range in West Midnapore, near Midnapore town in 1971. A silviculturalist, working for the Forest Department as the Divisional Forest Officer, was conducting trials that were continually disturbed by animal grazing and illegal harvesting by the local community. At the time there were no initiatives for sharing of forest resources between the government and the locals, with the government considering many of the locals no more than thieves. The forest official, contrary to the advice of his colleagues, sought out representatives of eleven local villages and negotiated the terms of a contract with an ad hoc Forest Protection Committee. The initial programme involved 612 families managing 12.7 square kilometres of forests classified as "degraded". Profits from the forests were shared, with the villagers getting 25% of the total profits. The experiment was successful and was consequently expanded to other parts of the state in 1987.

A few years later, JFM was employed in the state of Haryana to prevent soil erosion and deforestation. In 1977, villagers were persuaded that instead of grazing on erosion-prone hills, building small dams would help agricultural output on areas currently under cultivation. The programme led to reforestation of many hills in the state (www.jfmindia.org)

In 1990 the Central Government of India mandated that the individual state governments should formally adopt JFM as the primary mechanism through which the state would manage state owned forest resources. The JFM policy of 1988 is said to have been motivated by a desire to kill two birds with one stone-reduce environmental degradation (which Kumar 2002 reports the Central Government mainly attributed to local communities using the forests as *de facto* open access property) and to reduce rural poverty. Each state has leeway on the particular approach it adopts to implement JFM. In the States that have so far adopted JFM, the incentives offered by the Forest Departments to local village forest communities have ranged from wage payments for protective labour services to in-kind and revenue shares of the no-timber forest products collected; to revenue shares of timber sales, and to combinations of each (Datta *et al*. 2004).

Although schemes vary from state to state and are known by different names in different Indian languages, usually a village committee known as the Forest Protection Committee and the Forest Department enter into a JFM agreement. Villagers agree to assist in the safeguarding of forest resources through protection from fire, grazing, and illegal harvesting

in exchange for which they receive non-timber forest products and a share of the revenue from the sale of timber products. As of 2005, 27 states of the Indian Union had various JFM schemes with over 63,000 Forest Protection Committees involved in the joint management of over 140,000 km² of forested land (www.jfmindia.org).

2.7.2 Experiences of JFM in India

Like other phenomena that happen over large tracts of land and affect very heterogeneous communities and households, the experiences of JFM in India are mixed.

Sarin (2001) reports that in Uttarakhand Village Forests Joint Management has created space for the Forest Department to intrude on the only existing example of reasonably autonomous legal space for community forest management in India. The Village Joint Forest Management Rules provide very little decision making space for local villagers and a have a very negative impact on collective choice arrangements.

Some studies have reported improvements in output from forests such as increased yields of timber and non-timber forest products, fuel wood, fodder etc across some regions in India (TERI, 2000). Although Kumar found that forests managed by user groups under JFM were better managed then those managed solely by the Central Government, he contended that the distribution of benefits under JFM was at the same time very unequal as the rural elite captured most of the economic benefits. Much of the reduced resource extraction reported under JFM had come at the expense of the poorest (2002 in Behera, 2003). Two dimensions most frequently identified as affecting JFM outcomes have been intracommunity differences in social class and income. Kumar points to caste inequality as a pervasive feature of JFM in India. The group with dominant power essentially ran the Village Forest Committees and the preferences of this dominant group were reflected in the programmes adopted, helping the group to appropriate most of the benefits (2002 cited in Datta *et al*. 2004:6).

2.8 A Brief Look at JFM in Tanzania

The East African country of Tanzania has about 33 million hectares of forestland, of which 57% is outside government forest reserves. The significance of this has not been lost on the Tanzanian government which has gone on to provide incentives for forest management at

village level, the lowest level of local government in the country. These incentives began in the early 1990s when a number of Participatory Forest Management (PFM) activities were started in Manyara Region that for the first time provided a mechanism for the transfer of forest ownership and management responsibility from central to village government. These successful pilots have since been replicated in other regions e.g. East Usambara forests of Tanga region, highland forests of iringa, coastal forests of Tanga, Mtwara and Lindi Regions (Bromley and Ramadhani, 2006).

These activities implemented by an array of actors including local and international NGOs, local governments and supported by bilateral donors all helped to show the viability of PFM under a range of social and ecological conditions. The review of the Forest policy not only happened at the same time as these pilot PFM activities but also major reforms in Tanzania's economic and social spheres and thus helped in the resulting favourable legal environment for PFM. Today, mainland Tanzania has one of the most advanced community forestry jurisdictions in Africa as reflected in policy, law and practice (Wily 2000 cited in Bromley and Ramadhani, 2006).

2.8.1 Opportunities for PFM in Tanzania

Two approaches for PFM are being used in Tanzania- Joint Forest Management and Community Based Forest Management. The success of both these two approaches in Tanzania is due to a number of opportunities and enabling factors that can be group into four as follow:

(i) *Policy and Legal Framework*

There has been a positive and forward looking legal and policy environment that has permitted the devolution of ownership and management responsibilities over forest resources to local communities (URT 1998; Wily and Dewees, 2001 cited in Bromley and Ramadhani, 2006). The National Forest Policy of 1998 makes provision for a clear direction and mandate for PFM. The Forests Act (2002) supports PFM by enabling local communities to declare and ultimately gazette Village, Group or Private Forest Reserves. It also provides for registration and other procedures that enable villages, groups or individuals to secure local jurisdiction over forests or take on management functions in central and local government Forest Reserves through the establishment of JFM Agreements with the appropriate government authority.

Two important legal documents compliment the Forests Act: the Village Land Act (1999) which recognises customary tenure rights for village and communal land, and allows for its registration as 'village land'; and the Local Government Act (1982) which provides the premise for village councils to be executive and corporate agencies as well as providing the legal basis for village bye-laws, which are used to regulate forest access and use(Bromley and Ramadhani, 2006: 94-96).

(ii) General Agreement about PFM Objectives and Outcomes

There seems to be a general consensus on the objectives and outcomes of PFM among policy makers and senior forestry staff at both national and district levels. PFM is broadly implemented along two implicit policy objectives:

(a) Rehabilitation and Maintenance of Forest Quality

PFM primarily aims at restoring or maintaining forest quality, and the environmental and ecological services they deliver at local and national levels. This is drawn from the theory that devolution of management responsibility to the lowest levels will lead to better forest management.

(b) Improvements in Livelihoods of Forest Dependent Communities

It is assumed that rural livelihoods will improve through the capturing of forest benefits at village, community and household levels. These benefits can take the form of financial returns from the sale or lease of forest resources and collection of fines; empowerment through the securing of rights over local resources; a reduction in vulnerability through a sustainable supply of forest resources for domestic use; and improved partnerships with external institutions (Bromley and Ramadhani, 2006).

(iii) Growing Numbers of Experienced Facilitators with Grounded Local Experience

After 10 years of PFM in the country, Tanzania now boasts of an ever-increasing number of experienced practitioners. Though local level capacity still leaves much to be desired, formal and informal networking of practitioners is having a positive impact on dissemination of village and forest level experiences and learning.

(iv) Availability of Internal and External Financing for PFM

PFM has been identified as one way through which poverty can be reduced and has consequently benefited from a lot of funding. At present, national level funding (through the

Ministry of Natural Resources and Tourism) for PFM is being obtained from DANIDA, The World Bank, NORAD and GTZ, supplemented by internal revenue from Forest and Beekeeping Division.

These factors have all contributed to the success of PFM in Tanzania as evidenced by the reported increased numbers of sustainably managed forests. However, it has been unclear whether PFM has contributed to improvement of livelihoods of the communities involved. This is because much of the early PFM was carried out on degraded forestland that had little merchantable timber left. This made it difficult for forest managers to utilise the forests and a lot of time had to pass before the forests became commercially viable. Another reason is that since much of the early donor funding was directed towards high biodiversity forests, which also have high national and global values, local use options tended to be minimal. Thirdly, as forestlands are brought under village control and incentives for open access harvesting reduce, illegal activities drop and do incomes from fines. This results in Village Forest Management Committees' revenues reducing to very low levels (Bromley and Ramadhani, 2006).

2.8.2 Constraints of PFM in Tanzania

PFM has not performed well under all conditions. Environmental, economic and legal factors have influenced the success of PFM in Tanzania.

Economic- market forces can either promote or destroy PFM processes. Where market forces are very high it is very difficult for villages to prevent the indiscriminate harvesting of forest resources thereby undermining the PFM process. Where markets are weak villagers may not be able to sell their produce and are discouraged.

Environmental- as most of the early PFM was undertaken on highly degraded land where potential incentives, returns and incomes were minimal. This made long term environmental rehabilitation costly for many communities.

Legal- JFM areas only generated few financial returns, as they are catchment forest reserves that are maintained more for their biodiversity values and carbon functions than for generating income for communities. The viability of JFM in these Catchment Forest Reserves is at stake unless new income sources are found (Bromley and Ramadhani, 2006).

2.9 History of Joint Forest Management in Zambia

Like most other sub-Saharan countries, Zambia was colonised and managed based on laws and statutes of its colonial masters. At independence in 1964, it inherited and retained most of these laws notable among which were those pertaining to natural resources management. Whether it was wildlife, forests, fisheries or water, the pre-independence natural resource management legislation had one thing in common-the exclusion of communities (and citizens in general) in the management and in some cases utilisation of natural resources they had hitherto managed. In Forestry, this entailed the setting up of 'protected' forest areas and stringent measures against local communities accessing these areas.

Interestingly, after independence, and contrary to pre-independence campaign promises, the new Government of the Republic of Zambia did not abolish these 'draconian', authoritarian and exclusionary laws. By virtue of the Forests Act, Cap 1999, it created the Forestry Department whose mission statement is '*to ensure sustainable flow of wood and non-wood forest products and services while at the same time ensuring protection and maintenance of biodiversity for the benefit of the present and future generations through the active participation by all stakeholders'*. The policy objective of the government was to vest the ownership, control and management of all trees and forest produce in the state, this power being exercised on behalf of government by the Chief Conservator of Forests.

The Forests Act of 1973 did not explicitly mention the concept of joint forest management (or any such terms based on the concept of including communities in forest management) but it did provide for the transfer or assignment of the ownership, control, and management of specified forest areas to another person or authority, and the delegation of the exercise of the powers conferred on the Chief Conservator of Forests to another person or authority in addition to forest officers. Under sections 22 and 30 the Act[7] provided for the transfer of control and management of state lands or customary lands to other persons or authority

Section 22

'*….the Minister may, by statutory instrument, assign the control and management of any local forest to any person or authority, subject to such conditions as he may think fit'*

[7] Forests Act of 1973

Section 30

> *in the case of any State lands or customary area lying in the area of a local authority the minister may assign control and management of licensed felling, cutting, taking and removal of major forest produce in or from such land to the local authority subject to such conditions, if any as he may think fit'*

However, JFM could still not be implemented using this Act due to two serious limitations: (i) it does not apply to open areas and plantations (ii) it does not allow for the sharing of government revenue between government and communities or any other stakeholder for that matter (Jere, 2005).

In light of these limitations, and the glaring inability of the Forestry Department to manage the country's forest resources with serious financial constraints as evidenced by the continued degradation of protected forest areas, the Zambia Forestry Action Plan was prepared by the government, the result of which were the forest policy of 1998 and the Forests Act of 1999. The Parliament of Zambia enacted this new Forests Act in October 1999 to repeal the Forests Act, 1973 and provide a legal basis for JFM in Zambia once the Minister responsible for forests passes a commencement order.

2.9.1 The Forests Act, 1999

The main objectives of the new Forest Act are to *inter alia;* establish the Zambia Forestry Commission and to define its functions; provide for the establishment of National Forests, Local Forests and joint forest management areas; provide for the participation of local communities, traditional institutions, non-governmental organisations and other stakeholders in sustainable forest management.

The functions of the Zambia Forestry Commission once its is created will include, subject to the other provisions of the Act;

- Devising and implementing participatory forest management approaches for both indigenous forest and forest plantations, involving local communities, traditional institutions, non-governmental organisations and other stakeholders, which will be based on equitable gender participation

- In partnership with local communities, traditional institutions and the private sector, develop and implement management plans for National Forests, Local Forests and open areas.
- Devise methods for the sharing of costs and benefits from moneys obtained from licences, permits and concessions with local communities and traditional institutions.
- Pay out money from a forest revenue fund into a fund established by a Joint Forest Management Committee from the use of forest resources within an area of a Committee, as the Minister shall prescribe by regulations after consultations with the Commission.

The entire Part V of the Forests Act, 1999 is dedicated to JFM. It provides for the declaration of a JFM area, the composition and functions of a Forest Management Committee and how to deal with finances under JFM.

Section 25

(1) *The Minister may, on the recommendation of the commission. local community or owners or occupies of an area in a forest, declare by statutory instrument any Local Forest, forest plantation or open area, a Joint Forest Management Area.*
(2) *Any area proposed to be declared a Joint Forest Management Area under this section shall not be declared so unless the local community has given consent.*

Section 27

(1) *The functions of a committee shall be to manage and develop the Joint Forest Management Area and distribute the benefits amongst the local communities.*
(2) *Without prejudice to the generality of subsection (1) a committee shall have the power to-*
    (a) Develop and implement, in consultation with the commission, management plans for the Joint Forest Management Area aimed at reconciling the various uses of land in that area.
    (b) Negotiate, in conjunction with the Commission, Co-management Agreements with other stakeholders; and
    (c)Perform such other functions as the Commission or the Director-General may delegate to it.

However, this Act has not yet come into force since its enactment in 1999. To get round this, the government came up with the Local Forests (Control and Management)[8] Regulations,

[8] Statutory Instrument No. 52 of 1999

1999 to be the foundation for piloting JFM in Zambia prior to the commencement of the Forests Act of 1999.

These regulations empower the Minister to declare by gazette notice any Local Forest or part of any Local Forest to be a Joint Forest Management Area. Where he has declared a Local Forest a JFM Area, he has to constitute a Forest Management Committee for that area which shall comprise the following-

(a) One person who shall be appointed by the Chief in that area.
(b) A representative of the Chief Conservator of Forests.
(c) Three persons representing the villagers in that area elected by the villagers.
(d) One representative of the local authority in the area.
(e) One representative of holders of licences under the Act in that area.
(f) A representative of the Department of Agriculture.
(g) A representative each from the Department of Water, Lands and Fisheries.
(h) A representative of the Zambia Wildlife Authority.

These regulations do not extend to Open Areas. JFM is also not allowed in National Forests. Where there is public demand for JFM in a National Forest, the Forestry Department has to first re-designate the forest to a local forest for JFM to happen (Jere, 2005).

The Provincial Forestry Action Programme (PFAP) has done the piloting of JFM in Zambia in eight districts. These areas comprise six forest reserves and two open areas (Table 1).

Table 2. 2: JFM Pilot Areas in Zambia, 2006

Province	District	Forest	Area (ha)	Households
Southern Province	Choma	Ndondi No. 181	5,144	~ 700
	Livingstone	Dambwa No. 22	10,766	~ 300
	Namwala	Ila part of No. 40	10,571	~ 600
Copperbelt Province	Lufwanyama	Shibuchinga Customary Land	20,000*	~ 330
	Masaiti	Katanino No. 34	4,532	~ 490
Luapula Province	Mansa	Lukangaba No.149	7,163	~ 748
	Samfya	Mwewa No. 174	2,066	~ 320
Eastern Province	Petauke	Nyamphande Customary Land	20,000*	n.d.

Table1: from PFAP website (www.pfap.org)

In terms of economic potential and economic feasibility of the proposed JFM areas, Katanino Forest ranked highest (Njovu, 2003). Ndola-Kapiri Mposhi Road passes through the forest making it easily accessible and providing a good outlet for the forest products as a lot them are sold by villagers along this major highway.

2.10 Gender Issues in JFM in Zambia

Wonani (2004) in her consultancy report to PFAP on gender issues in JFM pilot areas in Zambia noted the following:

- The communities showed willingness to participate in JFM and could identify benefits that might accrue from their involvement. However, most of the women expected to face difficulties in participating in JFM due to their socio-economic position. They also reported that they lacked access to information concerning JFM.
- Field staff had very limited skills in gender sensitisation, analysis and mainstreaming. Only two members of the field staff had received specific training on gender issues.
- All the communities interviewed were happy with the existence of the JFM guidelines that would act as a guide to implementation. However, it was felt that the language

* The area in Shibuchinga and Nyamphande includes non-forest areas

was too technical and not user friendly. The women were worse off in terms of understanding the guidelines because of the high levels of illiteracy amongst them.

- Delays in implementing JFM were of great concern to all the stakeholders, especially the participating communities. Women in particular were discouraged from participating because their spouses did not see immediate benefits.
- There were many inequalities in the access to and control over resources and benefits within JFM. Men had more advantages than women because of their better socio-economic position, and the benefits accruing to men outstripped those accruing to women. Men gathered more valuable resources from the forest and sold them to generate income, whereas women accessed resources mainly for domestic consumption.
- Women's participation in all the decision-making bodies of JFM was very low. Of the sampled communities, none of the Village Resource Management Committees (VRMCs).
- Motivating factors for men and women to participate in JFM included foreseen benefits, poverty reduction, employment creation, community development, ownership and control of the forest. Women saw JFM as a panacea for the formation of women's clubs in their communities.
- The low participation of women in JFM activities were attributed to inadequate information; cultural and traditional restrictions; low literacy levels; lack of confidence; limited access to and control over resources and benefits; community perceptions of women's inability to effectively contribute to JFM; the attitudes of field staff; and a lack of female staff and role models in the forest sector.
- Mitigation measures to address these factors were identified: providing communities (especially women) with information on JFM; reducing the work burden through the provision of basic needs; introduction of literacy classes; sensitising communities on the need to involve women in JFM; and engaging more female field staff.
- There was very limited capacity at both district and community level to mainstream gender in JFM. Not enough material, human and financial resources are allocated to properly address gender issues. Nevertheless, there is potential to build capacities at both levels and this should be prioritised.
- A gender-focused training needs assessment that was carried out at both district and community level revealed that there were many areas that needed training at both

technical and social level. Gender training was lacking in almost all the communities. The few district field staff that had undergone gender training had done so a result of personal initiatives. Training needs were many, and required different approaches e.g. workshops, seminars, short courses, exchange visits, in-house training sessions, field visits, community-based training and refresher courses. A training of trainers approach could also be used if need arose.

- In a nutshell, there was potential to address gender issues in JFM. There was political will at district and community levels. The benefits of both men and women participating in JFM could not be over-emphasised.

The literature review has shown that JFM is framed differently by different individuals, groups of people and organisations. The reasons for different countries choosing the path of JFM are various but literature has shown that in most cases JFM was chosen as a last resort(rather than a preferred) approach to forest management after forests became so degraded that something different from the status quo (community exclusion) had to be done. This is not the case in Zambia. Despite the high rate of forest degradation reported (e.g. by FAO,2000; Forest Support Programme, 2004 in PFAP, 2005), the country still has substantial forest resources and forest degradation is not perceived to be a pressing issue by many. The feet dragging the government has engaged in does not seem to suggest that JFM is its preferred strategy to forest management either. The following chapters present a report of the study that was carried out in one of the areas where JFM is being piloted in Zambia.

CHAPTER THREE

3 STUDY AREA AND METHODOLOGY

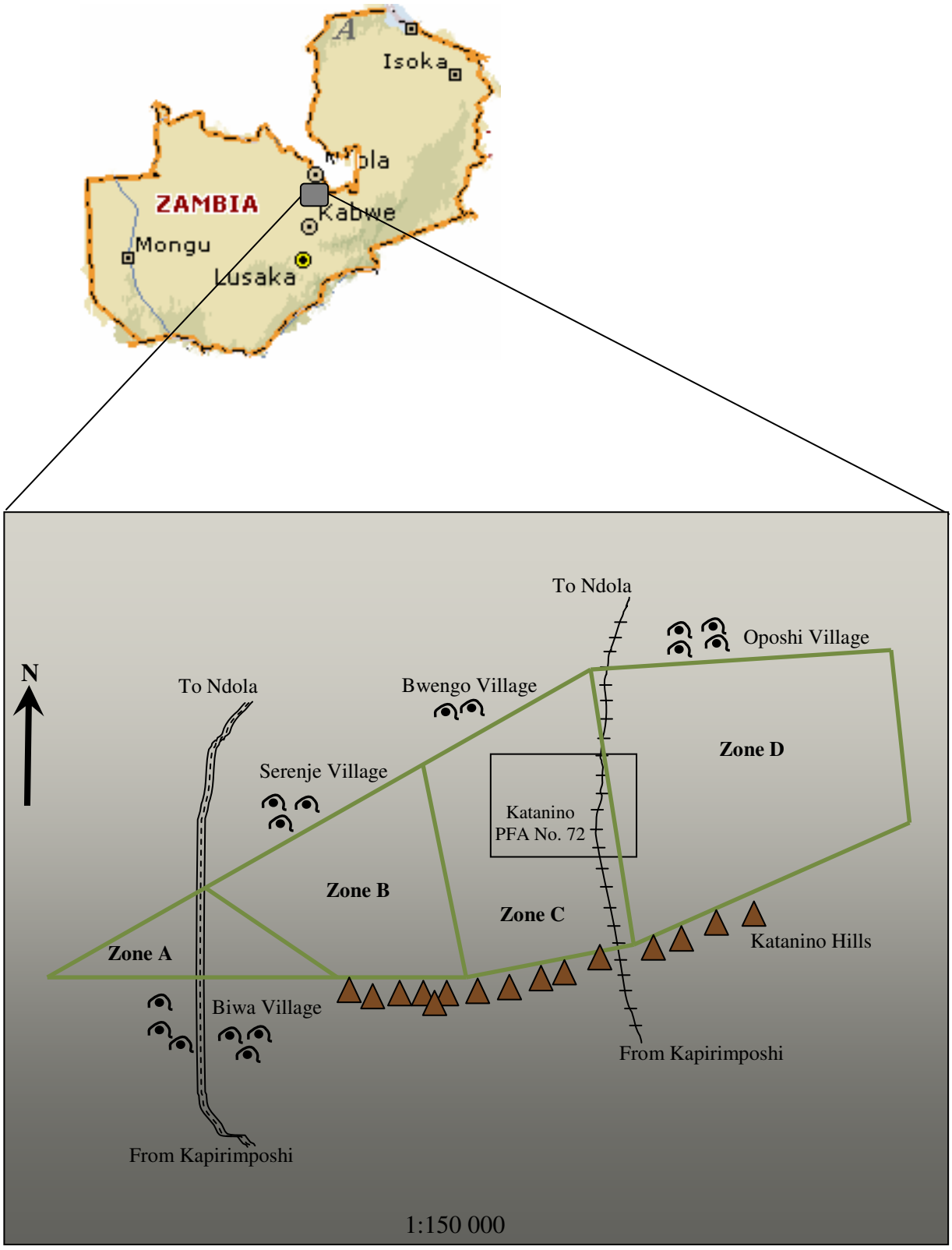

Fig.3.1 Map of Katanino Local Forest and Adjacent Villages (After FD, 2003)

3.1 Description of the Study Area

Katanino Local Forest No.34 is situated to the Southeast of Masaiti District, about 80km from Ndola on the Ndola-Kapiri Road. Though the Forest is situated less than 40Km from Kapiri-Mposhi, it is under the administration of Masaiti District Forest Department whose offices are 23 Km from Luanshya, much further from the forest than Kapiri Mposhi. In terms of traditional authority, it falls within 3 chiefdoms namely those of Senior Chief Mushili, Chief Nkambo and Chieftainess Malembeka. Katanino Forest shares boundaries with 4 villages (Oposhi, Bwengo, Serenje and Biwa). Its areal extent is 4532 hectares.

Katanino Local Forest shows a normal growth rate and the regeneration of the Miombo woodland is very high where the forest has been left undisturbed. Valuable timber species are not abundant but there is a good stock of mine quality timber. However, fires remain a major threat to the normal growth of the forest.

3.1.1 Topography

There are few hill formations in Katanino Local Forest, with the most prominent being the Katanino Hills. The topography is generally undulating, rising from the Mpongwe Plain in the South towards the Katanga border in the North and Eastern Masaiti District.

3.1.2 Geology and Soils

The soils are formed from the underlying acid igneous or silicereous sedimentary rock. Course-grained, loamy sand or sandy soils, with clay content that usually increases with increasing depth are found here. They are yellow-red to light yellowish-brown in places where they are well drained and grey brown in areas where there is poor drainage. Leached Sand veldt soils, which are light sandy loams or loamy sands with inert clay and low base saturation (due to leaching by excessive rainfall), are found in a wide area of the forest. Most of these soils are good for arable farming. Productivity is maintained through the application of chemical fertilizers and the use of hybrid seeds.

3.1.3 Rainfall

Zambia lies within the tropical rain belt of the world. It experiences rainfall from October to early April. The source of rain is mostly the Northeast and Southeast trade winds. Annual rainfall generally increases from South to North, ranging from about 1000mm near the Southern part of Katanino forest to about 1400mm near Chief Nkambo's area. The rains usually start with isolated showers, which become more frequent as the season advances. Violent thunderstorms, accompanied by treenail rains, are common during the wettest months, which are December, January, and February. The driest months are June, July and August.

3.1.4 Temperature

Temperatures range from a mean monthly average of about 15°C during the cold season to about 23°C during the hot season. The coldest months are June and July when frost may occur on an average of about three nights in a year. The hottest months are October and November, after which the rains cause temperatures to fall to more equable levels. In the past few years, temperatures of up to 35º C during the dry season have become increasingly common.

3.1.5 Vegetation

Katanino Local Forest Vegetation types are typical of the Copperbelt Province and are characterised by 90% single storey, deciduous and closed canopy woodland known as Miombo Woodland. Species found include *Julbernadia paniculata, Marquesia macroura, Brachystegia longiflora, Brachystegia utilis, Brachystegia boehmii, Isoberlinia angolensis, Uapaca kirkiana, Anisophellia species, Parinari curatellifolia, Albizia adiantifolia, Albizia versicolor* etc. The canopy is light but undergrowth is dense in some places.

The indigenous bamboo, *Oxytenanthera abyssinicaI* occurs frequently. Large Termitaria (up to 5 meters or more in height) and conical in shape are found almost throughout the forest. The Terminaria support distinct vegetation types, among which are *Cassia abbreviate, Combretum species, Ficus species* and *Erithrina* species.

3.1.6 Social and Economic Situation

There are 3842 households in Katanino Joint Forest Management Area(KJFMA). Oposhi village has 1,014 households, Bwengo 450, Serenje 732, while Biwa has 1,616. The average number of persons per household is 5(Forestry Dept, 2003). Just like in other rural areas of Zambia, poverty is widespread in the area. According to the Central Statistical Office (1996) 76% of the population are considered to be core poor. Subsistence agriculture is the main source of livelihood with crops like maize, sorghum, sweet potatoes, millet, cassava and dry season vegetables grown. Hand hoes are the dominant means of production. Livestock commonly reared are sheep, goats, pigs, ducks, chickens, pigeon and geese and cattle on a very small scale. In this area cattle is not traditionally reared. There is a significant trend towards keeping of smaller animals like goats, local pigs and chickens as these are perceived to be less vulnerable to drought , easier to manage and can be sold more efficiently when need be. Most of the population engage in the collection of non-timber forest products from the forest. These products can be used as fibres, medicines, vegetables, meat, cosmetics, sources of dyes, fats, latex oils, resins, fodder, charcoal etc.

