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# Contribution of Joint Forest Management in Improving Conservation and Local Livelihood in Rufiji District, Tanzania

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***Abstract***

*This paper attempts to explore the contribution of Joint Forest Management in improving conservation and local livelihood in Rufiji District. The study was carried in three villages (Mkupuka, Mangwi and Muyuyu). Household survey, key informants interviews, focus group discussions, and archive information were used to collect data. A total of 90 households, 10 key informants, and 9 Focus Group Discussion members were involved. Results indicate that 57% of the respondents had the view that local communities around Ngumburuni Forest Reserve did not realize direct benefits from JFM practices. Findings have also revealed that 82.2% of the respondents perceived the increased trend of deforestation after the introduction of JFM, a feature that does not promise sustainability of the forest reserve. Findings indicate that challenges hindered effective management of forest reserve include the increase of human population, expanding agriculture, and insufficient fund. The study concludes that, JFM has failed to show substantial contributions towards enhancing conservation and livelihood of local communities in the study area. It is recommended that for sustainable management of the forest resources there is a need to strengthen the JFM in improving conservation and enhancing local livelihood through conservation awareness, involvement of the local community in implementation of the JFM strategies, to ensure equal distribution of benefits realized from forest conservation, and strengthening patrol of the forest resources.*

***Keywords***

*joint forest management, conservation, livelihood*

## 1. Introduction

Globally, approaches to involvement of the local people in forest management have multiplied over the past three decades. These approaches have been known by different names such as participatory forestry, community forestry, joint forest management, and collaborative forest management (Iddi & Elvin, 2011). Despite of having different names, all emphasize on the decentralization of forest management rights, ownership in return for mutually enforceable responsibilities, with the aim of producing positive ecological, social and economic outcomes (Hackle, 1999; Iddi & Elvin, 2011).

Among the community approaches, Joint Forest Management (JFM) is a recent development in the history of modern forest conservation in Africa (Murphee, 2006; Igoe & Croucher, 2007; Iddi & Elvin, 2011). JFM aimed at enhancing forest conservation by involving people in forest resource management, poverty reduction and economic development through sustainable use and benefit shearing of forest resources (Balint, 2006; Murphee, 2006). JFM approach, open doors for the people to regain control over forest resources management and strengthening their decision-making capabilities (Nelson, 2007; Iddi & Elvin, 2011) instead of passive participation by information giving, to self mobilization and active participation in forest resource management (Ghimire & Pimbert, 1997).

JFM operating frameworks differ between countries and even between projects in the same country. In Angola for example, JFM involves registered villages that usually comprise of one or several villages (Igoe & Croucher, 2007; Iddi & Elvin, 2011). In Tanzania, JFM is facilitated by the Forest and Beekeeping Division and community conservation services under the Ministry of Natural Resource (Iddi & Elvin, 2011). It operates through the established village natural resource committees and natural resources funds (Blomley & Ramadhani, 2006).

The Tanzania Ministry of Natural Recourses and Tourism established JFM in Ngumburuni Forest Reserve (NFR) in 2000's. The concept of JFM came as a way to ensure local people around NFR benefit by being close to the resource so as to ensure conservation of the forest reserve and enhancing livelihood of the local people adjacent to the forest reserve (Tom & Said, 2009).

Moreover, the principal assumption of introducing JFM in Ngumburuni forest reserve is to decentralize by devolution the management and conservation of forest resources to the local community residing adjacent to forested areas (Bilney et al., 2010). Such decentralization sought that could minimize conflicts of interest on the use and control of forest resources and degradation of forest resources, to ensure equitable sharing of benefits accrued from forest services and enhancing conservation (Nelson & Ole Nako, 2005). The government role under JFM in Ngumburuni forest reserve is to formulate guidelines, coordination, monitoring and regulation (URT, 2012). The management and conservation activities of the forest resources move to the local authorities, which undertake the primary responsibility for implementation of JFM (Veltheim et al., 2002).

JFM has been viewed as one of the potential tools to address conservation goals as well as underlying social, economic, and governance challenges which drive unsustainable forest resource use and habitat loss (Adams et al., 2004). Despite that impact of JFM, the effectiveness of JFM as a conservation tool

remains poorly understood, partly because there is little information about its potential for livelihoods and conservation (Hackle, 1999). Similarly, there is less understanding of the mechanisms by which JFM approach might better conserve forests and improve livelihoods of the adjacent communities (Bilney et al., 2010).

*1.2 Statement of the Problem*

Ngumburuni forest reserve is one of the Tanzanian's homes of many endangered tree species such as Muninga (*Pterocarpusangolensis*), Mkongo (*Afzeliaquanzensis*), Mnangu (*Hymenaeaverrucosa*), Mdadarika (*Newtonia sp*.) and Mtanga (*Albiziaversicolor*) (REMP, 2003; Burgess, 2000). However, this forest has been experiencing increased anthropogenic activities within the forest reserve including encroachments for firewood, herbs, timber, poles, grazing, and charcoal burning (DANIDA, 2002). These ant-conservation practices have been a problem for decades leading to increased destruction of the forest resources in Ngumburuni forest reserve.