The Forest is an island in an area largely cleared of trees to pave way for agricultural fields or charcoal. The total size of land available to a household ranges between 5-10 hectares. There is only 1 borehole in the area. There are two schools in the area, a middle basic school and an upper basic school.

KJFMA is inhabited by people of many tribal groups. These include the *Lala, Lamba, Bemba, Kaonde, Shona, Luvale, Tumbuka, Namwanga, Lenje, Swaka, Tonga, Nsenga, Yao.* This diversity is a reflection of the high immigration of mostly pensioners from nearby mining towns into the area. The settlement pattern is usually a group of extended family or clan members consisting of about 10 households making up a village. The most common language spoken in the area is *icilamba*, a dialect of *icibemba*.

A chief, who has sub chiefs and headmen under him, heads a chiefdom. A sub chief is in charge of up to 10 villages, while a headman is in charge of up to 10 households. In Zambia, chiefs command a lot of respect and are symbols of power and authority. They are not elected but assume office through succession. Chiefs are the custodians of all land in their chiefdoms except that gazetted as protected. This means that any person wanting to settle in their

chiefdom has to seek their permission and apply for a parcel of land from them for use either to set up a homestead or for agriculture. The chief also acts as an arbitrator in both civil and criminal cases brought to him involving his subjects.

The chief determines land use, access and user rights on customary land in accordance with the traditional practices of a particular tribal grouping, while the Forestry Department determines the utilisation and management of the forest resource on that land. However, most communities in customary areas perceive the chiefs as the owners and controllers of such land and the natural resources on it, despite that land is vested in the president under the Lands Act of 1995 (Jere, 2004).

3.1.7 Management of Katanino Forest

Under JFM, the management and utilization of the forest has been divided among the villages through the creation of zones. A total of four zones have been created and each of the four villages registered under KJFMA has been allocated a zone whose size is based on the population size of the village. Different forest resources are found in these four zones and the proposed issuance of permits for harvesting of forest resources by villages will depend on the forest resources identified as to be plentiful in their respective zones.

Two new institutions have been created to oversee the JFM at two levels, with the chief represented in the higher level committee. Local participation is encouraged though the stipulation that election on to the lower level committee is done at village assemblies, with members of the second level institution drawn from this lower institution. Community members can also participate in JFM through joining User groups which have been formed based on forest based income generating activities that have been identified to be economically viable, culturally acceptable and do not threaten the forest.

3.2 Data Collection

Data collection involved both primary and secondary sources. Primary data was collected using questionnaire surveys, interviews, observations and focus group discussions. Secondary data was collected from published and unpublished reports from the Forestry Department,

Libraries at the Ministry of Tourism Environment and Natural Resources, University of Zambia, and the Internet.

3.2.1 Sampling

With regards to sampling, there were 4 villages each with different numbers of households to be investigated. Purposive sampling was used in order to have the two villages closest both to the forest and to the main road as samples. Random sampling for selection of questionnaire respondents was then conducted using lists of households from the traditional authorities. Interviews were then conducted with the heads of the sampled households. Sometimes both spouses were allowed to answer questions especially on household demographics as most men did not seem very sure of the ages of most members of their household. A total of 75 household questionnaires were successfully administered. This was out of a total number of 2348 households for the 2 sampled villages.

3.2.2 Household Survey

A household questionnaire (Appendix I) was designed and great effort was made to capture all the different aspects of the four objectives of the study. Where this was not possible, the information was left to be collected using other techniques. Members of the research team were encouraged to ask additional questions and make comments on the questionnaire in cases where they felt this would help better understanding of respondents' answers and situations. A total of 75 questionnaires were admitted for data analysis after being checked for completeness and coherence. All members of the research team were able to communicate with the respondents without the use of interpreters.

3.2.3 Participatory Rural Appraisal (PRA)

Participatory Rural Appraisal is a short cut method of data collection that involves local people and outsiders from different sectors and disciplines. The outsiders facilitate local people in sharing knowledge of life and conditions to plan and act, and in analysing information. It uses group animation and exercises to achieve this (Bhandari, 2003).

Two Focus groups, made up of 6 people were constituted to discuss JFM in their area. The first group consisted of two men and four women. One man was a member of a VRMC while one woman was an honorary forestry officer. Their ages ranged from 30-64. Discussions were mainly focussed on the perceptions of the discussants on the functioning of JFM from its inception in the area to date. Pebble sorting was used to investigate perceptions about who has control over the forest. Care was taken that everybody gave their views by asking potentially dominating voices to give chance to others to give their views. The second group consisted of three men and three women that were just ordinary community members.

3.2.4 Key Informant Interviews

Key Informant Interviews were conducted with Forest Management Committee, User Groups and VRMC leaders; Headmen; Forestry Department personnel from Masaiti and Lusaka (Appendix II); and a volunteer from the American Peace Corps who had been living in the area for over 14 months. Most of the key informants from the community had been involved in JFM from its inception in the area and thus had comprehensive knowledge on the subject. The information from the Peace Corps Volunteer was especially insightful as it gave a view of a 'resident outsider' which was used to triangulate with the views of the other 'local' key informants. The key informants and the Focus Group Discussants were asked questions on the local institutions, stakeholders 4Rs, etc (Appendix III).

3.2.5 Community Observation

A lot of observations of the day to day activities of the community were made. The holding of two community meetings for the entire JFM community provided extra opportunities for the research team to observe community dynamics. The research team did its best to fit into the community and the time spent chatting informally with community members and sharing meals yielded a lot of information that would not have been obtained through questionnaire surveys or focus group discussions. The research team's insistence on not going round the community with Forestry Department personnel ensured that it was widely regarded as a neutral entity.

3.2. 6 Transects through Katanino Forest

These were made with both adult and young members of the community to investigate the status of the forest. Though quite tiring, these transects provided a view of the forest and an appreciation of its good status that would not have been possible through analysis of aerial or satellite photographs

The household questionnaire and the guiding questions for Forestry Officers at Forestry Department, key informants and focus group discussions are attached as Appendices. All the tools used in the data collection exercise were tailored to best answer the objectives of the study within the available time frame and resources.

3.3 Data Analysis

Analysis of data was done using software packages like Minitab 14, Microsoft Excel and SPSS 10. The quantitative data was analysed using regression, Analysis of Variance, Two-Sample Z-Test, Two-Sample T-Test, GINI Coefficient, measures of central tendency and through graphical presentations. Qualitative data was analysed using Chi-square, Stakeholder Analysis, Sustainable Livelihood Framework and Ostrom's Eight Design Principles for Enduring Common Pool Resources. Summary of the tools used to analyse each of the four objectives is given in the table below.

Table 3. 1: Summary of Objectives and Data Analysis Tools

OBJECTIVE	METHOD OF ANALYSIS
1. Assess the present livelihoods and dependence on forest resources by different groups of people living in villages involved in the joint management of Katanino Forest.	Livelihood Analysis
2. Ascertain the various rights, returns, relationships and responsibilities among the stakeholders in Katanino Joint Forest Management (KJFM) Area.	Stakeholder Analysis
3. Examine the effectiveness of the local institutions in the villages that are part of Katanino Joint Forest Management.	Ostrom's Design Principles for Long Enduring Common Pool Resources
4. Assess the levels of knowledge and perceptions about the JFM among the stakeholders	Chi-square Analysis, percentiles, graphs

3.4 Limitations of the Data Collection

Of the 4 villages mentioned in KJFMA documents as being boundary communities, only 2 were sampled for the household questionnaires. This was because of the extremely large area over which the 4 villages are spread out which made it difficult to administer questionnaires in all of them on foot. Also, on the ground it turned out that there are a lot of villages adjacent to Katanino Forest. These had been grouped into 4 villages as Biwa, Serenje, Bwengo and Oposhi for simplicity during the piloting of JFM and the subsequent registration of KJFMA as an organisation with the Registrar of Societies. In actual fact, there are many villages adjacent to Katanino Forest and the data collection was done in 10 of them, but all falling under the umbrella names of Biwa and Serenje.

Only 75 household questionnaires were finally used in the data analysis as opposed to the over 100 that had been planned at the beginning of the study. This was because the research team had to make more than one trip to a household in order to conduct the interview as most respondents were not found at home considering the study was conducted during a very busy time of the farming season. On many occasions, the research team had to follow respondents to their gardens and then go back to the village to continue.

The research team also got an impression that most respondents were under-reporting both their agricultural and forest produce harvests. Some villagers intuitively give much lower quantities of bags of maize or sweet potatoes harvested when asked by an outsider in the hope of getting help. This under-reporting also extended to other sources of income like remittances, trading and casual labour. Asking a lot of check questions counteracted this behaviour.

Since harvesting of any kind of resource from Katanino Forest has been banned for over 5 years pending full commencement of JFM community members were not very forthright in disclosing the types and quantities of forest resources they harvested as a household. This was particularly pervasive for those forest resources whose harvesting results in significant damage to forest e.g. felling trees for bark rope or in order to get to a beehive. Only 2 respondents admitted to obtaining medicines from the forest for household use. However asking questions on access to health facilities in the area and the quality of these health facilities invariably led to the unconscious admission of dependence on medicines from the

forest because of either the non availability of medicines at the government clinic or the distance to the clinic.

The history of communities living adjacent to state forest and the Forestry Department in Zambia is one of fines, arrests and avoidance. The pre JFM policies of not allowing forest adjacent communities to access resources from forests gazetted as protected meant that conflicts between the communities and the Forestry Department were unavoidable. Communities harvested forest resources clandestinely and sometimes with impunity. This led to a culture of mistrust of outsiders asking about forest use. This suspicion has not yet withered away despite the improving relationships between the Forestry Department and the forest adjacent communities. Questions on forest utilisation receive very guarded and sometimes not very truthful answers when respondents are not sure about the motives of the researcher or if researcher asks too many questions.

This challenge was counteracted by not asking the respondents their names, the names of any member of their household or their ethnicity. In many instances respondents only agreed to be interviewed after being assured that the research team was not going to ask them their names but would only use labels to record household demographic data.

Collection of secondary data was problematic in Zambia because it turned out that the Forestry Department Offices did not even have the publications that were made by PFAP II. These were fortunately available from the PFAP website. Most government officials were also difficult to have access to as most of them were reported to be out on field assignments. Multiple visits were made with mixed results.

Two village meetings were called for by two organisations separately during the field study. These were called for by an NGO and a private business enterprise respectively. While these meetings caused time overruns in the research teams schedule as interviews and focus group discussions had to be rescheduled, they provided an opportunity for the research team to observe how the KJFM community interacts with outside organisations. Word had gone round that there was a lot of money to be made by individuals that would be given the opportunity to work with the profit business enterprise and its meeting was very well attended. On the other hand, the meeting called by the Forestry Department on behalf of an NGO that was looking into the possibility of providing grants for community income generating projects was poorly

attended. This was instructive on the motivations for meeting attendance by community members.

In most studies on forest income, total forest income is reported as income from forest products that are sold and consumed i.e. the monetary value of the forest resources not sold is estimated and added to the cash income from forest products that are actually sold. This is also true for crop and livestock incomes. However, in this study total forest income only includes income from forest products that are sold. It did not include the value of the consumed resources (see section 4.1.2.2 for details). This may limit the comparability of this study to similar research. This author believes that the definition of total forest income used in this study did not negatively affect the research results as incomes were not the focus of this study, but were only used in one of the four objectives to get an impression of the contribution of forest resources from Katanino Forest to the livelihoods of the local community. The very detailed questions necessary for obtaining such information may also have unnerved most respondents. The researcher did not believe this was justified for reasons already alluded to.

3.5 Definition of Concepts and Variables

Household

One person living alone or a group of people occupying one or more housing units who make joint or coordinated decisions over resource allocation and income pooling. A household has one person, usually an adult male recognised as the head of the household. A man and 3 wives is therefore one household even when each wife has her own housing unit in the family compound.

Local Community

The residents living adjacent to the forest within a maximum range of 5Km from the edge of the forest (Jere, 2004).

Low Income Group

Consisted of households earning the bottom 25% or the first quartile of the income bracket i.e. less than or equal to ZMK1, 390,000.

Middle Income Group

Consisted of households earning annual income between 25 and 50% i.e. 1st and 3rd quartile of the income bracket (ZMK 1, 390, 0001-3, 250,000).

High Income Group

Consisted of households in the top 25% of the income bracket i.e. their annual income was more than ZMK3, 250,000.

Total Annual Household Income

This is a sum of the household's incomes from crop production, trading, livestock income and remittances per year.

Total Annual Household Crop Income

This was calculated by aggregating the value of each crop harvested by a household, using the market price for the whole harvest, whether consumed or sold.

Total Annual Household Crop Costs

This was the sum of the cost of seed, fertilizers, and hired labour. It did not include household labour or seeds for minor crops from the household's previous harvests.

Total Household Forest Income

This was calculated by aggregating the incomes from all the forest produce from Katanino Forest that is sold by the household annually. It did not include the forest products that are consumed as it simply was not possible for the respondents to remember the quantities of the different forest products they consumed as a household. It also did not include fodder for animals because the study community does not collect for their animals. All the animals, except the few hybrid pigs, are free ranging and left to find their own food.

Village

This is as defined in the KJFMA Memorandum of Understanding. A group of villages were put together to make 1 large village managing a forest zone.

Gini Coefficient

This is a measure of relative income ranging from 0 (perfect equality) to 1 (perfect inequality). It is based on the Lorenz Curve, which shows the variance of the distribution of income from perfect equality. It is the ratio of the area between the 45 degree line and the Lorenz Curve to the total area under the 45 degree line. It was used to measure income inequality among the study community.

3.6 Data Validity and Reliability

Validity of data conveys how adequately a measure used in research captures the phenomenon under investigation. Reliability of data reflects the consistency of results across different measurement. Observed differences in results should be due to a genuine difference in the sample and not because of the unreliability of the data collection techniques or the researcher.

Validity concerns in this study were addressed through the refining of all data collection tools to the best possible standards. Pre field survey training sessions were held by the research team so that every member has the same understanding of what the different data collection tools were meant to achieve and how to explain the questions in the questionnaires to the respondents. The principal researcher and her assistant have wide experience in data collection and field dynamics from their past positions as research assistants for a social and market research multinational firm.

Reliability problems may arise as a result of some respondents wilfully giving wrong answers. This was counteracted as much as possible in the field. The researcher has also avoided making extrapolations based on rough estimates preferring not to provide quantitative data in cases where the reliability of figures left much to be desired.

3.7 Research Ethics

The researcher found herself in a big dilemma during a community meeting that had been called by a Non Governmental Organisation that gives grants to communities based on proposals submitted to it and after field verification by its staff. The representatives of this NGO wanted to verify the information in the proposal concerning the community activities and to explain to the community the conditions for the grant. It quickly became clear to the research team that the community was not being truthful about the numbers of members they had in the user groups and the functioning of these groups. On being asked about the members for each VRMC, the concerned leaders would stand up, open a page in their books and shout out numbers of members. The community would enthusiastically agree to these figures when it was clear they were blatant fabrications! Most interesting to the research was the 'gender sensitivity' of these fabrications. It was always almost equal numbers of men and women.
While all the community members interviewed had said that all the committees and user groups were not working as there were no on-going activities and people had lost interest, the community told the NGO representatives that they met every two weeks to plan activities and that the only problem was a lack of finances. Commitment was very high.

The researcher was at a loss for what to do; whether to tell the visitors that they were being taken for a ride and if they recommended the projects, their recommendations would be based on false information or keep quite. After consultations with the research assistants, it was resolved that the research team should not say anything. It is up to the NGO to conduct thorough investigations of communities it wants to give grants to. If other research teams could afford to sleep in tents and walk long distances in the scorching heat in pursuit of information, the NGO only had itself to blame for allowing its people to drive into the community in big 4x4 vehicles, talk to the "community" for two hours and expect to have obtained reliable enough information to base the disbursement of large sums of money on. Also, after having been told that there was a group of students conducting research attending their meeting, the least they could have done was to consult with these "independent observers". The researcher recently heard that the concerned NGO had approved grants for bee keeping and food preservation projects in KJFMA. She will be genuinely surprised to hear that these latest in the long line of bee keeping projects in Katanino are successful.

The following chapter report the results, data analysis and discussions of the objectives of the study. One section of the chapter is dedicated to the results, analysis and discussion of each objective to ensure smooth flow of information and linking up of related ideas thus assisting the reader to follow the discussion more effectively. After all the results have been presented and discussed, a section is dedicated to address the major challenges and opportunities of Joint Forest Management in the study area as ascertained from the findings of this research.

CHAPTER FOUR

4 RESULTS, DATA ANALYSIS AND DISCUSSION

This chapter is dedicated to the presentation of the results, their analysis and discussion of the findings. The presentation will be done based on objectives. The results, data analysis and discussion for objective 1 will be presented in the first section, and then the same will be done for all the objectives. This approach has been adopted to aid the reader in following the findings and discussion of one objective without disruptions. A brief summary of the major findings are then presented and then the chapter ends with a short reflection on the data analysis tools for the study.

4.1 Livelihood Analysis

The results of the study on Livelihood Strategies and Diversification are presented in this chapter. They are presented using a whole range of data presentation methods with the data being analysed concurrently. After presentation of basic demographic statistics about the sample in a table, the rest of the results and data analysis is presented based with a discussion on the issues arising from the analysis.

Pic.4.1 Tree felled for bark rope, Katanino Forest, Zambia.2006

The significance of Katanino forest in the livelihoods of the community members is given special attention as this is assumed to have a bearing on potential community involvement in forest managing activities.

4.1.1 Sustainable Livelihood Analysis for the Study Area

The Framework for Sustainable Livelihood Analysis with guidance from the research questions was used. This entailed looking into people's differentiated access to and control over the different forms of capital, the activities they engage in to ensure their survival and the role that environmental resources from Katanino Forest play in their households.

All the respondents reported farming as their primary occupation. Even though some had businesses or skills, these were considered as incidental even in cases where these other occupations clearly generated more income than farming. All of the respondents grew crops for sale, with sweet potatoes, followed by maize being the most important sources of cash income. The mean household cash income from sweet potatoes was ZMK 876, 600 while that for maize[9] was ZMK 796,987. This was despite maize fetching a higher market price per Kilogram than sweet potatoes.

Table 4. 1: Basic Household Information of Sample, KJFM, Zambia, 2006

Variable	Mean	Standard Deviation	Q1	Q3	Range
Age of household head (yrs)	39.80	12.05	32.00	47.00	56.00
Education level of household head*	2.23	0.99	2.00	3.00	4.00
Marital status	Married 81.33%	Divorced 5.33%	Separated 2.67%	Widowed 8.00%	Single 2.67%
Sex of Household Head	Male 86.67%	Female 13.33%			

[9] ZMK- Zambian Kwacha. Currently 1US Dollar= ZMK 4200.
*Level 0-no education; Level 1-grades 1-4; level 2-grades 5-7; level 3-grades 8-9; level 4-grades 10-12

Sweet potato income (ZMK)	876600	1227871	300000	1000000	10000000
Maize Income (ZMK)	796987	793717	300000	1000000	5130000
Cassava income (ZMK)	82267	252788	0.00	70000	1500000
Total Crop Income (ZMK)	1755854	1423820	1000000	2300000	10240000
Costs of crop production (ZMK)	167293	237149	0.00	220000	1000000
Other income (ZMK)	738267	1366855	0.00	800000	7200000
Livestock income (ZMK)	52133	122954	0.00	20000	600000
Livestock costs (ZMK)	9467	35256	0.00	0.00	200000
Number of cattle	0.35	1.72	0.00	0.00	11.00
Number of goats	0.77	2.49	0.00	0.00	12.00
Number of pigs	0.60	1.84	0.00	0.00	9.00
Number of chickens	9.09	10.87	0.00	15.00	55.00

(Source: Field Data.2006).

Ellis (2000) defined Rural Livelihood Diversification as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living.

Members diversify among different activities. This diversification is both intra (within) and inter (between) an activity. For example, between agriculture and trading. Then within agriculture, different crops are grown (maize, sweet potatoes, cassava, groundnuts, sorghum, okra, beans, and indigenous eggplants) and a few livestock kept (goats, pigs, cattle, sheep, and

chickens). Though sweet potatoes, maize and cassava are the most important in terms of quantities grown and sold, the other minor crops also contribute both to generation of household income and meeting consumptive needs. Chickens are clearly the most important type of livestock. Mean number of chickens per household was 9 while for other types of livestock this figure was less than 1. Livestock income reported was very small (mean=ZMK 52, 133) evidence of the general path of people's behaviour of only selling livestock in times of stress.

In analysing the extent of forest dependence by households and villages, the cash income from forest produce as a percentage of total cash income was calculated. It turned out to be surprisingly small. Only 4%. This is much lower than the over 20% reported from other areas (e.g. Velded et al, 2004). However this only included cash incomes. It did not include the forest produce that is not sold in the market but consumed at home. The forest produce that is consumed by households was not included in the calculation of forest income because it proved to be extremely difficult to estimate the quantities that are harvested by a household annually, within the time and resource frame of this study.

Different members of households harvest different types of resources during different times of the year. Though the types of resources harvested from the forest are known, the quantities are not, as it is difficult to tract the amounts harvested by each household member. This challenge is compounded by the respondents' reluctance to provide estimates of the quantities of forest resources they harvest because currently harvesting of any type of resource from Katanino Forest is illegal. Attempts were made to extrapolate the figures from the few respondents that did provide estimates during the data analysis but in the end it was felt that this would lead to a gross misrepresentation of reality and a subsuming of behaviour that would otherwise provide a window into the challenges of JFM in the study area.

Table 4. 2: Annual Household Forest Cash Incomes. KJFM, Zambia, 2006

Variable	Mean	Std Deviation	Q1	Q3	Range
Total household cash income(ZMK)	2,678,753	2,028,248	1,390,000	3,250,000	11,290,000
Total Forest Cash Income(ZMK)	90,533	248,002	0.00	0.00	1,800,000
Total Forest Income/ Total Household Income	0.04	0.10	0.00	0.00	0.55

(Source: Field Data. 2006)

More than half of the sampled households reported a significant contribution to household food security for products from Katanino Forest (58.7%) and 28% for forest produce from open areas. More households access forest products for household use than for sale. Reasons put forward for this phenomenon was the seasonal nature of most of the forest produce that is sold. They become very abundant at a time, prices are driven down and therefore unattractive for harvesting for sale for most households, as they are considered unprofitable. The most common forest produce harvested were mushroom, wild fruit, fibres, and tubers. Only 2.6% reported obtaining medicines from Katanino Forest. The money earned from selling forest produce is used for, first and foremost paying for the grinding of maize into mealie meal (maize flour), and buying household essentials like salt, cooking oil, washing powder and food.

4.1.1.2 Benefits and Costs Derived from Katanino Forest by Adjacent Communities

Communities adjacent to forests derive benefits but also suffer costs by virtue of their proximity to the forests. Though the benefits and costs may not be as high as those for communities leaving near wildlife areas, they are nevertheless important as they affect the way the communities relate to the forest.

Box. 4.1 Benefits and Costs of Katanino Forest to Adjacent Communities. Zambia. 2006

Benefits	Costs
✓ Forest Resources-bamboo, bark, grass, leaves, rattan, stem vines, papyrus, fruits, fungi, nuts, roots, bush meat, honey, and tubers. ✓ Cash incomes from the sale of forest resources. ✓ Biodiversity, soil protection, maintenance of catchment areas. ✓ Support for income generating activities from various organisations in efforts to minimise forest utilisation. ✓ A lot of visitors-researchers, government officers. ✓ Capacity building-management. Business administration, environmental and forest management, beekeeping, food preservation.	✓ Time- attending meetings called about forest related issues. ✓ Labour- community members provide labour for forest boundary maintenance, forest inventories, early burning and control of late fires. ✓ Opportunity Cost- of the land on which the forest is.

Source: Field Data. 2006.

These benefits and costs are not equally shared by all the communities that are adjacent to the forest. For example, Biwa and Serenje Villages are close to the main highway so they make more money from selling mushrooms and fruits than Oposhi and Bwengo Villages.

4.1.1.3 The Five Capitals in KJFMA

Access to different assets is quite varied among the community members. While some households have brick houses, DVD players and grow irrigated cash crops using hired labour, others live in grass thatched houses and only have their own labour to depend on. An

overview is given below of the five capitals important in Sustainable Livelihood Analysis as articulated by Ellis (2000).

Social Capital

There are good social networks within the community. Most households have extended families living in the vicinity or nearby villages. A lot of reciprocal relationships exist among households, clans and villages. Membership in KJFMA opens doors to working with NGOs, government agents etc. KJFMA is registered and recognised as a legal entity that can sue and be sued under its own right. It is also easier for the community to receive grants through this recognised organisation.

Human Capital

This relates to unskilled labour mostly provided by households for agricultural production. Larger households and households with a high average household age have more labour at their disposal. Households can also access labour from the extended family, and labour groups (at a small in-kind payment). Labour sharing systems are also quite common. Education levels are low with the mean level of education for household head only seven years of education.

Financial Capital

There is not much financial capital in the community. Most household income comes from the sell of sweet potatoes, maize, mushrooms, charcoal and local brews. However this income is most commonly used to meet consumptive needs and not invested. Access to credit, subsidies and grants available through groups and cooperatives e.g. farming cooperatives buy fertilizer at only 40% market price from the government.

Physical Capital

Hoes are available for farming to all households, a few ox-drawn ploughs and carts accessed by some households for farming and transportation respectively. Mean number of cattle per household was 0.35. A government storage depot is available near by. Lower and middle basic schools are found in the area but there are no schools with senior secondary levels.

Natural Capital

Good agricultural land, forest resources, high rainfall belt have a synergic effect on household food security. The area has been ranked highest of all pilot JFM areas in terms of economic

potential based on available resources and communication. Though there is increasing land pressure in the area due to increased population, households still control large tracts of land (average 5-10ha per household) and land is not generally a limiting asset in choosing livelihood strategies.

Access to all these forms of capital is mediated by different factors. These affect the livelihood options that are available to a household. Households will therefore have different livelihood strategies based on the assets and activities that are available to them. The next section makes a comparison both within and between the villages studied.

4.1.1.4 Comparison of Livelihood Strategies within and Between KJFMA Communities

The communities living near Katanino Forest are very cash oriented. There is a good market along the roadside as it is the highway from Ndola to Kapiri Mposhi and the capital city Lusaka. Most of them also take their merchandise for sale to the capital city Lusaka. A lot of their activities are therefore tailored towards the generation of cash incomes. The two villages were compared in terms of crop and forest incomes (Appendix IV).

Although no significant difference was found in the mean crop income for households in Biwa and Serenje ($p=0.395$), there was a significant difference in the mean household forest cash incomes of the two villages .The mean annual forest cash income of a household in Biwa Village was less than that of a household in Serenje Village ($p=0.00307$). Even when the outlier of ZMK1, 800,000 forest income earned by 1 particular household in Serenje Village was removed and the test repeated, the conclusion remained the same ($p=0.00058$).

There did not seem to be much difference in the livelihood strategies of the two villages analyzed, though Serenje Village had significantly higher forest cash incomes per household. This could be explained by the fact that the main road passing those both these villages has a lay by at Serenje Village, which results in more vehicles stopping at Serenje Village to buy the forest products than at Biwa Village. Serenje Village's higher annual household forest cash income did not significantly affect its mean annual total household income as there was no significant difference between this and the mean annual total household income for Biwa Village($p= 0.267$).

4.1.1.4 Relationship between Total Household Income and Forest Cash Income

Forest cash income was found to constitute only 4% of the income portfolio of the households in the study area. Statistical tests confirmed the non significance of forest cash income in contribution to the total annual household income. An investigation(using Two-Sample T-Test) into whether households that reported a contribution of forest resources to their household food security had total household incomes different from those that did not get anything from the forest also found this not to be the case (p=0.899)(Appendix V). Statistical analysis of Forest Cash Income against Total Household Income using Linear Regression showed the non existence of a linear relationship between the two incomes (p= 0.227, R^2= 2%).

4.1.1.5 Forest Dependence and Total Household Income

Since the birth of the community conservation narrative, an ever increasing amount of literature has been dedicated to showing that poor people depend more on forests, and the environment in general. It is argued that environmental conservation programmes should incorporate poverty reduction in their design as poor people will continue to degrade the environment as long as they have no alternative sources of income. The findings of this study did not however support this assertion. In KJFMA, members belonging to the low income group are not more dependent on forest resources than their richer counterparts. The reverse is also not evident

Table 4. 3: Comparison of four variables among income groups, KJFMA, Zambia. 2006

Income group	Age of household head (yrs)	Mean Household Size	Mean Education level of household head	Mean Forest cash income (ZMK)
Low Income (≤1390000] zmk	39.47 (12.179)	5.029 (2.153)	2.118 (1.066)	47 368 (117,229)
Middle income (1390000-3250000]zmk	41.12 (12.11)	5.121 (2.837)	2.212 (0.927)	61 026 (60 496)
High income >3250000 zmk	35.75 (11.76)	4.88 (3.56)	2.875 (0.85)	206 471 (443, 874)

(Source: Field Data. 2006).

There were no significant differences among the mean ages of household heads; mean household sizes; mean education levels of household heads; and mean annual forest cash

incomes per household among the three income groups. (The standard deviations are presented in brackets below the means).

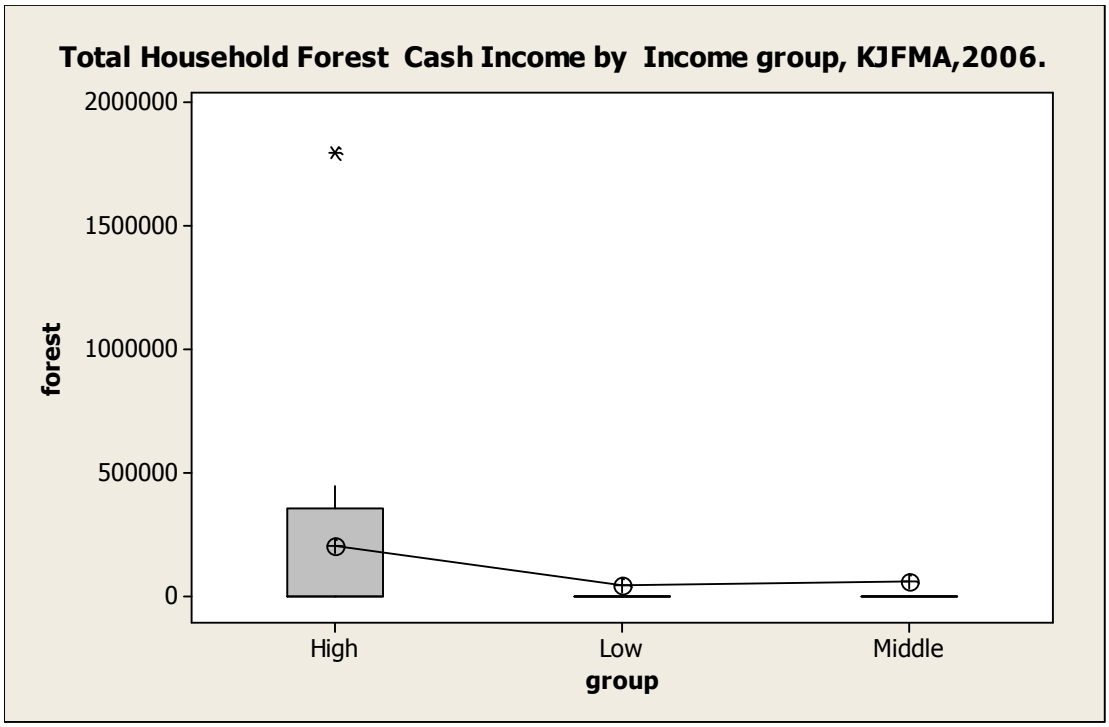

Fig. 4.1 Household Forest Cash Income by Income Group, KJFMA, 2006.

The income groups were categorized based on quartiles. The low income group and the high income group consisted of members with total annual household incomes in the first and last quartiles respectively. The middle income group was made up of members with annual total household incomes between the first and last quartiles (Fig.4.1). Though the mean forest income for the high income households was larger, this difference was not significant. The mean was influenced by one large outlier whose removal resulted in similar values for household income across the three income groups. The high income group had a very large standard deviation of ZMK443, 874.

4.1.1.6 The Lorenz Curve and Gini Coefficient

These were used as a measure of income inequality and to graphically show the distribution of income in the study area. The Gini Coefficient was = 0.248. . This means that there were no large differences in the incomes of a majority of the community members. This was confirmed from the Lorenz curve which showed that 10% and 90% of the population accounted for 7% and 58% of the total share of income in the community respectively. The

majority of the members are poor people with similar income sources with only a few households with very high incomes. The top 10% of the population had a share of 42% of the total income.

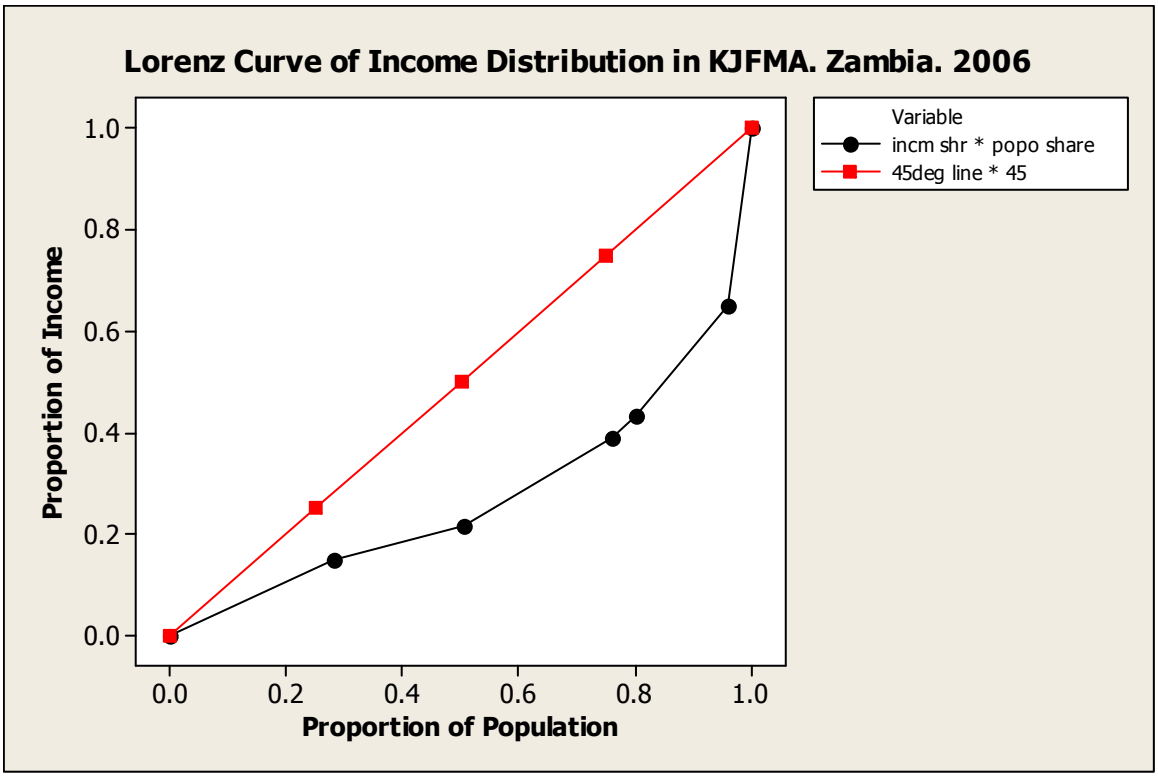

Fig. 4.2 Lorenz Curve of Income Distribution in KJFMA. 2006.

4.1.1.7 Relationship among Crop, Livestock, Forest, Alternative and Total Cash Incomes

A search for an analytical model that could best explain the relationships among the five categories of income as defined for KJFMA in this study was conducted. This was done using Best Subsets Regression. The analysis started with all the income categories being included in the model and then eliminated one at a time based on its influence on the R-square. The best model would be one with very small p- values and a large R-square.

The best model turned out to be;

Total Cash Income = 112646 + 1.02 Crop Income + 0.999 Alternative Income (Appendix V)

The significant contributors to the total household cash income are crop income and alternative income. These two incomes account for over 97% of the total cash incomes of an average household in the study area as shown by the R-square of 97.9%. Forest cash income

and livestock cash income were eliminated from the model because their influence on it was insignificant. This again confirmed what had already been made clear by other statistical tests conducted. Forest income does not have a big contribution towards the total household cash incomes of KJFMA.

The results and analysis presented above are discussed in the following subsection.

4.1.2 Discussion of the Livelihood Analysis

The following subsection of this chapter discuss the findings of the research related to the objective on assessing the livelihoods and dependence on forest resources by different groups of people living in the villages involved in the joint management of Katanino Forest.

4.1.2.1 Livelihoods are Diversified

The research findings indicate that there was a lot of diversification of livelihoods among the members of the villages studied. Most of the villagers were involved in activities that involved the sale of a resource for cash incomes. This orientation towards cash incomes was a consequence of two unrelated factors; firstly, a large number of the villagers are settlers from urban areas who went to live there after retirement from formal employment where they were used to having money every month. Secondly the villages of Biwa and Serenje are situated on the highway between Lusaka and the Copperbelt. This makes it easy for them not only to sell their merchandise along the road, but also to hike onto big trucks to go and conduct businesses in Kapiri Mposhi and Lusaka. Not many villagers in Zambia have this advantage of good communication. The average annual cash incomes earned by the villages may therefore comparatively be on the higher side. The crop income was for the year 2006 also boosted by the accessibility of government subsidized fertilizer and seeds under the Fertilizer Support Programme (farmers that are members of farming cooperatives paid less than half of cost of fertilizer under this programme) and the government's maize buying exercise which enabled the farmers to sell their maize to government at a nearby depot.

The study community is generally not involved in livestock farming. Though chickens are reared, this is done on a subsistence basis where the chickens are just left to fend for themselves with no deliberate management. Most of the sales of chickens are distress sales,

while consumption rates depend on the numbers and ages of the chickens that a household has.

Off- farm activities commonly include labour sharing systems where a group of farmers all work on a member's farm at a time, then move on to another's farm until all the members' farms have been tilled or weeded as the case may be. Another type involves a labour scarce household inviting people to help them farm their land in exchange for beer or food. Non-farm activities involve trading in charcoal, mushrooms, wild fruits, traditional beer, dried fish and groceries. Farming is the highest income generating activity with a mean annual crop income of ZMK 1,797,820 (67% of total household cash income) while contribution of forestry to annual household cash income is on average only 4%. The low contribution of forest products to the cash incomes of the households in the study can arguably be attributed to two phenomena. Firstly, the seasonality of most forest produce means that it is only available within a short period, and when it is available it is very abundant. This drives down prices and lowers its profitability. The produce is also very perishable, and gets spoiled before it can reach far off markets. This can be offset by preserving the produce and to this end a Food Preservation User Group was formed under PFAP. Members of this user group were trained how to preserve mushrooms, wild fruits and vegetables and how to make wines. They were even provided with the utensils for doing this. Unfortunately, these utensils quickly went into a serious state of disrepair and all food preservation activities came to an end.

The ban on harvesting of all forest resources from Katanino Forest that is currently in place and set to last until the commencement of JFM in earnest when permits and licences will be issued by the communities themselves also means that law abiding community members do not get anything from Katanino Forest and its contribution to their annual household cash income is zero.

According to Chambers and Conway (1992 cited in Siame, 2001:7) a livelihood is considered to be sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets without undermining the natural resource base. In analyzing the livelihoods of the study community, it has been found that the two major activities engaged in by the community i.e. Farming and charcoal burning are not being done in a way that is supportive of sustainable livelihoods. For most of the local people farming is a boom and burst activity. While a lot of money is made in the few months after harvest, by planting season most of the framers struggle to buy fertilizer and seed and to hire labour. The

returns from farming are not re-invested in farming but used for buying clothes, bicycles etc. In fact between the months of December to February there is quite a bit of hunger as the food stored from the previous season usually runs out for most families. This happens even for families that grow enough food to last them until harvest season because most of the harvest would have been sold for cash. Remittances from urban relatives are what make it possible for the farming cycle to continue for a substantial majority. However from the respondents interviewed, not a single one admitted to receiving remittances from relatives for anything. This is another example of the pervasive strategic behaviour of under reporting incomes in an effort to appear worse off so that "when people read the researchers reports, they will think that the local people are very poor and send money to the community".

As for the charcoal business, those involved also complained of the increasing difficulty of finding forested areas with trees suitable for charcoal. They claimed that in open areas there is virtually nothing left so they have to buy the logs from individuals that still have them on their lands. They also have to travel increasingly larger distances for them to buy the charcoal from people that can still burn it from the trees on their lands. This adds to transportation costs for the charcoal has to be moved to the roadside where it is sold or put onto trucks and ferried to Lusaka. The income from other activities like the selling of mushrooms and wild fruit, *chikanda*[10], *munkoyo*[11], caterpillars etc is also generally just used to meet consumptive needs, and not invested. This does not enhance their assets or capabilities. The extraction of NWFPs does not undermine the natural resource base, but charcoal burning on the other hand, diminishes the natural resource base as it involves the felling of big trees which are not easily replaceable.

[10] This is the root tuber of plant *Satyria siva* used to make a specialized meat like dish through addition of pounded groundnuts and bicarbonate of soda to the powder derived from the plant after it has been cleaned, dried and pounded. The final product has the texture of polony and is reddish brown in colour.
[11] This is a non alcoholic beverage made from the roots of *rhynchosia insignis* and a cereal, usually maize or millet.

Pic. 4.2 Bags of Charcoal along Ndola-Kapiri Mposhi Road, Zambia.2006

Stresses endemic to this area, and the whole country generally is the inter -seasonal drought when there is no rain. Since subsistence agriculture is rain fed this dry period brings with it food shortages. By December most of the food stored from the previous season has run out. Strategies for offsetting this food shortage include collection of mushrooms and wild vegetables, tubers and fruits. Some households and individuals also rent out their own labour in exchange for food, clothes or other household essentials.

4.1.2.2 Constraints of Measuring Income in Study Area

Though the constraints that are articulated below were observed in the study area, they can confidently be generalized to the rest of rural Zambia.

Income earned is not systematically recorded by the households. Households can recall how many bags of maize they sold to a government agency and at what price, also how many sacks of sweet potatoes they took to Lusaka for sale, maybe how many bags of dried, shelled maize, beans, groundnuts or pop corn they had at the end of the harvest season and that's just about it. A lot of income is not accounted for. For instance, a lot of maize is cropped while still fresh and either eaten or sold. For a household of 6, up to 4 different members may go to

the agricultural fields at different times to dig up sweet potatoes or cassava for the household. Each individual may come back with enough produce to fill a large basin. This is done frequently for months. This harvest is neither quantified nor accounted for when reporting crop incomes. Same is true for all the other food crops. The figures actually given as amounts of income earned from crops are therefore gross underestimates.

Costs of production are equally difficult to estimate in these scenarios. Most households save seed from own harvest for planting during the following season. This is supplemented by seed obtained from their extensive social networks, and is usually local seed. Hybrid seed is bought and planted by those households that can afford it, as it requires fertilizer. The bought seed is easier to cost as most heads of households remember how many bags of seed they had bought and how much they had paid for it. However the labour costs associated with either clearing fields or weeding are difficult to monetarise because households pay for labour in a multiplicity of ways and do not keep track of the amount of time invested. A young family with serious labour constraints may request help from village members. After a full mornings work, the 'helpers' are served food and *munkoyo* as payment. On other occasions, clan members help them with the implicit understanding that in future they will reciprocate. For most households and communities in general, the cost is not so important but the amount of harvest[12].

These constraints were also encountered in estimating incomes from forest produce. In the study community, mushroom is commonly sold along the road and to traders coming into the area from Lusaka. A household may sell mushrooms five days in a week at the height of the season. However, the amount of mushroom sold and the price at which the mushroom is sold is very variable as it is dependant on several factors (e.g. supply of mushroom, type of mushroom, size, type of customer, amount of traffic on the road etc). The money made from mushroom selling is quickly used to meet household needs. Different members of households engage in the sale of mushroom too. Though in the past collecting mushroom was a woman's domain, this is hardly the case any more. At the end of the season it is very difficult for a household to estimate with a high degree of certainty how much money they raised from the

[12] This has been observed in urban areas too. Most urban dwellers engage in agriculture. They walk long distances, use public or private transport to get to their gardens. Now it is common for them to hire labour and pay for it with food or clothes. Interestingly, the monetary value of the harvests can easily be less than the cost. It is possible for most to just buy their food crops from the markets at low prices and much less effort but they prefer to grow it on their own. Most just grow for consumption as 'the low market prices of the crops discourage them from growing crops for sale'.

sell of mushroom. On the other hand they are very clear about the difference that the mushroom made to the household food security. They are quick to say that it helped them. They at least made a bit of money to pay for grinding their maize; they were 'able to eat relish other than mushroom as they sold the mushroom and bought a different type of relish'. Such seasonal forest resources as mushroom, wild fruits and tubers are significant sources of livelihood as they are available during food shortage months when stocks of food saved from previous season are precariously low.

Hence, though income is the most direct and measurable outcome of the livelihood process (Ellis, 2000) in a setting like the study community use of income to analyze livelihood output would be severely inadequate for various obvious reasons. Firstly, a lot of income is not captured due to as discussed above a lack of record keeping or recall of activities by the community. Secondly, the amount of income derived from an activity or even the percentage is not *a priori* an indicator of the importance that an individual or household attaches to that activity. This is why individuals and household continue to engage themselves in activities with very high opportunity costs because it is not always about the money. Some low income activities may be extremely important to the household and a focus on just income would subsume this importance. For instance, the mean annual crop cash income per household in the study community was ZMK2, 678,753. This income was earned during a food abundant period for the households. When this is compared to the mean annual livestock income of only ZMK 52, 133, one could be tempted to consider the livestock income to be insignificant considering it is less than 2% of the mean annual household total income. However, this livestock income is earned when the household is in dire need.

Livestock income, usually from the sale of free ranging chickens usually makes a difference between having a meal or not for a household, or being able to take a child to a health facility. It is a sort of 'last resort' income. The household members remember that the year before they sold a chicken because they had no maize left in their granaries so they keep rearing the chickens. The same argument could be extended to forest cash income. Though the mean annual forest cash income for a household in the study area was only 4% and relatively small[13], it made a significant difference to some of the households. Clearly, the importance of

[13] Vedeld et al (2004) in the World Bank Publication 'Counting on the Environment' reported mean annual forest environmental income per household consisting 22% of total household income, while the median was for the same was 19%.

investigating entire livelihood portfolios of households cannot be overemphasized. As Njovu (2003) reports, 'the community members are comfortable to have a forest around although it does not offer direct income from wood sales but as long as they are able to collect NWFP and wood products that support survival at household level'. That is why livelihood analysis insists on investigating the many different ways in which households make their living, the means through which they access and control resources and the many factors that mediate this access as opposed to just their incomes(Ellis, 2000).

For the households of the study community the common activities are crop farming consisting of maize (both local and hybrid), sweet potatoes, cassava, beans, sorghum, popcorns, groundnuts, and various species of the *cucurbitaceae* family. On a small scale, there is also growing of vegetables like tomatoes, okra, aubergines, onions, and cabbages using irrigation during the dry season. Livestock farming is mostly free grazing chickens, a few goats, pigs, sheep and even fewer cattle. Stall fed hybrid pigs are bred exclusively for sale by a few households. Cattle are used for farming and transportation, only sold and consumed rarely. Trading in different goods, carpentry and bee keeping, spending some time with relatives in urban areas, meeting filial obligations and other reciprocal commitment constitute the livelihood portfolio of most households. One new activity that the study community has recently shown great interest in is the growing of Jathropha. The adoption of this bio-fuel rich plant as a normal part of the usual mix of crops grown by households is yet to be seen.

4.1.2.3 Assets, Activities and Mediating Factors

Assets, together with activities that an individual that owns them engages in determine the living gained by that individual or household (Ellis, 2000). At community level, the existence of communal assets like forests and the rules for their use also help in shaping individual and household activities. Studies conducted by PFAP I in the JFM pilot areas revealed that a high proportion of rural households utilized forest resources especially for subsistence purposes, though utilization for income generation was less widespread. All the firewood and 67% of medicines obtained from forests was reportedly used for subsistence while only 6% of forest foods and 3% of medicines were used for income generation (Njovu, 2003). Katanino Local Forest is the biggest natural capital that the community of KJFMA has. With its characteristic *Miombo* vegetation, Katanino Forest has 12 of the country's commercial trees. Although only 8.4% of these fall under the high value class, more than 46% can be converted to saw logs

while 25.4 % of the remaining volume can be converted to poles. Firewood makes up 27.3% of the tree volume (Njovu, 2003). The forest also has an abundance of fruits, medicines, bark rope, tubers, mushrooms and caterpillars. Some of these deserve special mention. For the fruits *Mpundu* (*parinari curatellifolia*) and *Mungongo* (*schinzophyton rautanenii)* have high economic potential as they contain oils that are prized in the cosmetic industry. They are also consumed and sold locally, including other fruits like *masuku(uapaca kirkiana)* and *mfungo (anisophyllea boehmii).* Various species of mushrooms (*Amanita, Cantharellus, Lactarius,Russuia termitomyces*), Caterpillars (*gonimbrasia, lobobunaea,imbrasia spp)* and *Chikanda*(*Satyrium spp)* are also readily available.

Aside from this natural capital, Katanino Forest has a rare advantage of having it easier for its products to reach markets because of the existence of the Ndola-Kapiri Road which traverses its western side. It was even reported as the best of the proposed JFM areas in terms of economic potential by Njovu (2003). So why is the KJFM community not tapping this natural potential and converting it to other forms of capital?

First and most importantly, because it does not have access to the forest in the true meaning of the word. Access implies the right or opportunity to reach, use or visit. While the community is allowed to visit the forest, its user rights are very restricted. Since Katanino Forest is a gazetted local forest, it means that the government owns all the forest resources contained therein even if the forest is situated on customary land. The community is not allowed to harvest timber as this is strictly under the control of the Forestry Department. There is an abundance of NWFPs which the community could be harvesting and processing before selling nationally or internationally. The Forestry Department could also preferentially issue casual, pit sawing or concession licences to individuals or groups within the community. Interestingly this was considered under PFAP and user groups formed to cater for community diverse interests. User groups that were formed were pit sawing, carpentry, food preservation and bee-keeping. It was envisaged that the pit sawing user group would be obtaining pit sawing licences from the Forestry Department, then selling their products to the carpentry user group. The other user groups were also aimed at adding value to the various forest resources they were interested in and then selling them. This would have been an excellent way of helping the community to raise income from the natural capital they have at their door step and as has been argued by a lot of scholars to provide them with motivation for managing the forest

sustainably. Unfortunately, because of the waiting game that full scale JFM implementation seems to have become in Zambia, most of these user groups are 'dead'.

The existence of physical and financial capital in KJFMA is, like in most of rural Zambia conspicuous by its absence. This area is even better off because it can boast of the Ndola Kapiri Road, and the road that forms the boundary between the Forest and Serenje village is an all weather road and open to vehicles up to the Camp site. Other common types of physical capital in the area are hoes, axes, ploughs, carts and bicycles. Individuals with trades e.g. carpenter, blacksmiths, and cobblers also have their tools of the trade. PFAP and a few NGOs had in the past tried to encourage small scale economic production processes by giving to the community tools and equipment to be used by the user groups. However, most of these tools and equipment have had very short life spans. The dryers given to the Food Preservation User Group are reported to have rusted and been abandoned within two months; some of the smokers that were supposed to be given to the JFM communities have lain in the FD Masaiti District offices for over a year. The bicycles that were donated to the communities by PFAP did not only stop functioning as 'community bicycles' within a short period but led to the withdrawal of membership from user groups by at least ten people, through their own admission. The fact that there were clearly not enough bicycles to give to every member did not seem to make any difference. "They told us that they would give all of us bicycles but when the bicycles came they only gave to a few people so we left the group". These sentiments were echoed by a married daughter of a headman and her husband.

While social capital in rural areas is ubiquitous, and an important part of the livelihoods of the individuals and households in the study area as well, it is also counterproductive in that it perpetuates conformity. Cultural and traditional restrictions were cited as some of the reasons for low participation of women in JFM activities. Women's low literacy levels; their limited access to and control over resources and benefits; community perceptions of women's inability to effectively contribute to JFM and their perceived lack of self confidence are all results of perpetuation of local norms[14]. These norms and traditions for instance deny women access to and control over resources, and thus place them in low socio-economic positions. Women's low socio-positions mean that they are at the mercy of either their spouses or male members of their family. Women are thus unable to articulate their positions with regard to

[14] Wonani (2004).

resource management, a situation which is inimical to sustainable forest management as women utilize the forest even more than men.

Since the organization Katanino Joint Forest Management Area is registered with the Registrar of Societies, it is a legal entity which can theoretically access credit from financial institutions. However, coming up with the collateral demanded by most financial institutions is a challenge the organization has not yet overcome. Fortunately, with the aid of the District FD the organization has been able to ask for help from NGOs like CRAIDS and JSPRF. At the time of the study there were good chances of JSPRP helping the community to restart beekeeping and food preservation projects by providing them with a grant to cover the cost of starting up these projects though with a proviso that the community should raise a percentage of the needed funds, though a small one. This, it was contended is meant for the community to value the projects as they would have committed their own resources as well.