The government of Tanzania through the Ministry of Forest and Beekeeping Division had put efforts to address the situation through introduction of JFM as a way to increase equity, efficiency, livelihood, and effective management of the forest resources (Bilney et al., 2010). However, studies on the impact of the Ngumburuni JFM show an increase in illegal overharvesting of timber, grazing, bushfires, debarking of tress, illegal farming, and charcoal burning in the forest due to unclear livelihoods options to the surrounding communities (Blomley & Ramadhani, 2006; Lund & Nielsen, 2006; Meshack & Raben, 2007; Meshack et al., 2006). Meanwhile, there is insufficient information documented on the contribution of the JFM in conservation of the forest resources and improving the local people's livelihood. It is against this back ground that this study intends to assess the current status of the JFM in improving both forest conservation and livelihood of the people around Ngumburuni forest reserve. Specifically, this study (i) assesses communities' livelihoods benefits associated with the Ngumburuni JFM reserve, (ii) examine conservation impacts associated with the Ngumburuni JFM, and (iii) determine challenges facing Ngumburuni JFM in improving forest conservation and livelihood options.

## 2. Method

*2.1 The Study Area*

This study was carried out in Ngumburuni Forest Reserve located in Rufiji District, Coast Region, Tanzania, which lies between $7^0$ 38" and $7^0$ 48" E, $38^0$ 52" and $39^0$ 6"S. Three villages (Mangwi, Muyuyu, and Mkupuka) adjacent to forest reserve were selected (Figure 1). The selection of these villages based on the reason that they were engaged in the JFM project, their closeness to the forest, and high intensity of the forest destruction before the project (REMP, 2003). Other reasons were diverse socio-economic characteristic of the villages and accessibility. The forest covers about 10,000 ha (REMP, 2003). Average annual rainfall varies from 900mm to 1,400mm, with significant daily monthly and annual fluctuations. Temperatures are ranging between $24^0$ and $31^0$ C with an average of $26^0$ (Burgess & Clarke, 2000).

The vegetation of the study area is characterized by four distinguished ecological units which include the coastal, Miombo, woodland, and riverine forests (Burgess & Clarke, 2000). There are about 484 different tree species in the area with high level endemism species (Munishi & Shear, 2005). Examples trees like Muninga (*Pterocarpusangolensis*) Mkongo (*Afzeliaquanzensis*), Mnangu (*Hymenaeaverrucosa*), Mdadarika (*Newtonia sp*.) and Mtanga (*Albiziaversicolor*) (Burgess, 2005).

The main economic activities conducted by the adjacent communities are agriculture due to the presence of a high water table in the reserve which stretches along the Ikwiriri-Muyuyu road (Kangarawe et al., 2005). The main crops grown in this area include rice, cassava and cowpeas. Other economic activities include the forest dependent activities which are logging for fuel wood and charcoal production.