With a mean education level of 5-7 years of schooling for household heads, the study community has low education levels which affect the activities and employment that its members are able to engage in. Under JFM where local participation is being demanded, the level of participation that local people can effectively engage in is quite limited. No matter how much capacity building is done at village level in issues of forest management, business and leadership training, as long as the levels of basic education remain low, the community will never be able to participate confidently and effectively at the highest level. As Pretty (1995 in Siame, 2001) puts it, 'village people are not used to participation on this (high) level. Restrictive forest legislation (of the past) lead to an attitude of inferiority, passive adaptation to rules and a deep mistrust of government officials on the part of villagers'. The relationship between FD and communities has largely remained paternalistic. The study community always waits for the FD, self mobilization is still alien. When asked why they cannot mobilize themselves and use the money they make from the sale of sweet potatoes and maize to buy beehives for themselves instead of always looking for outside help, one of the focus group discussants incredulously replied, "Do you honestly expect me to spend my hard earned money on bee hives? Bee hives that even my friends will be using? This is the only time of the year I get to buy clothes for myself and my children, clothes I dream about buying for the whole year. No! No! That's not going to happen". As shown by this person's response, and as has already been observed by one of the key informants, the study community has big problems in investing personal resources in 'community' or group programmes even when

they will definitely benefit. It is always expecting 'missionaries' to come and help it. Any outsider is perceived to be a potential benefactor. As long as this pervasive attitude does not change, it is this researcher's view that no programme is going to be sustainable.

Table 4. 4: Typology of Participation

Typology	Characteristic of Each Type
1. Manipulative Participation	Participation is simply a pretence
2. Passive Participation	People participate by being told what has already been decided or has already happened. Information being shared belongs only to external professionals.
3.Participation by Consultation	People participate by being consulted or by answering questions. Process does not concede any share in decision making, and professionals are under no obligation to take on board people's views
4.Participation for Material Incentives	People participate in return for food, cash or other material incentives. Local people have no stake in prolonging technologies or practices when the incentives end.
5. Functional Participation	Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet pre-determined objectives related to the project.
6. Interactive Participation	People participate in joint analysis, development of action plans and formation or strengthening of local groups or institutions. Learning methodologies used to seek multiple perspectives, and groups determine how available resources are used.
7. Self Mobilisation	People participate by taking initiatives independently of external institutions to change systems. They develop contracts with external institutions for resources and technical advice they need, but retain control over how resources are used.

Source: Pretty (1997)

A programme conceived by outsiders cannot succeed unless and until the intended beneficiaries value it to the extent that they are willing to invest something in it, instead of always just seeking something out of it. Using Pretty (1997) typology of participation (Table 4.4), the dominant type of participation in KJFMA is 'Participation for Material Incentives'.

Participating just for material incentives was why PFAP meetings and trainings drew large attendances. Food was given at these meetings, and a lot of things were promised. It is

difficult to determine whether or not the initiators of JFM promised what they could not deliver and over raised people's expectations in an effort to get them interested in JFM and meet programme objectives. What is easy to perceive however is the disgruntled feelings the community now has about JFM and its none performance; and the challenging task ahead of rekindling the initial interest if JFM implementation is to go ahead in this area in future.

The motivation for the government to seek local participation can also be speculated upon. Is it ,as alleged by some members of the study community, just to lower costs of managing forests by giving the donkey work of monitoring, boundary maintenance, early burning and control of late fires to the community while retaining the lucrative aspects (issuance of all timber licences) for itself?[15] Or is it out of serious concern for forest conservation and the desire to see local communities benefit from resources near them? Or is it donor prompted? In the case of Katanino Joint Forest Management Area, it seems as if the government is trying to introduce a tenure regime that is not appropriate for the prevailing conditions i.e. it is encouraging a common pool regime on a resource with little rivalry in consumption. Members of the local community have (sometimes even closer) alternatives for forest resources. The government has articulated that JFM means the participation of stakeholders in the sustainable management of forest resources and the sharing of benefits derived therefrom, according to the New Forest Act (1999). Whether this is just political rhetoric or not remains to be seen as the so called JFM Act has not yet come into effect despite its having been enacted in 1999.

As already mentioned, assets, together with activities that an individual that owns them engages in determine the living gained by that individual or household. However the possession of assets or merely having command over them, and the activities an individual can engage in to secure a living are mediated by several factors. Though women deserve special mention for being particularly limited in their command over resources and their own livelihood throughout their lives for socio-cultural reasons, the entire study community as things stand now, are very limited in their use of Katanino Forest. Although they have different types of capital as their endowments, they cannot utilize these to get benefits from the forest due to the restrictive legal framework still in place. The continued use of draconian forest legislature despite the enactment of new more community friendly forest laws is open to a lot of interpretations but lack of political will is the most intuitive one. All these, plus

[15] Functional participation, according to Pretty (1997) Typology of Participation

household demographics like household size, its asset status, collude to influence the livelihood strategies available to a household. They also impact on the interest or stake that the household will have in the forest. However, it is not only the households, varied as they are in terms of their interests and expectations from the forest that are interested in the forest but other stakeholders as well. In the next section, the major stakeholders and their rights, relationships among each other and to the forest, their responsibilities and returns from the forest as analyzed through the modified Stakeholder Analysis are discussed.

4.2 Katanino Local Forest and its Stakeholders

This section presents the results of a critical look into the individuals, groups of individuals and institutions that are in one way or another linked to Katanino Forest. This is done by analyzing the different claims that these entities have over the forest, the obligations that go with these claims and how these presumably contested claims have been addressed under JFM. The modified 4Rs Stakeholder Analysis (described in chapter 2) was employed to analyze this component of the research problem.

4.2.1 One Forest, Multiple Interests

Management of a natural resource involving many individuals and groups of individuals that value the resource differently is obviously a difficult task. Katanino Forest which is approximately 4500 hectares large and surrounded by a population of over 6000 (slightly more than 1600 households) has not been exempted from such a challenge. As an increasing body of literature continues to show, local communities are not spatially defined socially homogenous groups of people with common interests, values and shared expectations (Virtanen, 2000) as earlier believed but are heterogeneous spatially and temporally. KJFM Community (defined as all residents within a 5Km radius from the edge of the forest) is made up of even more heterogeneous groups of people than would normally be expected in a typical Zambian rural community because it has been settled by people of many tribal groupings, most of them retirees from the urban areas of Copperbelt and Lusaka Provinces.

This local community by virtue of its proximity to Katanino Local Forest has certain rights over the forest, which are different from and more specific than the rights of the general Zambian populace. However these rights, like all rights generally come with duties. Since other entities like the state, the private sector, and the national and international community

may also be interested in the forest, albeit with different sets of interests and are in a position to either materially affect or be affected by developments in the forest (Grimble and Chan, 1995), they should all be included in any stakeholder analysis on the joint management of the forest. The following subsections analyze the parties involved in Katanino Forest by looking at their benefits, duties, values and connections to the forest and to each other.

4.2.1.1 Who can get what from Katanino Forest?

According to Zambian law, all trees and all forest produce derived from national forests, local forests, state land, customary land and open areas are vested in the President on behalf of the Republic until lawfully transferred or allocated under the Forests Act or any other written Zambian law. Katanino Local Forest is gazetted and described as a local forest[16] situated on land other than state land, and is subjected to certain local rights which include meeting social, cultural and economic needs; the provision of raw materials for small and large scale industries, fuel wood and charcoal; conservation and development of forests for security of forest resources; protection of land and water catchment areas, wildlife habitats, ecosystems and fragile soils.

Villagers living within a radius of 5Km from the forest edge have user and management rights to the forest. This means that they are allowed to go into the forest and harvest NTFPs for home consumption or sale. The most common NTFPs harvested by the local community are wild fruits, mushrooms, root tubers, leaves, fibre and honey and the occasional animal. Once the Forest Act (1999) is in effect, they will also have rights (recognised in law)to get a share of the revenue from issuance of permits and licences for forest products from Katanino Forest though the details of how this will be actualised remain unclear as the JFM Guidelines are very vague on this issue.

In order to investigate further the legal or moral claims that the KJFM community has over Katanino Forest, it is necessary to discuss the tree and land tenure regimes of the area a bit further. The land inhabited by the people recognised as the local community is under customary law, specifically under the custodianship of Chiefs Mushili and Nkambo and

[16] Local Forests are differentiated from National Forests. Though both have been set aside as protected forest areas, the new Forests Act (1999) provides that Local Forests should meet the social, cultural and economic needs of the local community, and allows for JFM only in Local Forests, not National Forests. Another difference is that Local Forests are situated on customary lands while National Forests are on state land.

Chieftainess Malembeka. These traditional leaders have *de facto* control over the land in their respective chiefdoms in that, although the republican constitution states that all land in Zambia is vested in the President on behalf of the people, it is the chiefs that are involved in day to day land management in customary areas. They are the ones with the authority to decide who to 'give' the land to. This may be individuals desiring to settle in their chiefdoms or big investors trying to set up million dollar businesses. All projects to be set up in customary areas should therefore seek the chief's approval as the chief "owns the land" and can decide at will to change the use of a piece of land that has already been dedicated to another use. The guidelines for setting up JFM in Zambia clearly state that the local chief should support the idea of JFM in his area before it is set up. This may have been government's way of preventing jointly managed forests on customary lands from being turned into agricultural fields or settlements by securing the support of the chiefs right from the start. However, this may still happen, as even though the chief's support is secured at the beginning, there is nothing stopping him from changing his mind after a few years, especially if he feels his expectations are not being met. In fact, the lack of tenure security by JFM communities in Zambia is already one of the major criticisms of this novel approach to forest management in Zambia (PFAP, 2005: Jere, 2004).

As already mentioned above, the ownership of all trees lies with the state, even trees found on private land. Open Areas fall under customary land which is under the jurisdiction of chiefs. Therefore, while a local chief 'owns 'the land on which a forest is managed jointly by the local community and the government, the state owns all the forest produce. This means that local communities involved in JFM in open areas cannot own the trees, and cannot have title to customary land. Any land declared as a local (or national forest) becomes state land. On this type of land, both the forest and the land belong to the state. One direct result of these two statutes is that the communities do not have rights to alienate land. Also, whatever decision-making powers may be delegated to them under JFM can in effect only involve decisions about management and use, and use of NTFPs for that matter, not timber. The Forestry Department (government) still has control over the utilization and management of forest resources. Only it can issue pit sawing, concession, saw milling, casual, conveyance and charcoal licences. Even members of the local community are, by law required to get timber licences from the Forestry Department before they can get timber from 'their' forest and pay the same rates for licence fees as all other prospective licence holders.

During the field study, all the respondents that knew of at least one rule pertaining to the utilisation of Katanino Forest knew that they were not allowed to cut down trees from the forest. The reasons given for why this rule was in place as far as they knew were various but outstanding among them was 'because it was a government forest'. It seemed that it was generally accepted that the local community had no claims over the trees in Katanino Forest because the forest was not theirs. As for trees found in open areas, locally known as *impanga ya mfumu* (chief's land), these were perceived as being for the community. Resources belonging to the chief are resources for his subjects too while government's resources are just that.

In KJFMA the private sector is conspicuous by its absence. While the reasons for this may be various, it is easy to speculate that the lack of high value trees[17] in Katanino Forest may be part of the reasons. National Forests, where a lot timber is extracted have been exempted from being involved in JFM in Zambia. The reasons given by the government are that it would monitor the utilisation and exploitation of licences more effectively and ensure the security of forests of national importance (Jere, 2005). Since National Forests, the real jewels in the forestry sector have not been opened up to sharing mechanisms, the private sector has not seen a real need to be involved in JFM, especially since no incentives have been provided to whet its appetite. At the moment, no individual or company has been issued with a timber licence. This according to the District Forestry officials is because they have no framework by which they should be guided to issue such licenses as the government has not yet repealed the current Forests Act (19973) to pave way for implementation of JFM under the new Forests Act (1999). This has severely limited the scope for private sector involvement at the moment.

4.2.1.2 Rights and Duties go together

Rights and duties are two sides of the same coin and sometimes it can be difficult to delineate where rights end and duties begin. If a right is a person's *entitlement* to a privilege, then their duty towards that right is to do what they can to ensure that they can continue enjoying it. For a forest adjacent community, this would be utilising the forest sustainably.

[17] Although Katanino Forest has 12 of the country's commercial trees, only 8.4% fall under the high value class. These are also scattered over large areas, which is not very economical for commercial logging. On the other hand, Zambia's 57,000ha timber plantation estate consisting of pine and eucalyptus is preferred.

The local community adjacent to Katanino Forest has the following responsibilities as far as the forest is concerned:

- Maintaining the boundaries of the forest.
- Early burning (a forest management tool which minimizes incidences of fierce destructive fires in the hot season).
- Control of late fires.
- Issuance of permits for collection of NTFP from the Forest once the Forests Act (1999) is in effect.
- Monitoring of the forest to ensure it is in good condition.
- Drawing up of JFM plans in conjunction with Forestry Department and other stakeholders.
- Day to day management of the forest.
- Providing a financial report to the District Forest Officer within a stipulated period annually.
- Helping the Forestry Department in conducting forest inventories.
- Formulation of by- laws. These should however not conflict with government policies or legislation.

Although these responsibilities are clearly laid out in the JFM Guidelines, it is not clear who exactly in the community is supposed to do what and what happens if they don't want to be involved. During the field survey, some respondents said they did not take part in managing the forest because they did not get any direct benefits from it. When they are in need of some forest products, they either get from open areas or their uncultivated lands. This response was very much correlated to the distance of the respondents' households from Katanino Forest. Those living further away claimed more and more not to use the forest in any way and therefore not really part of its management though they acknowledged its ecological importance. "Us, we don't get anything from that (Katanino) Forest. We don't even know what is happening there" were quite common responses, especially on the western side of the Ndola –Kapiri Road where families live on farms.

The responsibilities of the Forestry Department have under JFM involved more office work and less of field work, as most of the field work related to forest management has been allocated to the local communities. The main duties now are:

- Licensing of the commercial cutting of trees.
- Providing technical assistance to communities in the preparation of JFM plans.
- Approval of the JFM plans.
- Conducting forest inventories.
- Ensuring sustainable flow of wood and non-wood forest products and services while ensuring protection and maintenance of biodiversity for the benefit of present and future generations through active participation by all stakeholders.
- Gazetting Forest Resource Guards as Honorary Forestry Officers.
- Developing project proposals and soliciting for funds, grants and donations on behalf of their JFM communities.

Presently, as already alluded to, no issuing of any kind of timber licences for Katanino Forest is being done by the Forestry Department. It is interesting to note that the Forestry Department's mission statement is 'Ensuring sustainable flow of wood and non-wood forest products and services while ensuring protection and maintenance of biodiversity for the benefit of present and future generations through active participation by all stakeholders'. This is a tall order. Not only should the Department ensure a sustained flow of wood and non-wood forest products and services (something it has had major difficulties in achieving in the past), it should also ensure biodiversity is protected and all this, through the active participation of all stakeholders. This means that foresters give up some of their powers to share them with other stakeholders. Whether this is something foresters are ready for or even want is an important question.

Under JFM the local community that had previously been excluded from the forest has been given responsibilities to manage the forest. In order to get commitments from the community, it should also have assured rights, either more or better rights than it had prior to JFM otherwise the whole exercise will be futile. Gonsalves (2006) argues for a complete transfer (medium to long term) of the natural resource base to the local community for it to manage on its own, and as it sees fit to meet both individual and community level needs.

4.2.1.3 What are stakeholders getting out of it?

Advocates of Community Based Natural Resources Management (CBNRM) postulate that people that actually utilise a given resource and acquire first hand knowledge of such a

resource through their daily interaction with it are in the best position to protect and manage it. This, they contend, will result in an improved environment and improved livelihoods for the community. Improved livelihoods are caveats for continued engagement of communities in CBNRM activities, which should come about through their increased access to natural resources (Gonsalves, 2006).

For its local community, Katanino Forest is a source of fruits, fungi, tubers, fibres, caterpillars, game meat, honey, and medicines. Cash incomes (mean per household of ZMK 90,533 annually) are earned from the sale of forest resources. Other benefits include biodiversity and soil protection; the maintenance of catchment areas; Support for income generating activities from various organisations in efforts to minimise forest utilisation; a lot of visitors-researchers, government officers; Capacity Building. So far community members have been trained in Business Administration, Environmental and Forest Management, Beekeeping, Food Preservation etc.

The types of forest resources harvested from the forest are largely gender based though there is a substantial degree of flexibility. Men typically go into the forest for building poles, fibres and thatch grass. Women go there mainly for wild edible plants, mushrooms, and firewood. Both men and women harvest medicinal plants of different species for different ailments. Men also reported going into the forest for mushrooms, though not as often as the women or the children. Benefits from the forest also include the unpublicised use of the forest as a place for performing different cultural rituals e.g. initiations into womanhood or marriage, and cleansing (after abortion/ miscarriage or widowhood).

Pic. 4.3 Two boys display mushrooms, Katanino, Zambia. 2006

Revenue from the issuance of licences for commercial uses of trees from Katanino Forest once it is again available, as well as revenue from fining forest offenders will help the Forestry Department in meeting its forest management duties. Sustained production of forest resources, its provision of ecological services, existence and option values (public good), sustained production of forest are some of the returns to the Forestry Department from Katanino Forest. The reduced cost of managing the forests is probably the most important benefit of JFM for the Forestry Department. As aptly put by PFAP (2005:5) in its Programme Completion Report,

> The main economic justification for JFM lies in the reduction of management costs to government and the securing of user access for subsistence goods for forest adjacent communities, rather than on potential inflows of cash from the sale of forest products.

For the other stakeholders, returns from the forest include being able to buy mushrooms, wild fruit, fibres, tubers etc harvested from the forest; being able to conduct research on forest or natural resource management related topics (researchers and students); Boundary

communities utilising the forest and its resources sustainably to improve their livelihoods is also an asset. The most obvious return for future generations is that they will have the option of having the forest to use in whatever way they may deem fit.

4.2.1.4 How do local people and the Forestry Department relate to each other and to the forest?

Villages are made up individuals that are heterogeneous in terms of age, gender, ethnicity, economic status, life aspirations and social capital. This heterogeneity was exemplified in the more than 10 tribes represented by the households that the research team came into contact with during the field survey. The reason for this state of affairs as explained to the researcher was that most people presently residing in the areas were settlers from other parts of the country, commonly mining towns. These went to settle in the area after either retrenchment or retirement. The study area was preferred for settlement because of its good soils and good communication. The result of this immigration is a community composed of very heterogeneous people. These differences among them account for individuals' varied relationships to the forest and to other forest users. For example, one household had solar panels; brick houses with galvanised iron sheets; mobile phones; DVD players; diesel pump used for irrigating crops during the dry season etc. This household did not seem to consider Katanino Forest important even though the forest was close by. For other households and individuals, Katanino Forest is mostly a source of NTFPs. These NTFPs are significant in their livelihood portfolios because they are available during the rain season when there is no food coming from agricultural fields. Selling mushrooms is part of livelihood strategies for a sizeable portion of the community. For charcoal burners, the forest is a significant source of bark rope[18] for tying up of bags of charcoal. The Forest is also an ever present source of medicines for different ailments. Members reported 'free' movement into forest because the forest is now 'theirs' under JFM as opposed to before JFM when they 'felt like thieves' every time they were in the forest and used to scamper at the sound of a vehicle or peoples' voices**.** What JFM has achieved is basically just to formalise activities that the community has always engaged in despite the 'fortress policies' that were a living legacy of colonialism up to over 3 decades after Zambia's political independence.

[18] Locally known as *inshishi*, this is the schrenchyme girdle of mostly *Brachestigia boehmii*.

There are generally shared norms among the community related to the utilisation of the forest. It is commonly accepted that rules and regulations against forest use currently in place should be respected. Therefore individuals that break the rules do not normally do this blatantly but in secret for fear of being seen by the general community. This is especially true for activities (e.g. cutting down trees) that are perceived to be serious offences by the community. Community members do not hide when they harvest mushrooms or wild fruit as this behaviour is acceptable to the community, even though the ban against harvesting anything from the forest is still in place. As one patrolman observed "it does not make sense for me to stop a person from uprooting mushroom from Katanino Forest when I know the mushrooms are just going to rot if they are not uprooted".

The relationship between foresters and communities are much improved under JFM (though Forestry Dept still paternalistic towards communities). Hitherto, the relationship was one of mutual antagonism and suspicion. Foresters were seen as 'leaf counters' whose mission was to stop people from accessing the forest. The relationship has been slowly moving towards partnership though communities expressed sentiments of being left with a lot of JFM work to do with little or no help from the Forestry Department. The Forestry Department regards the forest as a resource that still has to be protected for its important ecological functions but is now more open to 'sustainable use' as opposed to its pre-JFM preservationist standpoint.

In terms of legal aspects of the relationship of boundary communities to the forests, the communities do not have a lot of bases on which to exert their claims because the tenure has not changed from pre-JFM days when the government owned all the forest produce and the land associated with local forests (even if the local forest is found on customary land which is under custodianship of chiefs). Socio-cultural relationships e.g. forest as burial sites for important ancestors like past chiefs are virtually non-existent because of the past history of prohibition of communities from doing this in the forest. These people-forest relationships exist in open areas (or chiefs' lands) which have always been open to the local community.

In analysing the 4Rs of the stakeholders in the study area, it has been noted that there were very little, if any ambiguities concerning who has what rights over the forest. The state was perceived to have authority over Katanino Forest while the chiefs were perceived to own all customary land. There was more ambiguity over responsibilities and returns.

4.2.2 Discussion of the Stakeholder Analysis

Grimble and Chan (2001) defined stakeholders as groups of people with *common objectives and sets of interests* with regard to the resource in question and the environment who are either materially affected by, or can materially affect developments designed to bring about a particular transformation (emphasis added). Various criteria have been proposed by different scholars for defining stakeholders (e.g. Borrinists-Feyerabend, 1996). When the Government of Zambia made the decision to include other stakeholders in the management of the country's forest resources, it seems proximity to the forest resource was its most important criterion. This inference has been premised on the fact that though the government has defined JFM as the sustainable management of forest resources through the participation of stakeholders, it is only the participation of those that are closest to the forest resources (forest boundary communities) that has been made compulsory for any JFM to start. In KJFMA only the government and the forest boundary communities signed the Memorandum of Understanding (MoU) on how they were going to work together to jointly manage Katanino Forest.

The Local Forests (Control and Management) Regulations of 1999 have made provision for a representative of holders of licences in a JFM area to be on the Forest Management Committee for that area.[19] Therefore, the private sector has at some level been included as stakeholders in JFM. However this does not seem to be known by the community and did not come up in any discussion of composition of FMC conducted during the field study. There is a lot of criticism however of the perceived over representation of government on FMCs[20] which has left little room for other stakeholders.

The two entities considered as primary stakeholders in this study were the Forestry Department (government) and the Forest Boundary Community. These were the two entities that, to borrow part of Grimble and Chan (2001) definition of stakeholders '…are people who are either materially affected by, or can materially affect developments designed to bring about a particular transformation'.

A few points are now made about the major issues arising from the analysis of the 4Rs

[19] Statutory Instrument No. 52 of 1999.

[20] Refer to Chapter 2, Section 2.9.1 of this volume for composition of a FMC

4.2.2.1 Revelations from a critical look into Rights, Responsibilities, Relationships and Returns among Stakeholders.

4.2.2.1.1 Rights

The Forestry Department still has too much control. It owns all the trees and all the forest produce. Although the sharing of revenue has been proposed and the legislature to bring this about already enacted, the government should go further by sharing ownership as well. Sharing of revenue from JFM areas is proposed for all JFM areas including those areas in Open Areas. There is no need for government to share revenue from JFM areas in Open Areas. This would be taking away from what the people already had, instead of government letting go of the too much it already has. The ownership, control and management of forest areas in Open Areas should be left to the communities on whose land they occur. The community needs more rights to the forest in order to justify their increased forest management responsibilities.

4.2.2.1.2 Responsibilities

The responsibilities of the Forestry Department under JFM do not involve a lot of going out into the forests. Only the communities are 'getting dirty'. The Forestry Department can at least be involved in the annual forest boundary maintenance. This would go a long way in cementing the working relationship with the community. It also came up during focus group discussions that community representatives used to be involved in the planning and budgeting for JFM activities during PFAP days. It would be a good gesture for the Forestry Department to share this responsibility with the JFM community again once funds are available.

While it is understandable and even commendable that the Forestry Department gazettes some patrol men as Honorary Forestry Officers, it is not immediately clear why in carrying out this important responsibility it has no regard for local dynamics. The current crop of Honorary Forestry officers has no representation from Biwa Village. This has been a source of complaints by Biwa Village. The response given that the final decision was made by Forestry Department Headquarters in Lusaka and not the district offices in Masaiti only adds salt to the wound as the local people cannot understand how "people in Lusaka who do not even know them should be the ones making the decisions" . In future the Forestry Department would do well to keep a balance among the four villages that are part of KJFMA in its selection of applicants to gazette as Honorary Forestry Officers.

The combination of rights and duties between the local community and the Forestry Department (Government) is highly skewed. The Forestry Department has a lot of authority while the local community received the bulk of the management responsibility. Since the local people do not have the ability to realize their interests in the face of the Forestry Departments' interests, they have simply shown apathy towards JFM and continued pilfering from the forest. Transects into Katanino Forest by the research team revealed that the forest is in surprisingly good condition. Although there was clear evidence of illegal activities (picture 4.1), the status of the forest was very different from what one would expect in a situation where both the Forestry Department and the local community are doing very little to manage the forest. For the District Forestry Office, its perpetual lack of resources prevents it from visiting the forest at close enough intervals that would enable to effectively monitor the status of the forest. As for the local community, only a small group of people were carrying out the forestry management activities. Although the activities of the 'committee' were commendable, it was difficult for this researcher to believe that this small group of people had prevented the rampant clearing of trees that has been documented in other areas. It was therefore speculated that the pressure for forest resources from Katanino just was not that high. Reasons for this could be the still abundant land available to most households in this area. In fact land was never cited as a constraint to agricultural production by even a single community member. The major constraints to agricultural production were fertilizer and labour. The second reason could be that forest resources were available in open areas and 'private 'uncultivated lands. From the sampled households, 28% reported sourcing forest resources from areas other than Katanino Forest. Zambia's comparative forested area abundance[21] may therefore help to explain the relative lack of conflicts (and reduced dependence) where Katanino Forest is concerned.

4.2.2.1.3 Returns

According to the JFM Guidelines, the revenue made from a jointly managed forest will be shared between the government and the JFM local community. The proposed ratios are 60% for the Government (central government, Forestry Commission and FMCs) and 40% for the community (traditional leaders, VRMC).[22]Part of the share going to Forestry Commission will go to the district forestry office in whose jurisdiction the revenue was derived[23]. This

[21] Zambia has one of the highest areas of forest per capita in Africa, and is one of the most forested countries in Southern and Eastern Africa
[22] Jere (2004) p34.
[23] Interview with District Forestry Office Personnel conducted on 11th December, 2006.

would help build capacity at district level and make it possible for the district office to meet its JFM obligations e.g. visiting the JFM communities, carrying out inventories etc, something they are presently failing to do due to lack of resources.

Theoretically, the Forestry Department is expected to have the benefit of reduced management costs. This is predicted to happen after the communities have been trained to manage forests and net revenue is flowing into the communities. It is assumed that JFM areas will actually be making profits. In Zambia, and unlike other countries, JFM has been mostly proposed in areas where forests are still in relatively good conditions, and the possibility of generating more revenue than costs may be quite high. However it still remains to be seen whether this will be the case in practice. Some are very skeptical about this. For example, PFAP has argued that although there is potential for revenue from timber in a Miombo woodland (of which the JFM pilot areas are composed), the revenue will only be significant in the best stocked forests of northern and western Zambia (2005). It also still remains to be seen whether the benefits from JFM for the communities will be enough to justify their continued interest in its activities, especially since most JFM benefits are long term.

4.2.2.1.4 Relationships

While acknowledging that it takes time to rebuild relationships, it is difficult to imagine those between the Forestry Department and forest boundary communities as ever reaching a level where they can be called equal partners. It is easier to visualize their relationship more as patron and client, or big brother versus small brother. How could they be partners when one still owns everything and only invites the other to help manage some of it?[24] While it is true that relationships between the Forestry Department and forest boundary communities have improved, a lot still needs to be done. Bromley and Ramadhani (2006) define JFM as a collaborative management approach which divides both forest management responsibility and returns between government (local or central) and forest adjacent communities. In KJFMA the forest management responsibility seems to have been left mostly undivided whereas the returns are divided. The community has received a disproportionate share of forest management responsibility.

[24] Forestry Department is still in full control of National Forests as JFM is not permitted there. Local Forests, where JFM is permitted make up only 2.8% of the country.

The analysis of the 4Rs in KJFMA has revealed that there is a disproportionate share of responsibilities with the community at the receiving end. The government has not gone nearly far enough to relinquish control. The communities have only been given user and access rights while the government retains control and ownership of trees and all forest resources, and their regulation. Therefore JFM has not changed anything. As observed by the PFAP Phase II Mid Term Review, *"the benefits of JFM may be limited to the legalization of the resource utilization practice that the villagers have already been enjoying*"[25] .There is a serious lack of tenure security for the communities involved in JFM especially on customary land. The chief is the custodian of the land while the state owns the forest produce. What happens when the chief decides to do something else with his land? Though chiefs have been given a role during the setting up of JFM, the legislation is silent on their roles after JFM has been implemented. This may create problems in future, especially when sharing of revenue commences and the communities have to share the revenues with the chiefs.

The JFM guidelines stipulate that the Forestry Commission[26] will control the revenue management of the VRMCs. This commission will also issue pitsawing, concession, sawmilling, casual, conveyance, charcoal and any other licences, on the recommendation of the VRMC or FMC. Clearly the government has retained control over most of its pre-JFM responsibilities that generate revenue. It has even gone to the extent of controlling revenue management of the VRMCs. Is this a sign of complete lack of trust in the communities where money is concerned? An alternative would be just to monitor the VRMSc financial management, not to control.

In concluding the section, the analysis of stakeholders has shown that under JFM in Katanino only the forest boundary communities and the Forestry Department itself can be considered as primary stakeholders as things now stand. The private sector has not participated in the piloting phase while NGOs are at least becoming visible albeit only to support forest based income generating activities.

There are clear imbalances among the stakeholders' 4Rs. The local community's lack of tenure security under JFM is a problem. While it is true that this is the same land and tree tenure as existed before JFM, it is a thorny issue now because the local community has forest

[25] PFAP II Mid year report in Jere (2004: p36).
[26] This will be the new name for the Forestry Department once the Forests Act of 1999 comes into effect.

management responsibilities. Before JFM, everything belonged to the government, and the government also managed the forest. But now, everything still belongs to the government but the communities have management responsibility. So tenure becomes an issue. The Forestry Department (government) has retained too much control despite the political rhetoric to the contrary. While it is quick to let control of forest management responsibility (boundary maintenance, control of late fires, early burning) it does not show the same commitment when it comes to decision making or financial management responsibilities. The lack of commencement of the 'JFM Act' eight years after enactment by parliament makes one think the government is dragging its feet in actualizing even the little that has been promised other stakeholders in forest management.

4.3 Local Institutions and the Management of Katanino Forest under JFM

After the failure of many development programmes designed by 'experts' to bring development to rural communities of developing nations, a new paradigm of community participation started taking root. In natural resource management this saw the hitherto hegemonic paradigm of 'fortress conservation' being replaced by one that stressed the need to include local people in the management of natural resources. Proponents of this school of thought contend that communities are more efficient managers of natural resources in their areas of jurisdiction than other actors or agencies (Adams et al, 2005). Community based forest management institutions, or the set of rules, values and norms that guide decisions about resource management by community members have received a lot of attention from researchers in terms of how they function, what impacts they have on different people and environments etc. (Edmunds, 1997).

4.3.1 Analysis Using Ostrom's Design Principles

Ostrom's work on institutions in common pool regimes has been very influential in this field. Her Design Principles for Enduring Common Pool institutions developed to aid the prediction of CPR institutions although not without their share of criticism are increasingly being employed as analysis tools by many a researcher in this field. The Principles were employed in this study to examine the effectiveness of the local institutions in the villages that make up KJFMA.

4.3.1.1 (i) Clearly Defined Physical Boundaries

The boundaries of Katanino Forest are clearly defined and known to the general population. The 'community' has been involved in annual boundary maintenance for over three years now. The major competing uses for the forest are agricultural land pressure, charcoal, poles and fibres. However, since the forest is a demarcated local forest and therefore under state control, all these competing uses that are contrary to the provisions of Forest laws pertaining to local forest have been forgone. Cultivating inside the forest is strictly prohibited. Appeals were made by local people (approximately 8% of sample) to the research team during the field study for the Local Forest to be de-gazetted so that they could use it for agriculture. However, these appeals were made more as a sign of frustration with the stagnation of the JFM process than a serious need for land." Since they (Forestry Department) are not using the forest for anything, they should just give it to us we start cultivating there".

4.3.1.1 (ii) Clearly Defined Membership and Rights

At the time of study, (and for three years preceding that), local communities had not been allowed to get anything from the forest pending the issuance of permits for harvesting NTFPs. On the ground however, most villagers do get some forest produce from Katanino Forest (commonly mushrooms, fruits, tubers, fibres). Cutting down trees to get the bark rope has become increasing common (picture 1) though many local people frown upon it. The major culprits of this vice are charcoal burners and bark rope traders. Cultivating and burning charcoal in the forest are also seen as "cardinal sins". The common perception of the local people is that the forest belongs to the government which has rights to decide what activities the villagers can legally engage themselves in within the forest. Presently this includes allowing community groups or organisations (not individuals) to have bee- keeping enterprises inside the forest. While the local people have user and management rights, they have no rights to sale or lease the forest. Even though the forest is found in a customary area, not even the local chiefs, who otherwise have domain over customary land, can sell or lease the forest since it is a local forest, and therefore under government control. However, chiefs have been known to give away land in Local forests. Once the forest is 'invaded' by settlers, it is very difficult to move them out. Usually there is no political will to expel 'squatters' from forests.

According to Forestry Department officials, members of Katanino Joint Forest Management Area are supposed to be anyone living within a 5Km radius from the edge of Katanino Forest who by virtue of their rights over land (rights inherent in customary tenure) invest in and

derive benefits from the utilization of forest resources in their area. However, according to the local leadership of KJFMA, anyone who wishes to join KJFMA formally should apply to its executive committee which then decides whether to allow him or not based on his/ her forest utilisation and management record.

4.3.1.2. Congruence between Appropriation and Provision Rules and Local Conditions

The responsibilities of the community include: annual forest boundary maintenance, early burning, control of late fires and forest monitoring. Only a small group of people, most of them members of the executive committee are actually doing this. This group of people gets nothing in return for their efforts. This is a source of lamentation for them since as things stand at the moment they are not allowed to harvest any forest products. The irony is most community members disregard the ban[27] on getting anything from the forest pending complete implementation of JFM while the Committee that does the community forest management work also mostly obeys the ban. According to Ostrom (1997) this distribution system would be at risk of disintegrating as those who contribute time and effort to sustaining the forest are not happy with the fact that the benefits are even accruing to those not involved in the forest management work.

Any person who fells, cuts, fashions, burns, injures, takes, collects or removes any forest product without a licence, grazes domestic animals or allows domestic animals to trespass in a Local Forest commits an offence, according to Section 24 of the Forests Act (1999). This applies even to members of forest adjacent local communities, who have to get the necessary licences at the same rates as outsiders, and pay same royalties, levies or fees for any forest product. This is a disincentive for the local community as it is treated like "anybody" else but expected to put in more than others where forest management is concerned.

4.3.1.3 Collective Choice Arrangements

Local people can participate in the decision-making processes through the Village Resource Management Committees and the Forest Management Committee. The VRMCs are made up of representatives of village headmen, forest resource guards, and user groups. There is also a target for women to make up 30% of every VRMC. However this provision means little if it is taken up by women whose voices are not heard. Literacy levels were lower for women than men[28]. Illiterate women were reluctant to take up positions which required writing skills

[27] During the present study, 58.7% of the respondents reported harvesting forest products from Katanino Forest.
[28] The author does not have specific literacy rates for the area. However this perception is backed by field observations and informal chats with community members and key informants.

.The composition of the VRMCs is stipulated in the JFM Guidelines. The FMC must have representation from the local chief(s), FD, District Council and from each VRMC in the area. Ideally, VRMCs should have village meetings to get views from the community on the management of the forest and other related issues. The VRMC member that sits on the FMC then takes these views to this higher authority. However no effective presentation of village decisions can be said to be happening in KJFMA for two main reasons:

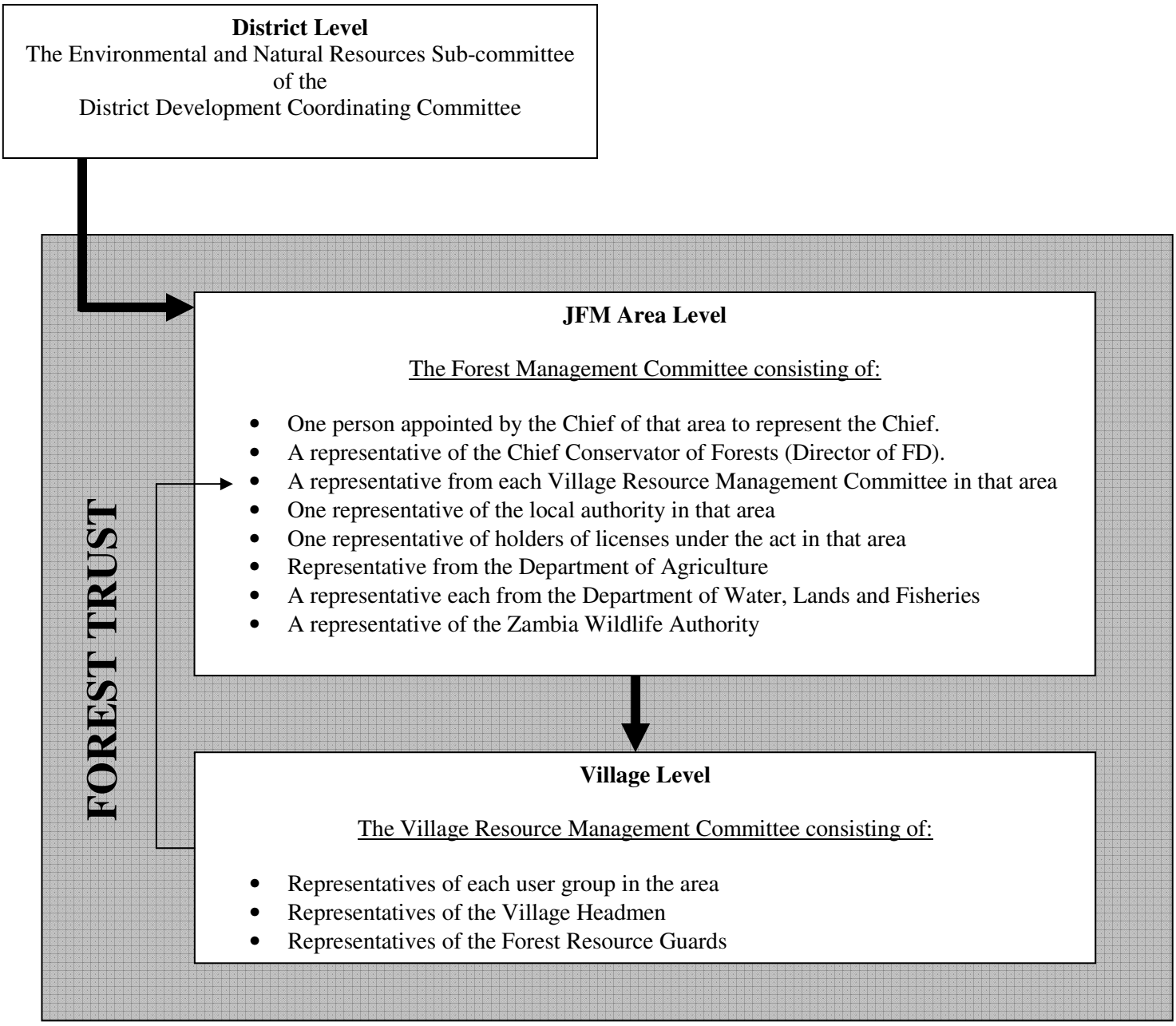

Fig. 4.3 Joint Forest Management Structure. Zambia.

(i) The VRMCs do not call for meetings to discuss JFM issues. On the rare occasions that meetings are called, it is usually when visitors go there and the meetings are called upon request by the visitors and to discuss the visitor(s) interests. These meetings are poorly attended and any decisions made cannot statistically be said to represent the 'community'. Only the executive committee members of user groups, patrolmen, and honorary forestry officers attend. Analysis of the household questionnaires that were administered during the current study showed that 60% of respondents had *never* attended meetings where JFM was discussed. Reasons presented for never attending JFM meetings were various, but the common theme was lack of interest and tangible benefits.
(ii) The VRMCs themselves do not have meetings. Neither does the FMC. As long as these committees that are supposed to articulate community interests do not meet, they are not in a position to make decisions on anything. The committees are perceived to be ' just a small clique of individuals that do not represent the community' and there is a misconception that office bearers cannot be replaced because " the other community members do not have the training necessary to belong to a committee that the current office bearers received under PFAP"[29]

The two organisations that have been formed under JFM (VRMC and FMC) to represent the community at village and area level respectively are unknown to the majority of the community members. In the survey, 81% and 73% of the respondents had no opinion on the functioning of the VRMCs and FMC respectively, while the figure for user groups was 68%. These organisations are not looked upon as entities that represent the communities but rather as a group of people that are in position for their own interests. There are two main reasons for this. Firstly, the whole concept of a few individuals representing the community is unacceptable to most community members. They all want to be involved in the decision making processes and speak for themselves. Decisions are not accepted by someone "who was not there in person". Community assemblies where everyone is present and can be involved in the decision making personally result in a deadlock of endless meetings where decisions are made that are overturned in the next meeting attended by different people (PFAP, 2005).

[29] A local leader expressed this view. It is therefore not surprising that most locals think the current crop of leaders cannot be easily replaced even when they are not effective.

The institution of chiefs is much respected in Zambian society. A person becomes a chief through succession (not elections). While their involvement is mandatory for commencement of JFM in their areas, their involvement in community forest management either through the newly created institutions or through community assemblies is inimical to participation of ordinary community in decision making. PFAP tackled this challenge by limiting the representation of traditional authorities to ex-offio membership of the committees. However the prescription of the new Forests Act includes a chief's representative on the FMC.

Theoretically, all community members can participate in the formulation of legally binding operational rules that are specific to their community through the making of by- laws. Under JFM legislation, rules and regulation stipulated in the forest management plan acquire legal status upon registration of the plan by the Ministry of Tourism, Environment and Natural Resources. Local councils may enact by-laws in support of JFM. However the major bottleneck has been the gap in legally binding support for the initial phases of JFM. Until the management plan is drawn up and passed through lengthy legal procedures, community rules are not law and cannot be enforced in magistrates' courts, though they can be enforced within the traditional system (PFAP, 2005). In practice however, only a small group of people are heard. These are usually local elites that seem to be present at every meeting, workshop or training organised for the community. Their opinions are rarely counteracted by the rest of the community because they are considered to be more knowledgeable than the ordinary community member. They may also be benefactors of some of the poorer community members and these would never publicly disagree with them. According to Datta et al (2004), local elites within a forest community may capture the bulk of the benefits, quite possibly immiserizing the poor.

The fear of free riders seemed to have hindered collective action in the study community. The incentive of the entire community benefiting from Katanino Forest did not seem to be enough to spur the local people to act. Rather, individual and household benefits were preferred. It is not clear whether the size of the community and/ or the heterogeneity contributed to the minimal collective action observed within the community. Olson hypothesized that group size influenced collective action in three ways: (1) larger groups would be less likely to achieve collective action at all, (2) the overall level of collective provision would be lower for larger groups that managed to achieve collective action, and (3) the degree of sub-optimality in collective provision would increase with group size (1965 cited in Poteete and Ostrom, 2004:

439). The role of heterogeneity in affecting the likelihood of collective action is strongly debated in literature. Datta *et al* (2004) have argued that homogeneity is a feature of successful JFM as it could result in a more efficient outcome both in terms of the sustainability of natural resources and income distribution. Sharing important cultural, social, or economic characteristics may increase the predictability of interactions, which may in turn provide a premise for trust. (Fearon and Laitin, 1996 cited in Poteete and Ostrom, 2004: 441). Evidence from a study of 18 forest user groups in Nepal presented by Varughese and Ostrom (2001) revealed that Heterogeneity was not a strong predictor of the level of collective activity. According to them, heterogeneity is a challenge that can be overcome by good institutional design when the interests of those controlling collective-choice mechanisms are benefited by investing time and effort to craft better rules. Clearly, as Poteete and Ostrom (2004) contend, the lack of consensus on the effect(s) of group size and heterogeneity reflect the impossibility of isolating their influence as they are interrelated with several other variables.

In 2003, the Forestry Department increased forest product fees dramatically. The new fees, applicable to timber, firewood, and poles and charcoal were more than the market prices of these forest products. This development, clearly done without consultation with local communities or other stakeholders has had the inevitable result of rampant illegal charcoal burning, and a reduction in FD revenue from these sources. It is a paradox why the government introduced such unsustainable levels of taxes in an era of joint forest management, especially concerning necessities like charcoal.

4.3.1.4. Effective Monitoring Procedures

Patrolmen and Forest Resource Guards (Honorary Forest Officers) carry out the monitoring of the forest. According to the JFM Guidelines, Honorary Forest Officers work under the supervision of the VRMC in the area and report to it on their activities. Patrolmen started working in 2001 while Honorary Forest Officers had to wait to be gazetted before they could start. At present, monitoring procedures are not working effectively because:

- Without training, Honorary Forest Officers have not been confident enough to arrest forest offenders or educate community members on the penalties for forest offences because they themselves are unsure what these are. Reports of forest offenders daring to be arrested were frequent among them. One Honorary Forestry Officer also

contended that it was difficult to enforce the 'no harvest ban' because it seemed irrational as "we also get mushrooms from Katanino". Others were more concerned about the opportunity costs associated with forest monitoring. "How do you expect me to spend a lot of time monitoring a forest or attending meetings when my friends are busy making money or tilling their land? Or when there is no food at home? It may be easier for those that are two, but for me, i am alone"[30]

- The committees that the Honorary Forest Officers are supposed to report to (VRMCs) are not functioning well. No one oversees whether the Honorary Forest Officers and the patrolmen are doing their jobs. The general impression was that since Honorary Forest Officers and patrolmen are not remunerated for their work, they cannot be taken to task for not performing.
- The general community feels the forest belongs to the government and the 'exclusive club known as the committee '. Therefore community efforts at making CPR monitors accountable are unheard of.

Katanino Joint Forest Management Area has a total of 12 Honorary Forestry Officers (HFO), none of whom are from Biwa Village and 16 patrolmen to cover an area of 4500 hectares. The patrolmen in each JFM village were given bicycles to use for conducting forest patrols. However, like other community forest management activities, the work of patrolling the forest has been neglected by some patrolmen because of the lack of remuneration problem. It seems working for community benefit is just not acceptable unless it is the whole community that is involved, not a few individuals working to better the community. Anyone who does anything for the better management of the forest expects to be remunerated as they claimed to incur opportunity costs. Some even resent the JFM concept of the forest now 'belonging' to the community. During the period when forest management was still under the Forestry Department's control, the community members were paid ZMK 10,000 (about US$2.5) per person for being involved in the annual forestry boundary maintenance. After two years of this, the community was then told to do this same work without payment as the forest was now theirs. Only the Chairman, treasurer and secretary were available for the work after this[31].

[30] Focus group discussion held on 2 November 2006.
[31] Key informant interview conducted on 1st November, 2006.

4.3.1.5. Legitimate System for Graduated Sanctions

Rules against violation are there but they are not clear. It is unclear what punishments should be given for some offences. It is generally known that felling of trees; burning charcoal, and having agricultural fields inside the forest are not allowed and are very serious offences. Sanctions for the above offences put forward by respondents were confiscation of tools used for felling trees; being taken to the local chief for him to decide on the punishment; being reported to the Forestry Department or being fined. Most local people did not know who is supposed to enforce the sanctions. Authorities mentioned (and percentage of respondents that mentioned these) as responsible for punishing offenders included; Committee (12%), Community (16), FD (11%), FD and Community (1.33%), Government and Community (1.33%), Headman (1.33%), Honorary Forest Officers (4%), Induna (1.33%), KJFMA (1.33%), Musonda (1.33%), no-one (1.33%), Patrolmen and Honorary Forest Officer (1.33%), Patrolmen and FD (1.33%) and 29% did not know.

There is no clear graduation concerning other offences e.g. what is more serious between picking mushrooms and harvesting wild fruit or digging up root tubers from Katanino Forest? What are the penalties? Though it is widely known that picking mushrooms, fruits, tubers and harvesting honey are not allowed, none of the respondents of the present study knew what the penalties for these offences were and none had ever heard of anyone being punished for them. Paradoxically, this confusion about penalties was even found among Honorary Forest Officers. There were a lot of disagreements among them concerning what sanctions to give for different offences, or even whether they, as Honorary Forest Officers even had powers to effect some of the punishments. This uncertainty was brought to the fore when one of the Honorary Forest Officers who had just moved to stay at the Forest Camp cut down trees ‘ to clear the area near his new home’ and used the felled trees to burn charcoal ‘since the trees had already been cut and there was no point in not utilising them’. The resulting sight of a heap of charcoal *inside* the forest was a source of consternation by community members. Upon been questioned about this development, other Honorary Forest Officers admitted to not knowing what to do about it. Some HFO also expressed fear of ‘punishing an offender who later goes to complain to the chief and the chief summons them to explain why they punished his subject’.

4.3.1.6. Cheap/ Accessible Conflict Resolution Mechanisms

There were no mechanisms for swift, inexpensive and fair mechanisms for conflict resolutions related to KJFMA. Conflicts remained unresolved for long periods, especially when there was no outside intervention. The non-resolution of conflicts seemed to be exacerbated by the pervasive phobia of witchcraft. Small conflicts about who should keep or repair the community bicycles donated by PFAP remain unresolved with the bicycles now just mostly being used as personal ones because people are not ready to confront the issue for fear of the unknown. The conflicts are however, non violent. Chiefs are recognised as legitimate arbitrators but not all cases are taken before them.

4.3.1.7. Recognition of Rights to Organise

The authority of chiefs is universally recognised by both local communities and government. In the JFM Guidelines, the chief has been given a very prominent role i.e. the setting up of a JFM area can only go ahead *inter alia* when the chief of the area supports the idea of JFM. However, the New Forestry Act does not specify the role of the chiefs after JFM implementation takes place. Chiefs can and do act as arbitrators in both civil and criminal offences in their chiefdoms and this can easily include forest offence. There is no recognition of rights by communities to make big decisions concerning forest resources. The Forestry Department is still firmly in control. Anything significant has to be approved by the Forestry Department (e.g. names of Honorary Forestry Officers).

The institutions to be formed under JFM including their compositions and functions are stipulated in the Forests Act (1999) and the JFM Guidelines. The communities are constrained to organise within the confines of the law. This 'blue print' approach does not cater for the heterogeneity that is found on the ground. Communities are allowed to make by-laws concerning forest management. Once a JFM community's management plan has been gazetted, its provisions become legally binding. These by-laws are arguably more effective for community forest management as they provide for self regulation that local communities can easily identify with because of the active roles that the communities play during the by-law formulation exercise. The by-laws provide specific guidelines at local level and can be used to implement time tested indigenous knowledge, traditional practices and institutional arrangements. The by-laws however, can only cover issues that are permissible within the main act and promote the broad objectives of the particular law under which they are enacted.

They should also be formal in nature with penalties being expressed as fines rather than in-kind sanctions (Jere, 2004).

The local institutions formed under JFM (VRMC, FMC, User groups) are upwardly accountable in that they are only mandated to report to higher authorities. The FMC has to present a financial report to the Forestry Department and the District Development Coordinating Committee but is not obliged to do the same to the community. The FMC has also been criticised for being dominated by government institutions making it difficulties for local communities to effectively manage themselves on their own and only calling for government help as and when they deem it necessary.

4.3.1.8 Nested Enterprises

According to Ostrom (1997:8) in larger resources with many participants (e.g. forests) nested enterprises ranging in size from small to large make it possible for participants to solve diverse problems involving different scale economies. By nesting each level of organisation in a larger level, externalities between groups can be addressed in larger organisational settings that have a legitimate role to play in relationship to the smaller entities.

The JFM guidelines provide step by step directions on how to set up JFM in an area. The institutions, as well as their compositions and functions are clearly laid out in law. Since the Statutory Instrument[32] on piloting of JFM in Zambia only provides for JFM in Local Forests, the tenure systems of the piloted JFM areas are the same.(This would not have been the case had JFM also been piloted in open areas). There is therefore a lot of uniformity in the way these JFM areas are coordinated. When it comes to locally tailored rules and regulations, these have to be compatible with the main legislation and when they are part of the management plans, they have to be approved by the Forestry Department before they can become legally binding. This removes sources for inconsistencies between one level of forest management and the next. On the other hand, the 'setting in stone' of the workings of a JFM area makes iteration difficult and leaves little room for innovation at village level. The multi-layer system of actors with varied interests means that interests may sometimes conflict resulting in the more powerful actors realising their interests at the expense of the less powerful ones. For example the government deciding to increase forest product fees to levels that make it unsustainable for actors with interests in trading in these products.

[32] S.I No. 52 of 1999.

4.3.2 Discussion of Ostrom's Principles

The issues arising from the analysis in the preceding subsection are analysed here. Some of the findings from this analysis have already been alluded to in previous chapters but their repetition here is a reflection of their significant.

Katanino Forest is in very good condition and its boundaries are very clearly marked and known by the community. The community does not have tenure of trees either in the forest or those found in their agricultural fields. They are not allowed to burn charcoal unless it is from trees that have already been felled to clear land for agricultural production or other development purposes[33]. However, this legislation is unknown to the community and the members consider trees on their fields as theirs while those found in Open Areas while not theirs are still available to them. Only trees in Katanino Forest are perceived to be 'out of bounds'. This is a classic case of the differences in *de jure* (what is actually written in the statutes) and *de facto (*what is accepted and practised on the ground) situations. This distinction is also clear when it comes to who is a member of Katanino Joint Forest Management Area, the umbrella organisation formed to deal with all JFM issues in the study area. The JFM legislation stipulates that any person living within a 5KM radius from the edge of the forest is a member. On the ground however, executive committee members reported that only individuals that apply to them in writing are considered for membership and their applications may be accepted or rejected based on the views of the executive committee members.

There has been no issuing of any type of forest licence for Katanino Forest since the piloting of JFM started in the area as required by JFM regulations. However, the stalemate in the process has meant that no forest produce could legally be taken out of Katanino Forest for the past five years or so. While this ban remains in force, the community is still expected to carry out its forest management work. This is a serious case of incongruence between appropriation and provision. Since the government has been dragging its feet on the promulgation of the commencement order that will see the repealing of the current Forest Act (1973) by the 'JFM' Forests Act (1999) this anomaly may continue for many months into the future. The community is very frustrated and disappointed. To make matters worse, the community does not know the real reason why it cannot start getting or issuing permits and getting a share of

[33] Forests Act (1999) section 38 (i)

the revenue derived from Katanino Forest. As far as the members are concerned, the only thing remaining is for the foresters from Masaiti District Forest Office to bring them date stamps so they can start issuing permits for NTFP from Katanino Forest. This was not one persons view but what is generally believed. Perhaps they were told this because it was felt they would not understand the real issue which is the lack of legislation to commence JFM on a full scale. However, this just seems to have made the situation worse because" honestly how long can it take for an entire office to come up with even one date stamp? They are just not serious. They just don't want us to start making money as well. We will also stop looking after the forest".[34]

Since there is no money flowing into the institutions set up under JFM (VRMCs and FMC), no financial reports to be made, no issuing of permits for NTFPs , the air seems to have gone out of them. Serenje Village only has 12 general members while the figure is even less for other JFM villages. On the issue of monitoring, the forest is effectively looking after itself. Again money matters. The general community members reported that they cannot take patrolmen to task for not performing because the patrolmen are working on voluntary basis. The Honorary Forestry Officers are handicapped because even though they now have identity cards to distinguish them from offenders in the forest, they have not been trained as the Forestry Department does not have the funds to do this.

JFM in Zambia is still teething. Although implementation of JFM in other African states e.g. Tanzania has generally been slow, Zambia has turned slow implementation into an art. Eight years after the Forests Act meant to allow full scale implementation of JFM, the JFM communities are still far from ready. In the study community even basic issues like how to deal with forest offenders, what rights the locals have over the forest resources, how they can organise each other to make a decision concerning the whole community are still not in place. The fear of free riders prevents many from making contributions to community developmental activities.

[34] View expressed by one of the VRMCs executive members in an outburst of anger during an informal discussion.

Table 4. 5: Analysis of KJFMA Using Ostrom's Design Principles. 2006

Success Principles	Description
1a. Clearly defined physical boundaries	Physical boundaries are clearly defined
1b. Clearly defined membership and rights	Theoretically, anyone living within a 5km radius from edge of forest is a member. In practice, individuals have to apply to the executive committee to become members. Members have use and management rights only.
2. Congruence between appropriation and provision rules and local conditions	No individual is allowed to harvest anything from the forest at the moment. However, 58% of respondents admitted to accessing the forest for at least one type of resource, commonly mushroom and wild fruits. In future, harvesting will be allowed through a licence and permit system. A small group of members carry out all the community forest management work.
3. Collective choice arrangements	Local people are not participating in the decision making processes. Community representatives elected to sit on JFM committees not representing their communities. Concept of a few individuals representing whole community unacceptable to most community members. Forestry Department perceived to be still in control of the forest.
4. Effective monitoring procedures	Ineffective procedures. The monitors are not audited. Community feels monitors cannot be held accountable as they are not being remunerated for their work.
5. Legitimate system for graduated sanctions	Foresters and chiefs recognised as having the authority to punish forest offenders. Authority of Honorary Forest Officers unclear. No clear system for graduated sanctions.
6. Cheap/ accessible conflict-resolution mechanisms.	No mechanisms for swift, inexpensive and fair conflict resolutions. Conflicts remain unresolved for long periods. Conflicts usually latent rarely brought out in the open. Chief's arbitration considered as legitimate but not all cases are taken before him. There is confusion about which cases should be taken to the FD for resolution and which should be resolved locally.
7. Recognition of rights to organise	The local community can make by-laws within the confines of existing forestry legislation pertaining to forest management, but these have to be gazetted before they can become enforceable in a court of law. The by-laws provide specific guidelines at local level and are usually based on indigenous knowledge, traditional practices. JFM organisations are upwardly accountable.
8. Nested Enterprises	One Management plan (which includes by-laws on forest utilisation) has been designed for the entire JFM area. Step by step guidelines on setting up JFM in an area have been devised by the FD leading to uniform coordination of JFM areas and consistence between one level and the next one.

(Source: Field data, 2006).

Using Ostrom's Design Principles[35] to assess the CPR institutions in the study area revealed that the institutions are not doing well on about 7 of the 8 principles. The only principle they seem to have performed well on is about clearly defined physical boundaries. However, it should be borne in mind that most of these institutions, with the exception of the institution of the chief, are new institutions and still trying to find their bearings under very difficult circumstances. Ostrom's Design Principles for Enduring Common Pool Resources do not give a time frame after which new systems set up to manage CPRs should score highly on these principles. It is the researcher's opinion that once the new Forests Act comes into effect and JFM starts in earnest, more community members will be participating in the decision making process as they will see the benefits of doing this. Once the VRMCs have the resources to remunerate the patrolmen in some way, the whole community will be involved in monitoring whether the monitors are doing the job they would be paid for. The rules and regulations will be modified as new situations arise that require re-interpretations and clarifications.

4.4 Knowledge of and Perceptions about JFM in Katanino Area among Stakeholders.

According to Wikipedia Encyclopedia, 'perception is the process of acquiring, interpreting, selecting, and organizing sensory information.' It consists of one's interpretation of the world, but as commonality of perception goes towards 100%, perception becomes reality. Thus reality is just a popular consensus of perception. What is commonly referred to as reality is as a matter of fact, only an agreed upon perception (http://en.wikipedia.org). The Oxford Dictionary defines perception simply as an interpretation or impression based on one's understanding of something.

People's perceptions of something e.g. rules influence how they act towards it. If they perceive the rules to be too strict and impossible to follow, they may just decide to ignore them. When there is a change in the management of natural resources, as has been happening in the forestry sector in Zambia, it is important that the new local institutions set up are perceived as legitimate otherwise the community may not obey them. Information on any changes in administration, resource access and use, penalties for breaking rules, offtake levels etc should be disseminated to all stakeholders in way that will be easily understood. This

[35] Ostrom has defined a design principle as 'a condition that helps to account for the success of these institutions in sustaining a forest or other common-pool resource and gaining compliance of generation after generation of users to the rules applied in a location' (1997: 7)

section analyses and discusses the results on investigations into the levels of knowledge, attitudes and perceptions about JFM of the stakeholders in Katanino Joint Forest Management Area.

4.4.1 Attitudes and Perceptions of the Local Communities towards the Rules and Regulations of KJFMA

The results of the study showed that most people do not know how the rules and regulations for the management of Katanino Forest under JFM are working (Fig.3). The results showed that 34.7% had no opinion on whether or not the rules and regulations were effective, while the same percentage agreed that the rules and regulations were effective. Those that strongly felt that the rules and regulations were effective constituted 17.3% of the respondents, while 13.4% disagreed with this assertion, half of them strongly.

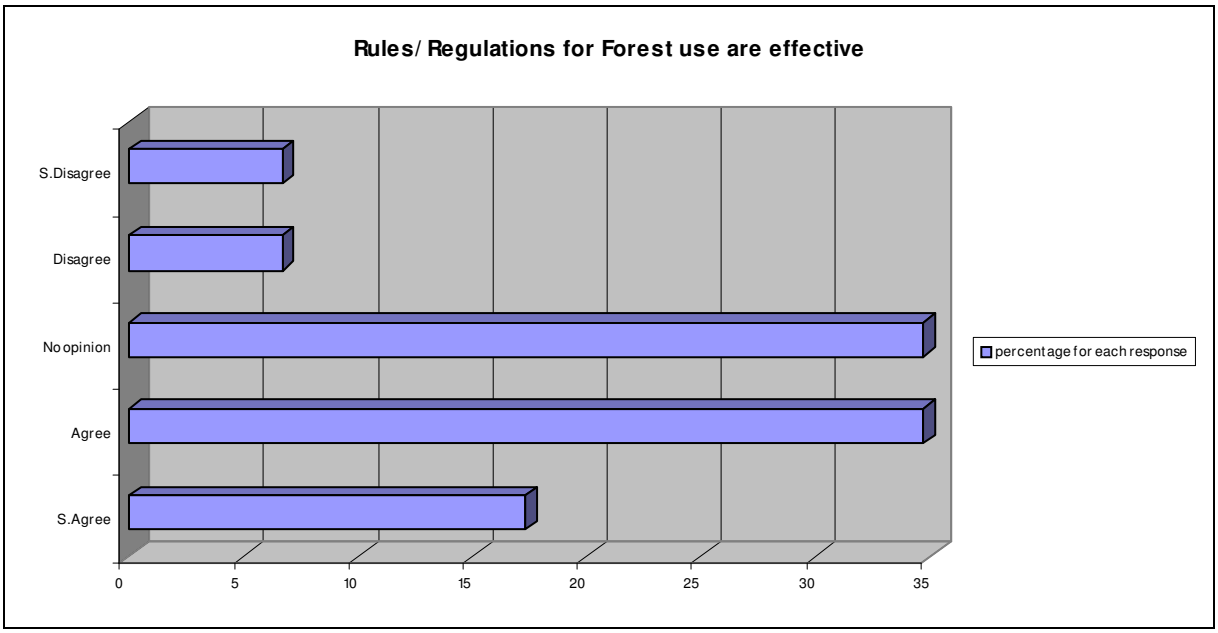

Fig. 4.4 Perceptions about effectiveness of rules and regulations, KJFMA, Zambia. 2006

A Chi-square analysis confirmed that the observed differences in responses are real differences in peoples' perceptions and not due to chance random factors ($x^2_{crit,\ 0.05,df=4}$ =9.49, x^2_{calc} = 29.73).

Some Honorary Forestry Officers revealed during focus group discussions[36] that some community members known to them blatantly break the rules (by felling down trees to get

[36] Focus Group Discussion held on 3/11/2006 in Serenje Village.

bark rope) and then show it to them daring to be arrested. Most of the few 'JFM members' still active in KJFMA contended that the rules are effective only because they are still working hard to enforce them and sensitising others on the rules and regulations pertaining to the utilisation of Katanino Forest and the importance of following them.

Most of the respondents are familiar with at least one rule pertaining to the management of Katanino Forest (mean number of rules known= 1.48, StDev= 1.20). The most common rule known to respondents was that they are not allowed to cut down trees from the forest (68% of respondents), while 'not allowed to get anything from the forest' was a distant second (24%). Though 24% of the respondents reported that at the moment the communities are not in effect allowed to get anything from the forest until the issuing of permits by communities starts and JFM is wholly underway, they also admitted to ignoring this rule and harvesting some products from the forest, the most common of which were mushrooms and wild fruit.

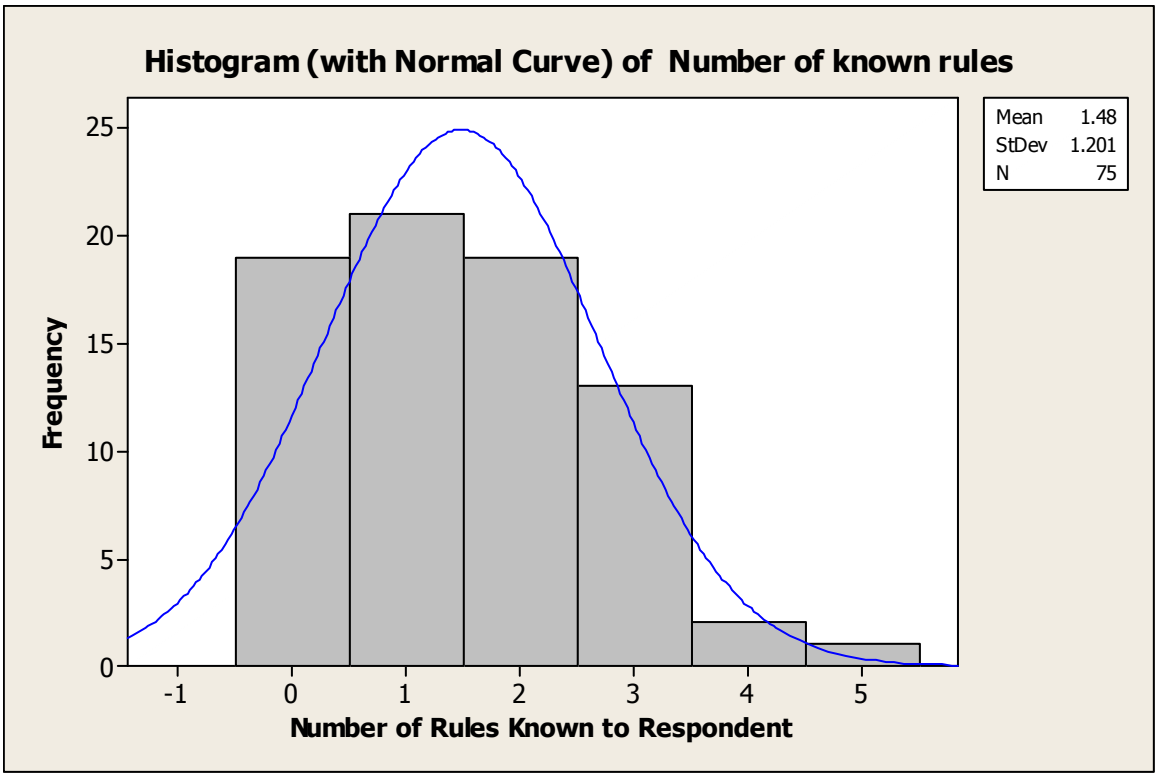

Fig. 4.5 Number of Rules Known to Respondents, KJFMA, Zambia. 2006.

The reasons given by the respondents for why these rules had been put in place were noteworthy in their similarity. An overwhelming majority answered that the reasons for the rules were to conserve the forest and because the forest belongs to the government. Less common responses were 'getting forest produce banned because it damages trees', 'rules in

place because trees protect air and animals, and disease prevention', 'to help with future generations'. The two most unique responses were 'because it is a forest' and 'because the forest resources are used for training'.

The research results showed that 34.7% of the respondents strongly agreed that it was easy for all stakeholders to obey the rules and regulations governing the use of Katanino Forest while 16% also just agreed. Some had no opinion on the matter (34.7%) while 9.3% and 5.3% disagreed and disagreed strongly respectively. The reason given by those that disagreed was that Katanino Forest was a significant and sometimes only source of some resources for many people. Also some of the rules were not very well known so one could even break them unknowingly.

4.4.2. Levels of Knowledge on KJFM Among the Local Communities

Levels of knowledge about JFM among the communities were found to be relatively low. It was apparently not very clear to many of them about who manages Katanino Forest, who makes the rules and regulations pertaining to its management or who is responsible for punishing rule breakers as evidenced by the many varied answers given. A question asking who managed Katanino Forest resulted in answers like ' the committee[37]' (16%); the community (30.7%); Forestry Department (17.3%); The Government (4%); FD and Community (4%); FD and Patrolmen (1.3%); FD and KJFM (1.3%); PFAP (6.7%); Guards (1.3%); ZAFFICO (1.3%); Musonda (1.3%); Webby (1.3%); Patrolmen (2.7%) and 10.7% said that they did not know.

The authority(ies) responsible for regulating the utilisation of Katanino Forest and its general management were equally unknown but guesses included more or less the same responses provided for the query on who managed the forest though Forestry Department here was 24% and 25.3% did not know. On who was responsible for punishing individuals that broke the rules pertaining to Katanino forest, 16% said it was the community; 12% said the committee; 8% thought it was patrolmen; 10.7% said Forestry Department; 4%-Honorary Forestry officers; 4% also for PFAP; PFAP and Committee, Patrolmen and Community, Patrolmen and FD, Patrolmen and Honorary Forestry Officers, KJFMA, headmen, chairman and police, were

[37] This is a group of individuals actively involved in JFM issues in the communities who are also office bearers of different committees and user groups formed under KJFMA.

respectively mentioned by 1.3% of the respondents. The remaining 29.3% did not know who punished forest offenders.

Types of punishments given to forest offenders reported by the few respondents that had actually heard of an offender being punished or just knew the punishments were confiscation of tools used in the act of breaking the rules, fines, and confiscation of the forest products. Most of the respondents (over ⅔) had no idea what the punishments were.

Various user groups were formed when JFM was being initiated in this area. Of these the most well known seemed to be the Beekeeping User Group (mentioned in 35% of cases). This was distantly followed by the Food Preservation User Group (only 12%). Pit sawing, Carpentry, Nursery, Crafts, Soya Bean Growers, Horticulture and Jathropha[38] were the other user groups mentioned (all of them by less than 8% of sample). Over 40% of the sample could not mention any user group at all. Of the total sample, 68% did not know how the user groups were functioning while 19% thought the user groups were largely ineffective (the word commonly used to describe the workings of the user group was 'dead'). A small proportion of only 5% of the respondents said the user groups were very ineffective whereas 8% thought they were effective. No one thought any of the user groups functioned very effectively.

More than 81% of the respondents interviewed during the survey had no idea how the VRMC in their village was doing. For Biwa Village alone this figure was a whopping 95%! Overall only 8% said the VRMCs were working well while the rest said these committees were doing nothing. For the Forest Management Committee (FMC), their activities were also largely unknown with 73% not even knowing of their existence. Only 9% said the FMC was effective (most of the respondents who said this were the so-called JFM members) while the rest (14.7% and mostly former JFM members) said this committee was also mostly dead and only 'resurrected 'when there were visitors from outside KJFMA.

The organisation KJFMA is largely unknown to most ordinary area members. Some members know of an organisation called 'PFAP', 'the Committee' or 'the Foresters' involved in

[38] Jatropha (*Jathropha curcas)* is a bio-fuel rich plant that is currently being promoted in Zambia as an alternative to fossil fuels. It is not a user group formed under KJFMA but a group known as the Jatropha group was just being formed at the time of the research by a company promoting the growth of Jatropha. A large number of the farmers have since received Jatropha seeds to grow under contract. A few old residents actually had the plant in their compounds, which they had received from the Forestry Department many years before though at that time the huge economic potential of the plant was not appreciated due to lack of market.

looking after Katanino Forest in conjunction with the Foresters from Masaiti District and that's about all. The rest just call this organisation by the names of individuals they know to be actively involved with intonations of the organisation being personal-to-holder for these individuals. On the relationship between this organisation and the Forestry Department, over 55% were not aware of how these worked together while about 20% perceived the Forestry Department to have too much control over the running of Katanino Forest. 27% disagreed with this assertion (most of them members of 'the committee').

Patrolmen perceived themselves as not having the power to stop illegal forest use by community members. This is because their calls against this go largely unheeded. They are perceived as just individuals belonging to a group favoured by the Forestry Department, whose meetings ordinary community members cannot even attend.

4.4.3 Stakeholder Perceptions of Constraints to KJFMA'S Effective Management

For the community, the most important constraint to effective JFM in their area was the lack of remuneration either in cash or kind for the JFM work done. Those singled out for deserving some form of tangible benefit at personal level were Honorary Forestry Officers, Patrolmen, individuals involved in annual forest boundary maintenance, early burning or control of late fires. This view was unanimous. It was strongly felt that in view of the declined interest and lack of participation in JFM activities by the rest of the community, the importance of remunerating the few that were still committed could not be over emphasised. The active members also contended that while they understood the value of their work to their community and the country at large, they needed some tangible benefits to help boost their morale and "shut up their friends who laugh at them for wasting time doing unmerited work". Even small allowances or "tokens of appreciation" would help to reduce the huge opportunity costs in terms of time and resources they incurred in fulfilling their JFM responsibilities. When taken to task about wanting to be remunerated for helping to manage "their" forest, the quick response was "the forest officers from the Forest Department used to be paid for managing the forest when it belonged to them, so why can't it be the same even for the community members now managing their forest?"[39]

[39] View expressed during focus group discussions, key informant interviews and all informal interviews and chats conducted with various community members.

Another constraint cited was government bureaucracy. The length of time taken for action to be taken or "promises" made to the community by government officials was reported to be very negative for community morale as far as JFM activities were concerned. Most local people claimed they slackened in their commitment to JFM as they felt they were waiting for benefits that may never materialise. The Forestry Department was also blamed for hindering effective functioning of KJFMA by its "lack of visibility" within the communities. It was argued that since community members are not experts in forest managers, it was imperative that at least one forester resided within the area to give the community expert advice when needed. His presence would also serve as a constant and visible reminder to the community of the Forestry Department's commitment to the success of JFM in their area. This they claimed would be a positive turnaround to the "present habit of Forest Department officials of just turning up in the community in the morning and asking us to inform people about their meeting in the afternoon that same day, conducting hasty, poorly attended meetings on the same day and blaming the community members for not attending meetings when in fact they just don't give us enough notice about their meetings". These meetings were also said to be too infrequent and of late only called when there were visitors wanting to visit the JFM community.

The Forestry Department was also accused of not meeting its part of the 'joint' in JFM by letting the community do all the work without even the benefit of their technical advice or just providing guidance on emerging issues. An example was given of Biwa Village where the last VRMC Chairman supposedly "ran away" with two community bicycles and the constitution but no remedial measures had been taken and the VRMC still had no chairman at time of study.

The unclear status of Honorary Forestry Officers[40] was mentioned as being inimical to effective management of Katanino Forest under JFM. The lack of confidence by Honorary Forestry Officers in conducting their duties brought about by ignorance of their powers due to their not having been trained as promised has left a vacuum in law enforcement. This they explained, was because no arrests are made because it is unclear exactly what powers the said

[40] Honorary Forestry Officers are community members appointed by *Gazette* notice under Forests Act (1999) for periods not exceeding three years to discharge the functions and perform duties of a Forest officer either generally in *any* part of the Republic of Zambia including any National Forest or Local Forest; or limited so as to empower the Honorary Forestry Officer to perform functions in *a* part of the Republic or a National Forest, Local Forest or other area specified in the notice of appointment.

officers have, which legislation they may derive these powers from and what protection they have from being sued for punishing offenders. Closely related to this was the thorny issue of not having any Honorary Forestry Officers from Biwa Village. The trend of events as narrated to the researcher was that all the VRMCs under KJFMA were asked to submit names of prospective Honorary Forestry Officers to Forestry Department in Masaiti District to be forwarded to their headquarters for approval. This was done but when the approved names were released, none of them were for applicants from Biwa Village. This 'aberration' on the part of Forest Department Headquarters was argued to be as a result of a lack of appreciation for community dynamics on the ground.

The perceptions of other stakeholders were not surprisingly different from those of the local community under Katanino Joint Forest Management Area. One view from a forest official was that most of the benefits of JFM were long term but this had not been sufficiently impressed upon the local community. He conceded that this might be the case because in the initial stages of piloting JFM, a lot of expectation was created in the community by expounding on the benefits of JFM without emphasising the long-term aspects so as to entice the largest number of people to join. Lack of synergy among villages was also said to be a problem.

Officials from the Environment Ministry, University of Zambia and the Forestry Department itself all alluded to the lack of commencement of the new Forestry Act as the biggest constraints to effective management of Katanino Local Forest as a JFM area. Without the new Forests Act (1999) being in place, there is no JFM. Everybody's hands are tied. Civil servants need to have the legal backing before they can move forward on JFM. Some alluded to the apparent lack of activity in this area to 'governments reluctance to let of the forests especially after the below par performance of the wildlife sector'. The lack of finances needed for transforming the Forestry Department into the Zambia Forestry Commission, as provided for by the new Forests Act was also cited as a constraint. There are fears that the 'Commission' may not be able to sustain itself as 'even ZAWA that makes more money from issuing hunting licences is still not on its feet'.

An American Peace Corps Volunteer who had lived and worked in the community for over a year was asked to give her opinion about what she perceived to be the major constraints to

effective joint forest management (especially on the part of the community). The following was her response verbatim:

1. Lack of interest/motivation in management of the proposed projects designed to try and help them. If people were *truly interested* in beekeeping they would find a way to repair the hives they were given to overcome some of the other problems. They were given the tools to do this, but the tools just 'disappear'. Also, they would get their bikes and make contact with some nearby potential honey buyers e.g. Luansobe Beekeeping Cooperative, Kaloko Trust, Mpongwe Beekeeping Enterprises or at least try to sell honey along the road. Same problem with food preservation- if they were truly interested they would maintain the solar dryers they were given and at least use them to help with their own food security, if not sell preserved foods. Same again with nurseries and woodlots. If people were interested in these projects, they would maintain these projects-weed them and protect them from fire. As an outsider, the lack of activity in beekeeping, food reservation, nurseries and woodlots points to a lack of interest. We care about what we are interested in.

2. Insistence on 'community' based projects rather than individual opportunities. In talking with people and working with them, I find community projects are difficult to organise and there is a preference for individual/household level opportunities. It seems the 'JFM community' is only organised and functional when outsiders come in and require such organisation. For example, to the best of my knowledge, no VRMC or FMC meetings are held unless the forestry dept or I goes to the communities and requests a meeting. Even then, callouts seem to rarely reach all members (see below # 3)

3. Communication- Even though Katanino is a relatively small forest, distances between villages are far enough that communication is difficult. Each village was given a bicycle but that was many years ago and some have fallen into disrepair or were stolen. And the concept of a 'community bike' is difficult, who keeps it, who gets to ride it, schedule it etc. and it seems there is not a lot of trust among the members.

4. Slow progress and years of disappointments from the FD. It seems villagers see proposals, ideas, and experiments as 'promises' and when the 'promises' go

unfulfilled, there is disappointment and discouragement. Due to low levels of education in the general area, there is little understanding of government processes and delays. Community members feel they do all the work and never receive 'promised' benefits. I don't know how to bridge this big 'disconnect' between the Forestry Department and villagers. It only seems to get wider as time goes by.

All her observations were also made by the research team during the field survey. It seemed that the preoccupation with 'community projects' despite the obvious preference for individual projects by community members was set to continue as even during the field study, an NGO visited the area to discuss their possible funding of a community bee-keeping and food preservation project. Bee hives from Kaloko Trust remained unutilised and were still being kept at the home of one of the 'committee' members even as this new project was being planned.

4. 4 .4 Discussion

A discussion of the results and data analysis follows in this subsection.

For in the end we will conserve only what we love.
We will love only what we understand
And we will understand only what we are taught
Baba Dioum, African Conservationist

More than five (5) years after the concept of JFM was first introduced to the community surrounding Katanino Forest, it remains largely unknown. The acronym KJFMA was used exactly twice the entire duration of the research team's stay in the study community, and it was by a village headman and former chairman of the same organization. The average member of the community knows at least one forest product whose harvesting is prohibited; has never heard of the VRMC and the FMC; thinks the Forestry Department manages Katanino Forest; Knows about the existence of the bee-keeping user group but does not know how it is working; thinks felling of trees from Katanino Forest is prohibited because it is government property; has never heard of a forest offender being punished and may or may not know of a penalty for a forest offence.

The pervasive lack of knowledge on JFM issues among the general populace and the much higher levels of knowledge among executive members are instructive on the sharp differences that are found within a community. How did this difference come about? How is it that a certain group of people have a quite comprehensive knowledge of JFM while the rest of the community remains ignorant? Was the information disseminated at workshops where only a select few were invited or at village assemblies where the turn out was bad and only a few interested individuals that also just happened to be executive members of the various groups attended? This anomaly should be addressed if JFM in this area is to be management of Katanino Forest by the Forestry Department and the community. Otherwise the current situation of where only a clique of people are thought to be the only ones with privileges of helping the Forestry Department to manage the forest would continue. This is obviously not desirable as these few people cannot effectively manage a forest that is over 4500ha in size.

Another aspect of the low levels of knowledge among the general community on the workings of the JFM committees hinges on accountability. How can they make their representatives accountable or take them to task if they have no idea how they are performing, or even what they are supposed to be doing on their behalf? Katanino Forest is perceived by the surrounding community as something that belongs to the government. This is not surprising as land tenure has not changed under JFM. This perception is difficult to reconcile with the concept of co-management. As long as the community feels the forest belongs to the government, what would be its motivation for involvement, especially on voluntary basis? The state of affairs now is that individuals are motivated to take part in activities when there is promise of remuneration at individual or household level, not for the entire community. The idea of someone working in a community project where the benefits accrue to the entire community (including those that do not take part) is very disturbing to most community members. This phobia of free riders prevents individuals from contributing labour for community projects.

The concept of JFM being beneficial to *the community* has not taken root. Common perceptions are that *individuals* or *households* should benefit directly from being involved in any JFM activity. These benefits should be in form of something very tangible like money, bicycles or t-shirts. All the respondents that had something to say on how they thought local could be motivated to participate in JFM activities said this.

The "what's in it for me "attitude has to be changed before JFM starts in earnest, especially with the long term nature of most of JFM benefits. Otherwise there will be a lot of conflicts when money from the JFM Fund starts flowing into the community. Community members will have problems accepting, for instance, the drilling of borehole using revenue from JFM activities as JFM benefits because such a developmental project would even benefit those that do not take part in community forest managing activities.

Forestry Department personnel received training under PFAP with a total of 518 person days of training undertaken by field staff[41]. This training included the use of PRA tools, community development, project management, community mobilisation and facilitation, natural resources assessment and biometrics. It is hoped that this training has gone a long way in changing the foresters' perceptions of their own roles (facilitator, co-manager and not police) in the new paradigm of forest management. In the proposed overhaul of the Forestry Department (to the Zambia Forestry Commission), efforts should be made to change the culture of the organization into one that supports flexibility and adaptive learning necessary for encompassing the dynamism and heterogeneity found in communities.

4.5 Summary of Major Research Findings

This section provides a summary of the major findings from the analysis of the four objectives as presented in the preceding sections. Emphasis is put on the challenges and opportunities that have been brought out in the analysis. An attempt has been made to present them in a format that reflects the objectives i.e. starting with the challenges and opportunities arising from objectives 1, then objective 2 up to objective 4. These are then followed by challenges and opportunities of an overarching nature that cannot easily be linked to one objective.

4.5.1 Livelihood Analysis

Although a lot of 'selling' of JFM to the communities has been based on the sharing of benefits, it is not a given that they will always be any revenue to share as long as there is JFM. It is very possible for a JFM area to run at a 'loss' i.e. incur more costs than cash benefits, especially in the initial stages when JFM is just being set up and the committees are still trying to find their feet. PFAP II, tasked with the piloting of JFM in Zambia had a total

[41] PFAP Annual Progress Report, 2004 ,p4

expenditure of counterpart funds in 2004 of € 58,000. According to PFAP (2005) it may not be possible to ever achieve financial sustainability for JFM in many areas. It argues that the sizes of the JFM areas (2000-10000ha) are not big enough to yield substantial and sustainable timber yields. In all the seven PFAP II pilot areas (this includes Katanino), large scale commercial exploitation is not an option. But only in such a scenario would revenue sharing make any sense. As for NTFPs, they are only marketable if they are sourced in very large quantities. The emphasis, by both the Forestry Department and the communities themselves on revenue sharing was therefore unfortunate.

What is going to happen to the communities when JFM begins in earnest and there is no money to share? Intuitively, one can foresee conflicts between the FMC and the general community as accusations of squandering money start flying around, followed by the Forestry Department once again being accused of not fulfilling its promise. It is imperative that the high expectations of high revenues flowing into the communities from the issuing of permits for NTFPs and casual or pitsawing licences be lowered through the dissemination of correct, 'hyperbole free' information on the levels of revenue expected to be earned from the forest. It is also important for the community and other JFM stakeholders to realize that making money from JFM activities is not the most important benefit or indicator of the success of JFM.

This study has shown that though only 4% of a household's annual total income is from the sell of forest products from Katanino Local Forest, over 58% reported that forest resources from Katanino Forest contribute significantly to their livelihoods through provision of food, medicines, and fibre especially during the food shortage months. Vedeld et al (2004) reported that one function of forest income in rural livelihoods is its regular uses in support of current consumption, but with no or limited scope of lifting people out of poverty. The forests products fill a seasonal gap in the sense that they provide a periodic and reasonably predictable contribution to food security, serving as a 'seasonal buffer' or 'safety net'.
This means that just maintaining the forest so that the community can continue getting products from there to help fill the seasonal gap in food and other resources is already a benefit. If they make a bit of money while doing that, even better, but it should not exclusively be about money.

Katanino Local Forest vegetation is typical of the Copperbelt vegetation characterized by Miombo Woodlands. It has 12 of the tree species officially listed as commercial trees in

Zambia. Of the total timber forest products found in Katanino, 46% can be converted into logs, poles (25.4%) and 27.3% into firewood. Medicines bark rope, caterpillars, honey and wild fruits are also very abundant and in sufficient quantities to meet market demand once the potential is developed. However value addition is a problem due to limited skills and lack of processing technology (Njovu, 2003). Of the timber species, only 8.4 % are categorized in Class 1, 5.6% in Class 2, while Class 3 has 18.9%.[42] Since large timber concessionaires are attracted by tree species from the first two classes, not many of them are expected to flock to Katanino Forest in future.

With the diverse types of forest resources in Katanino Forest, there is a lot of potential for forest based processing industries. The major challenge for the local community is the lack of financial capital for purchasing the equipment and tools needed for such activities. However, there is opportunity for community members by forming cooperatives or user groups and being able to access soft loans or grants from financial institutions or NGOs.

4.5.2 Shirking of responsibilities by majority of local community members

Like most savanna forests, Katanino Local Forest is disturbed by fires during the dry season on an annual basis. These fires if not checked, can cause considerable damage to the forest. Fire management is therefore a part of forest management in Zambia. Prior to JFM, this responsibility lay with the Forestry Department but has since been transferred to the local community. Unfortunately, only a handful of community members are actually involved in this work (all well as all the other community forest management activities). The rest of the community does not seem to feel that it has a responsibility to manage the forest. The capacity of the community in forest management has been built up through trainings that were organized by PFAP. This knowledge can be used to not only manage Katanino Forest but also help in the establishment of communal and individual woodlots. The recent interest in and promotion of Jathropha tree by the private sector has seen a lot of members from Katanino area taking up the planting of this tree. This has been possible for two reasons. The area is very suitable for the growing of this tree and the community already has the knowledge of managing trees which they acquired from the trainings for JFM.

[42] Class 1- high value tree species. Class 2- Low value, high quality trees. Class 3- Low value, low quality species. Class 4- Fuelwood. Class 5- others.

Miombo Woodlands, of which most of Katanino Forest is composed, are characterized by very diverse products and uses. Their production potential is nevertheless comparatively low. Miombo trees grow slowly with species and products scattered over vast areas. This very much limits the sustainable off-take in an area. This constraint should be borne in mind in whenever management and utilization programmes are considered in the forest and the returns that all the stakeholders can sustainably and realistically get from the forest made explicit right from the start.

4.5.3 Institutional Aspects

The institutions are divided between the new ones specifically set up under JFM and the old ones, whether modern or traditional

4.5.3.1 New Institutions

The new JFM institutions are the Village Resource Management Committees, Forest Management Committee, User groups, Village Resource Guards and Katanino Joint Forest Management Area Trust. The first challenge for all these institutions was getting the compositions and functions right so they could be both efficient and effective. The composition of the FMC has been criticized for being too government heavy and impractical (PFAP, 2005). As the composition is stipulated in the new act, this composition can only be changed once the Act becomes effective and lengthy amendment procedures are followed. A VRMC does not represent a village as existing on the ground but a group of villages. In Katanino area, 4 VRMCs have been formed which all have representation on the FMC. According to the JFM Guidelines, one of the duties of a VRMC is the collection of money from licences and permits. It is unclear which licences are referred to because the new Forests Act does not allow the issuing of licences by the community. Only the Director General (of the Commission) or a forest officer authorized by the Director General can exercise powers to issue licences. This is just one example of the contradictions and confusion between the Forests Acts and the JFM Guidelines. This author's view is that some of this confusion is called by the 'existence' of two Forests Acts. Both of them are normally quoted, and when it comes to issues that are allowed under one act but not the other, it becomes really confusing. For example, the 'CEO' of the Forestry Department is called the Director General. However, this is the title of said officer under the (new) Forests Act of 1999.The position under the current Act is Chief Conservator of Forests and should be the rightful title until after the

repealing of the current Act. The reification of the Commission adds to the confusion as it is refereed to in some documents as an already existing body. The solution to this duality is to effect the new Act immediately.

The Forest Resource Guards, also known as Honorary Forest Officers when they are gazetted by the MTENR, do not have powers to enable them seize and detain any forest produce obtained or removed in contravention of the rules made by the VRMC or the Forests Act (1999). Since the community has now been tasked with the monitoring of the forest, the guards should be empowered with 'police' powers. They cannot always be depending on law enforcement officers to do the policing because these law enforcement officers are not usually found in or near the forests where forest offences are committed.

4.5.3.2. Old Institutions

The Environmental and Natural Resources Sub-Committee of the District Development Coordinating Committee (DDCC) coordinates environmental and natural resources management at district level. For purposes of JFM its duties are to ensure that the benefits from jointly managed forests are shared between the entities involved according to the JFM Plan; approve audit reports; and settle arguments in the FMC. It still remains to be seen how this sub-committee will perform its JFM functions.

Chiefs do not have any specified functions to perform in JFM. Other than soliciting his support during his implementation and as a signatory on behalf of his community during the signing of the MoU, the roles of a chief is JFM have not been articulated. During the field survey, most of the respondents reported they would like to see the chief play a role in JFM of educating his subjects on the importance of JFM, and the need to use the forest sustainably. Since chiefs are still quite respected in Zambian traditional society, a chief is probably one of the best JFM 'ambassadors of goodwill' one can get. More specific roles for chiefs have already been called for in many for a (e.g. Jere, 2004).

The Forestry Department is very centralized with very minimal avenues for decision making at district levels. The bureaucracy, typical of most government agencies is stifling. District offices are run at zero budgets. However there is scope in the proposed overhauling of the

Forestry Department to incorporate decentralized structures with not only decision making powers delegated to lower levels of the agency but also resources.

4.5.4 Social and Cultural Issues

Natural resources are locally known as *'ifilengwa na Lesa'* whose literal meaning is things that were created by God. This is indicative of how natural resources are perceived, as things that are freely provided by God and therefore should be freely accessible to anybody. Local community members 'paying' for forest resources (especially NTFPs) is therefore not the most natural of situations. This unusual situation is even more paradoxical when the JFM rhetoric of the community now being owners is put in the same light. Why should people pay for something that is theirs?

Forest utilization is very gender specific. Forest ventures like harvesting of bark rope, pitsawing, tree felling and harvesting of honey are exclusively male activities. Uprooting of edible tubers like *chikanda, munkoyo*; collection of various species of wild vegetables are the domain for women. Collection of fruits and mushrooms was reported by both men and women of all ages in the study area. When it comes to involvement in JFM related community activities, however the women disappear. The reasons given for this, by both male and female respondents were: Women

- do not see the benefits of participating in JFM activities.
- are stopped from participating by their husbands.
- do not have time to go for meetings because of the heavy workload at home.
- do not know about JFM. Most women cannot read or write so they feel out of place in set ups where reading and writing are done e.g. in a workshop. They cannot take up positions for the same reasons.
- just do not have confidence in themselves. They feel that everything they say will not be accepted by the men.

However, exceptions were also found in the study area. For example, there was one woman, an executive member of two local institutions who was an opinion leader in community meetings, focus group discussions, and spoke her mind at every opportunity. Sometimes she had to be asked to give chance to others to air their views! The setting up of a user group dealing with food preservation, something that is considered the preserve of women may

encourage women to at least participate in a user group dominated by women, and with time they may move to join other groups.

One major challenge very evident in the study community is the fear members have of taking office bearers to task either for misdemeanours or gross misconduct. Members would rather quit a group or complain privately but direct confrontation is very rare because of the fear of being bewitched. Interestingly, even individuals that are afraid of confronting a particular offender are also feared as witches by others and will not be approached about their aberrations. In many situations, only outsiders that are not part of the vicious cycle of fear can arbitrate in such situations but with the increased day to day forest management responsibilities, such conflicts can only get worse.

During the course of the field study, it quickly became clear who among the community members had more than seven years of formal education. The four people that had completed their high school education were in a different class all together as far as responses to questionnaire questions and articulation of issues were concerned. They had all been involved in JFM activities at one point or another and actually knew a lot about JFM. Those with less than 5 years of education, though may have been involved in JFM activities at one point were not forthcoming with their answers. Even when it was clear they knew the answers, they had to be prompted. Their answers were usually preceded by"I don't know anything but….." In the final analysis it was more an issue of confidence in articulating oneself than a total lack of knowledge.

4.5.5 Legal Challenges and Opportunities

4.5.5.1. *Statutory Instrument for Piloting JFM has shortcomings*

The largest and most important challenge to Joint Forest Management in Zambia has been and continues to be the legal framework. Almost 8 years after the enactment of the Forests Act meant to make JFM legal in Zambia, the old Forests Act of 1973 is still active while the new one remains dormant. While a way was found to go round this legal hurdle through the Statutory Instrument on Local Forests (Control and Management) Regulations, 1999, which enabled the piloting of JFM in Local Forests, this also has its limitations. Firstly, it only provided for the piloting of JFM in Local Forests. Since 60% of forests are on customary land

with only 2.8% of the forests gazetted as local forests, this means JFM could not be piloted in a large proportion of the country's forests and thus JFM experience was quite limited.

Secondly, since the formulation of the Statutory Instrument (and also the new Forests Act) pre- dated JFM in Zambia, the formulation of these pieces of legislature was based on a lot of assumptions and experiences from other countries. The piloting of JFM in Zambia therefore quickly ran into problems which had not been foreseen and whose solutions needed amendments to the JFM legislation. A Statutory Instrument was drafted to revoke the SI of 1999 but this also remains dormant. The best solution to this is just to activate the new Act then make the amendments to the Act.

However, if the SI has many shortcomings, the New Act has even more, and even if it had been implemented, similar challenges would have been faced. So when it is finally in place it will still have to be amended to make provisions for new issues that have arisen since the piloting of JFM started in the country.

4.5.5.2 The New Forests Act (1999) has many shortcomings

PFAP and other stakeholders have contended that the exclusion of National Forests from JFM is baseless. The rampant mismanagement of the country's forests that has occurred under the government's control of the forests is testimony that the government has failed to look after the forest's alone, and needs the participation of other stakeholders (PFAP, 2005). A senior Forestry Department official asked to comment on this defended government's position saying that National Forests are too vast to be managed by local communities. Partitioning of a national forest to give manageable portions to communities would also just create confusion and one cannot have the same forest being managed under different legal regimes. That is why the government has proposed the de-gazetting of a national forest, or part of it before JFM can take place there to avoid the use of dual systems of management in the same forest. PFAP however argued that even the whole system of forest reserves and their classification needs to be revised as "the current differentiation into local and national forests is almost meaningless" (PFAP, 2005: 9).

The Act has not changed the ownership of trees on customary land from the state to either communities or private land owners. Communities should have been allowed to at least own

the trees found on 'their' lands. The land tenure of a JFM area does not change. A JFM area is not protected from alienation by a local chief or compulsory acquisition[43] by the government. The Act encourages increased community involvement without providing for a corresponding increase in community rights towards the forest.

The Act defines a local community as

> the residents ***within*** or adjacent to a Local Forest, Joint Forest Management Area or open area who by virtue of their rights over land including customary land tenure invest in and derive benefit from the ***sustainable*** utilization of forest resources in their area.[44]

However, the same act in Section 24(1) prohibits squatting or residing in a Local Forest. The local community of section two which should jointly manage the forest with the Forestry Department becomes illegal in Section 24. The proviso of 'sustainable utilization of forest resources in their area' can be inferred to mean that JFM should not be carried out in degraded forests because obviously here the forest utilization has not been sustainable. This is absurd to say the least. The definition proposed by Jere (2004: 10) and used as the definition for local community in this study should instead be adopted in the Act[45]

The Act does not differentiate between JFM in Local Forests and on customary land. It proposes co-management and revenue sharing even on customary lands, which are under the jurisdiction of chiefs. This is taking away from what the people already have. Instead, the example of Tanzania should be emulated where different types of collaborative forest management are practiced based on the type of forest, whether state or customary[46]. The local communities should be left to manage the forests on customary lands (open areas) on their own. The revenue derived from forests on customary lands should not be shared between the local communities and the government but should be left for the communities. The government may however tax the community income.

[43] The state can do this under the law of eminent domain
[44] Section 2 (emphasis added).
[45] See section 3.5 of this volume.
[46] See section 2.7 of this volume for a brief look at JFM in Tanzania.

4.5.6 Apathy towards forestry issues and lack of political will

One of the most important challenges of JFM in Katanino or other areas in Zambia is that forestry issues are not a matter of concern to the general population. Since they are not a priority for the people they are not a priority for the government. Other issues like media freedom, national constitution have the whole of civil society and an array of interest groups lobbying for them but the Forests Act is not talked about. While other issues have pressure groups formed in their cause, there have been no protests to the freedom statute to pressure the government to start the commencement procedures for the new Forests Act.

The large sums of money needed to set up the Zambia Forestry Commission have been given as one of the reasons for the stagnation of the forestry sector in the country. This is closely linked to the job insecurity created in some minds when the Commission is mentioned. It is generally believed that a lot of foresters will lose their jobs when the Commission is finally born. Most foresters prefer to have their pension, leave or other benefits to be paid prior to transferring to the Commission but the new Act is clear on the issue. It stipulates that the pensionable service of a person transferred from the Forestry Department to the Commission will be treated as continuous. The government may just not be ready to give away forests. Control over resources is a source of power, whether in a household, village, town or at national level. It cannot be an easy thing for a government to let go of such a huge resource. However, the government may just allow JFM in Local Forests and in forests on customary land while retaining the sole management responsibility and control of National Forests. The performance of these forests under JFM may then be assessed in future with a view to extending JFM to National Forests if it proves successful in Local Forests. In the meantime the government should instead improve its monitoring of National Forests and forest licence-holders. This author believes that illegal logging (harvesting much more than is provided for by their licences) by individuals and companies with forest licences are a significant contributor to illegal felling of trees.

4.5.7 The forestry sector is different from the wildlife sector

Another challenge is that the forestry sector is just not the same as the wildlife sector where collaborative management has been tried and benefits have accrued to the communities in the form of a share of revenue from the hunting licences. In the wildlife sector, a lot of money is

made from hunting licences. Similar amounts of money cannot be expected in the forestry sector because foreigners will not pay huge sums of money to cut a tree. There is also quite a bit of non consumptive use of wildlife resources that earns a lot of money for the wildlife agency, whereas in the forestry sector, big money is in the cutting down of valuable trees that took many years to grow.

The rampant charcoal burning is not conducive to JFM. Charcoal burning, done by both male and female adults(although women require help in the felling of the trees and preparation of the logs for burning) not only leads to the felling of the trees to be burnt, but extra trees are felled to get the bark rope needed to form the 'head' of the packed sacks of charcoal. Most respondents reported having to walk longer and longer distances to find people still with suitable trees in their forests that are willing to sell them the trees. The trees in their own fields having been long depleted. Sooner than later, the search for charcoal trees will turn to Katanino Forest. Although all the three chiefs (whose chiefdoms are involved in JFM) have repeated banned charcoal burning in their chiefdoms, advising their subjects to concentrate on agriculture instead, this is one piece of advice that has largely gone unheeded. Since Katanino Forest is still in good condition, an opportunity exists to prevent its degradation. It would be more difficult to restore it once it is degraded.

4.5.8 Piloting JFM in Zambia has been very expensive

Piloting of JFM activities in three provinces of Zambia (Luapula, Copperbelt, Southern) was spearheaded by PFAP from 2000 to 2005. This Programme was heavily funded by the Finnish Government. By June 30th 2004, the Finnish government had pumped a total of €5.88 million (ZMK 35.3 billion) into the programme while GRZ had put in €256,600 (ZMK 1.54 billion).PFAPs operational budget exceeded by several times the amounts available to the Forestry Department for the entire country (PFAP, 2005). Even the most enthusiastic proponent of JFM in Zambia would find it had to believe that the Zambian Government can scale up JFM without external support. To quote PFAP,

> There is no indication of the ability or determination of the Forestry Department to sustain programme activities after withdrawal of donor support. The resources made available by PFAP far exceeded those available to the Forestry Department and it will be virtually impossible , without either further external support or a huge increase in direct funding from central

> government, for JFM activities in the pilot areas to be sustained, never mind to envisage a scaling up of JFM nationally (2005:5)

It would be a huge blow to the JFM communities in Zambia should JFM implementation not start in earnest in the shortest possible time as these communities have invested a lot of time in the piloting activities and have great expectations. If JFM is not actualized, not only would a big opportunity for communities to interact with the government in a very positive setting be lost but it would take years for these communities to learn to trust the government again as a number of them are already disgruntled and lament about broken promises.

4.5.9 Women are not fully participating in JFM activities

Women found it difficult to participate in JFM activities because of their limited access to information on JFM; their lower socio-economic status and triple roles which required their presence at home; and lack of female role models in the forestry sector. Mainstreaming gender in all future JFM activities would encourage the participation of women in JFM activities. Women's participation is important because they utilize a significant portion of forest resources in their traditional roles. As suggested by Wonani (2004), women's participation in JFM activities can be improved through the reduction of their household roles so that they have time left for JFM activities. The resuscitation of the Food Preservation User Group which was reported to have been dominated by women should see more women joining. This would provide a platform for women to learn about other JFM activities within their communities.

4.6 Reflections on the Data Analysis Tools used in the Study

After reflecting on the data analysis tools used in the study, the research asked herself whether the findings of the study would have been different had a different set of analysis tools been employed. Her response was 'probably not'! However, the use of the modified 4Rs Stakeholder Analysis and Ostrom's Principles led her to ask the following rhetorical questions:

- Should a community of over 3000 households be considered as 1 stakeholder? Is this not subsuming the heterogeneity of the members of this community? Or is it agreeing with the 'bounded entity, homogeneous with shared interests and aspirations' definition of local community? Some members of the local community are "in another world" when it comes to Katanino Forest but have also been included as primary stakeholders by virtue of their proximity to Katanino Forest. What are the implications of this?
- What should one make of new institutions that perform poorly on Ostrom's Principles? Should a time frame be given for them to adapt, and if so how much time? Or should they be immediately considered as a common pool regime that will not endure very far into the future?

The two analysis tools (4Rs and Ostrom) are similar but each brought a different perspective to the research problem and there were benefits in using both of them.

The last chapter of this report presents a summary of the report in the conclusion. This is done by giving a brief summary of the major findings of each of the four study objectives. It ends by making some recommendations to the government, the local community and other JFM

CHAPTER FIVE

5 Conclusions and Recommendations

This chapter starts by presenting the concluding remarks by summarizing the study in its first part. The second part is made up of recommendations of the study drawn from the findings of the study.

5.1 Conclusions

The aim of the study was achieved. The challenges and opportunities of Joint Forest Management in Katanino Joint Forest Management Area have been determined through investigations based on the study objectives and research questions.

5.1.1 Livelihoods of the members of KJFMA

The study revealed that agriculture was the most important occupation for the community. The mean total household cash income was ZMK 2,678,753 per year. Of this, 67% was from crop farming alone while forest cash income was only 4%. Maize and sweet potatoes were the most important crops and were grown for both consumption and sale. Livestock rearing was not very significant in income contribution with the mean number of goats, cattle and pigs less than 1 per household. Only chickens were common (mean number owned per household was 9) although these were all free range chickens with minimal costs to the household, and kept mostly for rainy days as most households reported only selling their chickens in distress times. Various types of forest resources were accessed from Katanino Local Forest. These included fruits, leaves, roots, bark, seeds, animals, caterpillars and mushrooms. The households living closer to the forests harvested more forest produce from Katanino than those living further away while those living closer to the road (especially near the lay-by) sold more forest produce. A significant contribution of forest products from Katanino Forest to livelihoods was reported by 58% of the sample.

Of the five types of capital, financial capital is the scarcest in the area, followed by physical capital which is restricted to basic farming implements like hoes, a few ox-drawn ploughs and carts. There are only two schools in the village but the area is well connected as the main road from Ndola to Lusaka passes through the area. Unskilled household labour is mostly

available, and mostly important in crop farming. Education levels are low with the average household head only having received 5-7 years of formal schooling. There are good social networks as villages are made up of extended families that live next to each other though this proximity is sometimes a source of wrangles.

Harvesting of forest resources exclusively for home consumption was reported by 44.6% of the sampled households. This, compounded with the very small contribution of forest cash income to total household income showed that the forest resources are more valued for their contribution to household food security than for direct monetary reasons. The forest resources are abundant during the tilling season when food stocks from the previous harvest season are running low.

In this study, the incomes reported for forest products were restricted to the cash incomes that were earned from the sale of forest products. The value of the forest products that were not sold were not given monetary estimates because of the difficulty of doing this when the respondents were not confident in their estimates of household consumption of these products per year. The author desisted from making extrapolations of monetary values of consumed forest products based on scant data so as not to end up with estimates that had no basis on the ground.

5.1.2. Stakeholders' Inputs and Outputs from KJFM

The two primary stakeholders were the local community and the Forestry Department. The community had access and user rights while the Forestry Department owned and controlled the utilization of forest resources. All forest resources are vested in the President on behalf of the Republic. The community has responsibility for day to day management of Katanino Forest as well as maintenance of forest boundaries and fire management. The Forestry Department is responsible for the issuance of pit sawing, saw milling, casual, charcoal licences and concessions. Once new Forests Act is in effect, community members will be able to harvest NTFPs from Katanino Forest provided they get a permit. During the study 58% of the sampled households reported accessing Katanino Forest for NTFPs despite the ban to the contrary.

Relationships between Forestry Department and the community are much improved under JFM. Now they can sit down and discuss the co-management of the forest whereas before it was always the Forestry Department chasing community members away from the forest or fining them for forest offences. There is a perception however that the Forestry Department has not delegated enough decision making authority to the community, while it was quick to delegate the management responsibility. Frustrations about this imbalance have been exacerbated by the voluntary nature of community forest management activities. It is a thorny issue for the few community members actually involvement in forest management that they are not remunerated in any direct way for their work. The assertion that they should not expect to be remunerated because they are managing their forest has not gone down well because" foresters were remunerated for looking after a forest that was theirs".

5.1.3 Effectiveness of Institutions

The institutions (new and old, traditional and modern) involved in JFM in Katanino were analyzed using Ostrom's Eight Design Principles for Enduring Common Pool Resources. Though membership, rights, and physical boundaries were clearly defined, community members were not actively involved in decision making concerning Katanino Forest. Attendances of meetings where decisions were supposed to be made were very poor, on the rare occasions that these meetings were called. No elections had been held since 2001 and the same office bearers were still in place. This situation had been promoted by the perception that only individuals that had been trained in the ways of community organization management were eligible for positions of leadership.

The monitoring procedures were largely non functional. The monitors were not working because of lack of training; lack of remuneration, and the authorities they were supposed to report to (VRMCs) were themselves inactive. The general community was not taking the monitors to task because they were perceived to be not really accountable to anyone since they work without pay. The average individual knows of at least one rule pertaining to the forest. The most well known rule is that felling of trees inside the forest is strictly prohibited. Sanctions against violation are even less known. Confiscation of tools used to commit a forest offence was mentioned as one penalty for violation by very few respondents. Authorities responsible for punishing offenders were also not well known as exemplified by the 13 different categories of answers given by respondents. Some of the respondents (29%) could

not even guess who was responsible for punishing forest offenders. There was no clear system for graduated sanctions.

Chiefs have been given a prominent role in the setting up of JFM in that no JFM implementation can proceed without their support and signed acceptance. They represent their subjects in the signing of the MoU between the Forestry Department and the local communities. However, their role after JFM implementation is not specified. Communities can come up with by-laws for more specific regulation of forest utilization and management. These by-laws have to be compatible with all main legislation on which they are based. Also, the by-laws are enforceable in a court of laws once they are gazetted by the Ministry responsible for environment. Otherwise, they remain enforceable only under traditional authorities.
The organization formed to coordinate JFM activities at area level i.e. the Forest management Committee has been criticized as composing of too many government institutions making effective decision making by the communities themselves difficult.

There were no mechanisms for swift, inexpensive and fair mechanisms for conflict resolution related to KJFMA. Conflicts remained unresolved for long periods, especially when there was no external arbitration. The non-resolution of conflicts by community members among themselves seemed to be exacerbated by the pervasive fear of witchcraft. Also most of these conflicts were non confrontational for the same reason. The community was afraid to confront offenders for fear of being bewitched.

Using Ostrom's principles, the conclusion seemed to be that the institutions were not effective and the CPR may not endure far into the future. However, it was also noted that most of these institutions were still in their infancy and were slowing adapting to a difficult and dynamic environment. The non stalemate in JFM implementation caused by the legal deadlock continues. There was a lot of optimism that once JFM commenced in earnest, these institutions would become more effective and efficient as changes are made to accommodate the situation on the ground.

5.1.4 Knowledge of and Perceptions of JFM among stakeholders

The levels of knowledge on JFM were assessed among the community, and the results revealed a general lack on knowledge on JFM among the community. Over 70% of the respondents could only guess at who managed the forest; who was responsible for regulating the utilization of the forest; and types of punishments given to offenders for various offences.81% of the respondents had no idea how the VRMC of their village was working, a large number of them never having even heard of the committee. The Forest Management Committee was similarly unknown. The few respondents that were familiar with these two JFM institutions (most of them current or former members) said these two institutions were for all intents and purposes "dead".

Major constraints to the effective management of KJFMA as perceived by the community were, first and foremost, the lack of remuneration either in cash or in kind for the community forest management work they did. Honorary Forestry Officers, patrolmen, individuals still involved in annual forest boundary maintenance and fire control were singled out as deserving special mention. The Forestry Department was also accused of not being visible to the community anymore, even just to offer technical advice. Another constraint was given to be the 'Forestry Department's lack of commitment to meeting its part of the "joint" in JFM'. Other constraints cited by the community were government bureaucracy; inaccessibility of the District Forestry Offices to the community; the unclear status of Honorary Forestry Officers; and the prolonged delay in the commencement of full JFM activities.

A third party that has worked with both Forestry Department and the community gave a list of constraints as:

- Lack of interest in the management of the proposed project designed to help them by the members of the local community.
- Outsiders' insistence on community projects rather than individual opportunities. Community projects are difficult to organize as the locals clearly prefer individual projects. There is no 'JFM community' when there are no outsiders around.
- Communication constraints make getting information to everyone and in good time difficult, especially with the failing into disrepair of community bicycles.
- Slow progress and incomplete understanding of government bureaucracy.

The Forestry Department perceived the constraints to include the lack of appreciation of the long term nature of most of the JFM benefits. This was admittedly not impressed enough upon the community during the initial stages of JFM piloting. The villages that constitute KJFMA were not very synergic in their operations. Not surprisingly, the biggest constraint was reported to be the non commencement of the Forests Act (1999) which has led to the continued pending of a lot of other activities.

5.1.5 Summary of Challenges of and Opportunities for JFM

The challenges and opportunities were summarized in the last section of chapter 4. After synthesizing the findings from the four objectives, it was clear that the lack of JFM legislation in place had stalled even the most promising of projects and led to the losing of morale by both communities and the Forestry Department itself. One of the biggest opportunities that for JFM in Katanino area is the very good status of Katanino Forest, followed by the proximity to the main road from the Copperbelt Province to Central and Lusaka Provinces which makes the communication between Katanino Area and these places quite easy, and provides a good outlet for its products, for forest and agricultural.

5.2 Recommendations

1. The immediate promulgation of the commencement order to repeal the current Forests Act (1973) and bring into force the Forests Act (1999). Relevant sections of this Act should then be repealed to incorporate the lessons learnt from the piloting of JFM.

2. There should be a distinction between JFM in Local Forests and in forests on customary land. The government should not have a share of the revenue derived from forests on customary lands but should impose a soft tax on the income from such forests.

3. The government should retain the current exclusion of National Forests from JFM, at least for the time being. Only when JFM proves to be very successful in local forests and open areas should national forests be considered for possible inclusion in JFM. This is a pre-cautionary measure based on the logic that JFM is not a panacea for

successful forest management but something that has to be tested and continually adapted to suit local conditions. The Forest Department should however step up its management of the National Forests. With Local Forest being managed more and more by communities the Forestry Department should have more staff dedicated to the management of National Forests.

4. In the setting up of a JFM area, not only ecological, economic and gender analyses of the feasibility and impact of JFM in the area should be done but also social studies (including anthropological perspectives). This would help in the prediction of community behaviour to new developments. The donations of 12 bicycles to KJFMA by PFAP led to the quitting of hitherto committed members from JFM projects. The effects of such donations should in future not always be assumed to be positive.

5. The government should review the fees charged for forest products to encourage compliance. The fees should be a small percentage of the market value of these products.

6. Promotion of small scale forest based processing ventures. These should include food preservation as there is an abundance of fruits, vegetables, and mushrooms which just go to waste due to their perishable nature. These fetch high prices when processed and packaged to a high standard.

7. Provision of incentives to the private sector for investments in forest based ventures in JFM areas. Mechanisms should be put in place for securing benefits for JFM communities from these ventures e.g. employment.

8. The composition of the Forest Management Committee should be revised to reduce government representation. It should also leave more room for other stakeholders e.g. NGOs.

9. Management plans made by JFM communities should not be gazetted. This would make it possible for revisions to be made as more lessons are learnt or the JFM environment changes in a shorter period of time. They should instead only require the

approval of the Provincial Forestry Officer. In this era of decentralization the Provincial Forestry Officer should have the authority to make such decisions.

10. The government should increase its budgetary allocation to the Forestry Department.

11. District Forestry personnel must visit their JFM communities frequently as a show of support and commitment. Effort should be made to visit the communities even when there are no visitors interested in meeting the community.

12. The community living near Katanino Forest should be sensitized on JFM. The information disseminated to the community should however not include exaggerations on benefits (especially revenue from the forest) but should be based more on the continued existence of the forest as a benefit in itself.

13. Mechanisms for resolving conflicts related to JFM must be clarified.

14. Lobbying and advocacy for Forestry issues needs to be increased.

15. The government should recognize community timber rights and allow JFM communities to pay for Forest licences at reduced rates.

16. Community schools should be set up in Katanino area. This would help reduce pupil attrition and absenteeism as presently children walk long distances to get to school resulting in most of them either dropping out of school completely or being frequently absent from school.

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Appendix I

HOUSEHOLD SURVEY QUESTIONNAIRE

INTRODUCTION

My name is……. I am conducting research on the opportunities and challenges of managing Katanino Forest under joint forest management by the Government of Zambia and other stakeholders like local communities, Non Governmental Organisations and the private sector. I am asking questions to people who live in the villages surrounding the forest, chosen randomly, so that i can get their views. The information provided will be for academic purposes only and will be kept confidential and anonymous. Is it ok for me to interview you?

Thank you.

Questionnaire #	
Name of Village	
Chief/ Headman	
Enumerator's Name	
Date of Interview	
Start time	
Finish time	

A. HOUSEHOLD DEMOGRAPHIC DATA

Labels for people living in household, starting with household head	Sex	Age	Occupation/ economic activity	Marital status	Highest level of education attained
Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**

Codes for Q2

1- male
2- female

Codes for Q4

1- farmer
2- fishing
3- teacher
4- health personnel
5- secretary/clerk
6- casual labourer
7- others (specify)

Codes for Q5

1- married
2- single
3- divorced
4- widowed
5- separated

Codes for Q6

0- no formal education
1- Lower basic (grades 1-4)
2- Middle basic (grades 5-7)
3- Upper basic (grades 8-9)
4- High school (grades 10-12)

B. HOUSEHOLD AGRICULTURAL ACTIVITIES AND ASSETS DATA

List of major crops grown (3-4 crops)	Uses of major crops grown	Challenges linked to production of major crops	Possible solutions to challenges in Q10	Estimates of annual income from each major crop (include consumption)	Other sources of household income/ food/clothes	Estimate of income from each alternative source of income
Q7	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**	**Q13**
Others (specify)						

Codes for Q7

1- Cassava
2- Maize
3- Beans
4- Pumpkins
5- Sweet potatoes
6- Sorghum
7- groundnuts
8- wheat
9- peas
10- rice
11- coffee

Codes for Q8

1-home consumption
2- for sale
3- given as gifts/ reciprocity
4- others (specify)

Codes for Q9

1- accessing seeds
2- fertilizer access
3- droughts
4- lack of markets
5- pests
6- late delivery of inputs by govt/ suppliers

Codes for Q12

1- Trading
2- Casual work
3- Remittances

List of major livestock reared and quantities	Uses of major livestock reared	Challenges of rearing major livestock	Possible solutions to challenges in Q15 (C)	Estimates of expenditure on inputs into crop production
Q15 (A) **Others (specify)**	**Q15 (B)**	**Q15(C)**	**Q15 (D)**	**Q15 (E)**
Estimate of costs related to livestock	Estimate of income from livestock	Estimate of annual costs of other activities		
Q15F	**Q15G**	**Q15H**		

Codes for Q15A
1- cattle
2- goats
3- pigs
4- chickens
5- sheep
6- ducks
7- rabbits
8- donkeys

Codes for Q15B
1- home consumption
2- for sale
3- for paying dowry
4- transport
5- draught power
6- manure/organic fertilizer
7- others (specify)

Codes for Q15C
1- lack of veterinary services
2- shortages of grazing areas
3- diseases
4- shortages of feeds
5- lack of markets
6- conflicts with wild animals
7- others (specify)

Agriculture related assets owned and quantities	Do you hire any assets that you don't own as a household during your agricultural activities?	If you answered yes in Q17 (A), what is hired? (Otherwise go to Q18)	Does your household have any agricultural fields in Katanino Forest?
Q16	**Q17 (A)**	**Q17 (B)**	**Q18**

Codes for Q16 and Q17 (B)

1 Ox drawn plough
2 Tractor
3 Tractor trailer
4 Hoes
5 Ridge/cultivator
6 Harrow
7 Tractor plough
8 Oxen
9 Labour

Codes for Q17(A) and Q18

1- No
2- Yes

C. FORESTRY USE AND JOINT FOREST MANAGEMENT

What products do you get from Katanino Forest?	Are there forest products that you are not allowed to get from Katanino Forest?	If you answered "yes" to Q20 (A), what products are these? (If you answered "no" to Q20 (A), go to Q21	Why are you not allowed to get the products listed in Q20 (B)?	What uses are made of each of the products obtained from Katanino Forest?	Give an estimate of monetary value of <u>all</u> the products obtained from Katanino Forest annually. (List value for each product separately)	How do the forest products from Katanino contribute towards the livelihood of your household?	Do you get forest products from forest/ areas other than Katanino Forest? (If you answer "No", go to Q24)	If answer to Q23B is yes, Where else do you get forest products from?
Q19	**Q20 (A)**	**Q20 (B)**	**Q20 (C)**	**Q21**	**Q22**	**Q23 (A)**	**Q23 (B)**	**Q23 (C)**

Codes for Q19 and Q20 (B)

1. Fibres (bamboo, grass, rattan, stem vines, papyrus)
2. Vegetal (fruits, fungi, nuts, roots, seeds, tubers, spices, flowers)
3. Fauna [food]-(game meat, birds, honey, invertebrates)
4. Fauna [non-food]-(live animals, ecotourism)
5. Medicines and Cosmetics (medicinal roots, bark, leaves, flowers)
6. Extractives (dyes, essential oils, fats, latex oils, oil seeds, resins, tannins, gum)
7. Soil, salt, minerals, stone.

Codes for Q20 (A) and Q23 (B)

1. Yes 2. No

Give a monetary estimate of the value of these forest products not from Katanino Forest. (List value for each product separately)	How do the forest products from alternative source contribute towards the livelihood of your household?	Which members of the household are involved in collection of forestry products?	Who decides how the forestry products are used? (Whether domestic use or sold)?	Is the income from sale of forestry products used I the same way regardless of how collected the products or who did the selling? (probe)
Q23D	**Q23E**	**Q23F**	**Q23G**	**Q23H**

Codes for Q23F

1- Adult male
2- Adult female
3- Female children
4- Male children

Who manages Katanino Forest?	Katanino Forest is jointly managed by the communities living around the forest and the government	Are you a member of any of the committees/ organisations involved in managing Katanino Forest? If yes, provide name.	Mention rules and regulations for using Katanino forest or harvesting forest products from there	Who has put these rules and regulations in place?	Who makes sure these rules and regulations are followed?	Who punishes the rule breakers?	What types of punishments are given to the rule breakers?
Q24	**Q25**	**Q26**	**Q27**	**Q28**	**Q29 (A)**	**Q29 (B)**	**Q29(C)**

Codes for Q25

1- True
2- False
3- No opinion

What do you think of the punishments given to rule breakers?	Katanino Forest is being managed well under joint forest management	What problems do you face in working with other villages in KJFM?	Describe relationship of communities with Forestry Department Staff	What do you think of the working of Village Resource Management Committee?	What do you think of the working of the Forest Management Committee?	What user groups have been formed in your village?	Comment on the working of the user groups, if any	What would you say have been the successes of KJFMA?	What would you say have been the failures of KJFMA?	What would you like to see done in future to improve management of KJFMA?
Q 29 (D)	**Q30**	**Q31**	**Q32**	**Q33 (A)**	**Q33 (B)**	**Q34 (A)**	**Q34 (B)**	**Q35**	**Q36**	**Q37**

Codes for Q29 (D)

1- Too harsh
2- Harsh
3- Fair
4- Good
5- Very good
6- No opinion

Codes for Q30

1. strongly agree
2. agree
3. no opinion
4. disagree
5. strongly disagree

Codes for Q32

1. Very good
2. Good
3. Don't know/ no opinion
4. Bad
5. Very bad

What should be the roles of chiefs in the management of Katanino forest?	How should members of the various organisations constituted for JFM come into office?	What incentives should be given to locals to encourage participation in JFM activities?	Have you ever attended meetings called in the village where management of Katanino Forest under JFM was discussed?	What do you see as the main challenges to management of Katanino Forest jointly by government and local communities?	What solutions would you propose to the challenges you have mentioned (in Q39)?
Q35	**Q36**	**Q37**	**Q38**	**Q39** **Top of mind:** **Other challenges:**	**Q40**

Is it only the 4 villages (Oposhi, Bwengo, Serenje and Biwa) that are allowed to use Katanino Forest?	If not, how are outsiders excluded?	How are people from villages/communities not involved in KJFM dealt with in the utilization of Katanino Forest?	Katanino Forest is zoned into **6** with each village surrounding it having a zone that it's allowed to use and manage.	Members of the Forest Management Committee are elected by the local community	The chief has to support the idea of JFM for it to be implemented in a forest
Q41 (A)	**Q41 (B)**	**Q42**	**Q43**	**Q44**	**Q45**

Codes for Q41 (A)

1. No
2. Yes
3. Don't know

Codes for Q43, Q44 and Q45

1. True
2.False
3. No opinion/don't know

The villages surrounding Katanino Forest do not benefit as much as they should from the Forest	The rules and regulations governing the use of Katanino forest are effective	The Forestry Dept has too much control over the running of Katanino Forest	The rules governing the use of Katanino forest under JFM are promoting good management of the forest	It is very easy for all stakeholders to obey the rules and regulations governing KJFMA	The rules and regulations governing the use of Katanino Forest favour some villages.
Q45	**Q46**	**Q47**	**Q48**	**Q49**	**Q50**

Codes for Q45-Q50

1. Strongly disagree 2. Disagree 3. No opinion 4. Agree 5. Strongly agree

What factors prevent women from participating in JFM activities?	What factors motivate women to participate in JFM activities?	What factors prevent men from participating in JFM activities?	What factors encourage men to participate in JFM activities?
Q51A	**Q51B**	**Q51C**	**Q51D**

Thank you very much!

Appendix II

INTERVIEW GUIDE- FORESTRY DEPT HEADQUARTERS, LUSAKA

1. In how many areas has Joint forest Management been implemented in Zambia to date?
2. What challenges have characterised JFM implementation in these areas? (Generally, and specifically for each pilot area)
3. What would you say have been the successes of JFM in these areas?
4. What legal provisions have been established for JFM in Zambia? Have these been adequate in the work on JFM that has been done so far?
5. Guidelines for starting JFM in Zambia have been drafted by the government. What, if any have been some challenges/ limitations/ constraints associated with these guidelines in the implementation of JFM in Zambia?
6. Why is JFM not allowed in National Forests when extensive areas of forest are classified as National Forests?
7. What kind of benefits are local communities allowed / not allowed to enjoy under JFM? How is the sharing of benefits from jointly managed forests to be shared between communities and government/ forestry dept?
8. What are/ have been the weaknesses of communities involved in JFM? Is there anything that can be done to overcome these weaknesses?
9. What have been/ are potential strengths of communities involved in JFM?
10. Could you comment on the implementation of JFM without the Forest Commission being in place? This question is put forward on the basis that current forest legislation on JFM in Zambia makes specific references to this Commission.
11. According to the Guidelines for JFM, the Chief of the area has to support the idea of JFM in his area. Why has the chief been given such prominence?
12. Is there anything being done/ has been done to improve relations between Forestry Department staff and local communities in JFM areas?
13. Why does FD propose to share benefits of JFM even on forests on customary land?

Appendix III

GUIDE QUESTIONS FOR FOCUS GROUP DISCUSSIONS AND KEY INFORMANT INTERVIEWS

1. Who is involved in the management of Katanino forest?
2. Who has user/ usufruct rights over what resources/ areas of Katanino forest? Is it just the 4 villages Oposhi, Serenje, Bwengo and Biwa? Who else?
3. Can others be excluded? If so, how?
4. Sales of land that is part of Katanino forest not allowed? Why?
5. How much do the communities contribute towards the management of the forest? Do they do a lot of management work in return for little or the other way round? Are the people doing the most forest managing work the ones benefiting from it the most?
6. Who makes decisions on how to manage the forest? Are locals (common people) represented in decision-making concerning the forest? How are their representatives chosen? What about other stakeholders (NGOs, Forestry Department, Private sector), how involved are they in decision-making concerning the forest?
7. Are the decision makers/ those in positions of authority accountable and to whom? Downwardly or upwardly accountable?
8. Are decisions/ regulations made by local authorities binding? Forestry Departments or political leaders overrule decisions made by local authorities/institutions?
9. Apart from the harvesting of forest resources, what else is Katanino Forest used for by the local community?
10. What do you know about VRMC and FMC?

Appendix IV

COMPARISONS BETWEEN ANNUAL HOUSEHOLD CROP, FOREST AND TOTAL CASH INCOMES OF BIWA AND SERENJE VILLAGES

Comparison between the mean annual household crop incomes between Biwa and Serenje Villages using the two sample Z-test.

	Biwa Village	Serenje Village
μ	1, 759,651.163	1, 849,109.375
n	43	32
s	1,616,142,674	1,332,660.169
δ	1,597,239.769	1,311,672.083
	Z = -0.266 P-value = 0.395	

H_o : $\mu_b = \mu_s$ **H_a:** $\mu_b < \mu_s$

p -value = 0.395 which is greater than 0.05. Therefore, H_o is retained. It cannot be stated that there is a difference in the mean crop incomes of households of Biwa and Serenje Villages.

Comparison between the mean annual household crop incomes between Biwa and Serenje Villages using the two sample Z-test.

	Biwa Village	Serenje Village
μ	17,906.98	188,125
n	43	32
s	60,378.10	1,332,660.169
δ	59,671.889	1,332,660.169
	Z = -2.740 P-value = 0.00307	

$\mathbf{H_o}$ **:** $\mu_b = \mu_s$ $\mathbf{H_a}$**:** $\mu_b < \mu_s$

Z= -2.740, p-value= 0.00307 (which is less than 0.05). Therefore H_o is rejected and H_a is accepted. The mean forest income of a household in Biwa Village is less than that of a household in Serenje Village. Even when the outlier of ZMK1, 800,000 forest income earned by 1 particular household in Serenje Village is removed and the test repeated, the conclusion remains the same (pvalue=0.00058, Z =-3.259).

Comparison between the mean annual total household incomes between Biwa and Serenje Villages using the two sample Z-test.

	Biwa Village	Serenje Village
μ	2,557,325.581	2,841,921.875
n	43	32
s	2,172,876.453	1, 837,213.564
δ	2,147,461.819	1,808,279,258
	Z = -0.622 P-value = 0.267	

$\mathbf{H_o}$ **:** $\mu_b = \mu_s$ $\mathbf{H_a}$**:** $\mu_b < \mu_s$

Z =-0.622, p-value =0.267 (which is greater than 0.05). Therefore H_o is retained at 5% Level of Significance. It cannot be stated that there is a significant difference in the mean total household incomes between the villages of Biwa and Serenje

Appendix V

Two-Sample T-Test and CI: total income, livelihood contribution

```
Two-sample T for totaincm

livecont   N     Mean    StDev  SE Mean
no        31  2643032  2109469   378872
yes       44  2703920  1993344   300508


Difference = mu (no) - mu (yes)
Estimate for difference:  -60888.2
95% CI for difference:  (-1015127.9, 893351.5)
T-Test of difference = 0 (vs not =): T-Value = -0.13  P-Value = 0.899  DF = 73
Both use Pooled StDev = 2041866.5780



                              Individual 95% CIs For Mean Based on Pooled StDev
Level   N     Mean    StDev      --+---------+---------+---------+-------
no     31  2643032  2109469      (-----------------*-----------------)
yes    44  2703920  1993344          (---------------*--------------)
                              --+---------+---------+---------+-------
                             2000000   2400000   2800000   3200000
```

Best Subsets Regression: total income versus crop income, alternative income, forest cash income, livestock income, number of forest products.

```
Response is totaincm

                                                    l
                                                    i
                                                  c a f f i
                                                  r l p o v
                                                  o t r r e
                                                  p i o i i
                                                  i n d n n
                                                  n c u c c
                          Mallows                 c o c o o
Vars   R-Sq  R-Sq(adj)      C-p            S      m m t m m
   1   52.6       52.0        *      1405320      X
   1   41.9       41.1        *      1556822        X
   2   97.9       97.8        *       299948      X X
   2   54.3       53.0        *      1390734      X     X
   3   99.7       99.6        *       121440      X X   X
   3   98.6       98.5        *       248539      X X     X
   4  100.0      100.0        *  0.000000000      X X   X X
   4   99.7       99.7        *       119792      X X X X
   5  100.0      100.0        *  0.000000000      X X X X X
```

Regression Analysis: total income versus crop income and alternative income

The regression equation is
totaincm = 112646 + 1.02 cropincm + 0.999 altincom

Predictor	Coef	SE Coef	T	P
Constant	112646	58093	1.94	0.056
cropincm	1.01729	0.02337	43.53	0.000
altincom	0.99856	0.02553	39.12	0.000

S = 299948 R-Sq = 97.9% R-Sq(adj) = 97.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	2.97943E+14	1.48971E+14	1655.81	0.000
Residual Error	72	6.47777E+12	89969057551		
Total	74	3.04420E+14			