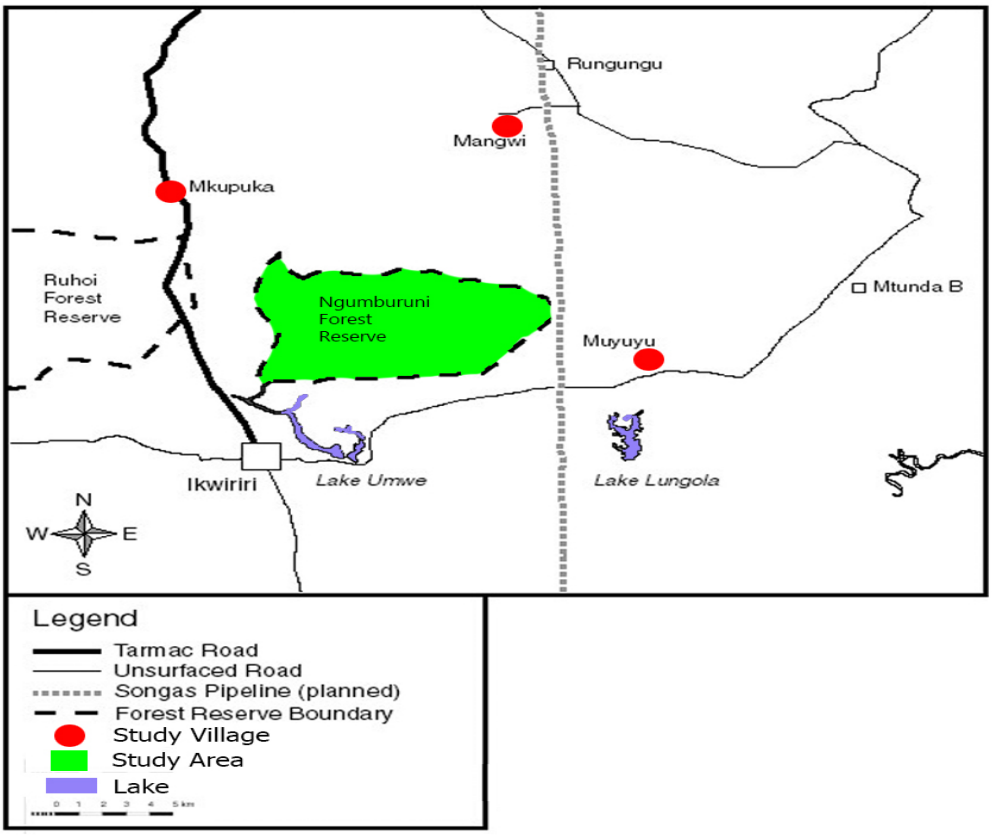


**Figure 1. Map of the Study Area**

*2.2 Data Collection and Analysis*

Several methods were used to collect data for this study. These involved the use of key informants interviews, focus group discussion, household surveys, and archive information. The details of each aspect are described as follows:

2.2.1 Key Informant Interviews

Personal interviews were conducted using a checklist guide. The interview involved 10 key people who

were purposively selected based on their knowledge on forest and their position in the community. These key people were forest extension officers, Village Natural Resources Committee Chairpersons, Village Executive Officers, Rujifi Forest Officer, Ward Executive Officer, and District Game Officer. Information captured from these key people include the benefits accrued from Ngumburuni JFM reserve, conservation and livelihood impacts associated with Ngumburuni JFM reserve, and the challenges which associated with the Ngumburuni JFM reserve. Information from key informant interviews was complementary to the information collected from households through questionnaires.

2.2.2 Focus Group Discussions

Focus group discussions were held to get data from youths, elders and adults. Each group composed of 3 members. These groups were preferred in view of the fact that they were interacting with the forest resources for different purposes. Topics which were discussed encompass the status of conservation before and after the establishment of the JFM, livelihood and conservation impacts associated with the JFM, factors influenced the performance of the JFM, and the ways forward to strengthen the JFM practices.

2.2.3 Household Survey

Household survey through the use of questionnaires was used to collect data face to face from 90 respondents. Issues constituted in the questionnaires include the socio-economic characteristics of the respondents, livelihood and conservations benefits accrued from the JFM, challenges associated with the establishment of the JMF, and the ways forward to strengthen the performance of the JFM practices. For household survey to be effective, a number of steps were taken including; the preparation of the survey tools (questioners, note book, checklists, pens, etc.), recruitment of the research assistant, and questionnaires pre-testing.

2.2.4 Archive Information

Archive information was used to get data for this study from published and unpublished reports, books/journals, debates, and conceptual materials pertinent to the topic under study. Archive information had contained information which some of them were from the study area and others were from other parts so as to capture information from other areas where JFM operates.

*2.3 Data Analysis and Presentation*

Analysis for quantitative data was done by using Statistical Package for Social Science (SPSS) version 16.0. Data from focus group discussion and key informants were mainly qualitative in nature. Therefore, major or repeated issues were organized into categories, interpreted and presented in forms of figures, tables and narrations. Analyzed information was presented in tables and graphs.

## 3. Result and Discussion

*3.1 Socio-Economic Characteristics of the Respondents*

3.1.1 Age Group

The findings revealed that 87.8% (n=90) of the respondents were aged between 18-50 years old. This

indicates that the majority of the people were matured enough to provide information about Ngumburuni JFM reserve.

**Table 1. Age Group of the Respondents**

| Age of the respondents | Village Name | | | Total | (%) |
|---|---|---|---|---|---|
| | Mkupuka | Mangwi | Muyuyu | | |
| 18-34 | 17 | 19 | 15 | 51 | 56.7 |
| 35-50 | 10 | 7 | 11 | 28 | 31.1 |
| Above 51 | 3 | 4 | 4 | 11 | 12.2 |

Similarly, the differences in age could associate with the different roles as a function of the age set in the society. For example; youth play protective role and enforcing laws and by-laws, while elders are concerned with conflict resolutions (Felician, 2001). This indicates a typical division of labor among African families in cultural perspectives.

3.1.2 Education Level

The study results unveiled that education level of the respondents in the study area varied from non-formal education to the College/University level (Table 2). Further, results disclosed that 61.1% of the respondents had not attained formal education in the study area. Meanwhile, 26.7% had attained primary education. In practice, the number of years spent in education is often associated with the acquisition of the knowledge and skills where as insufficient education is often highly correlated with individual's lack of skills and ignorance (Mbeyale, 1999). These results imply little literacy level in the study area.

**Table 2. Education Level of the Respondents**

| Education level of the respondents | Village Name | | | Total | % |
|---|---|---|---|---|---|
| | Mkupuka | Mangwi | Muyuyu | | |
| Non formal education | 18 | 19 | 18 | 55 | 61.1 |
| Primary education | 10 | 9 | 5 | 24 | 26.7 |
| Secondary education | 2 | 2 | 3 | 7 | 7.8 |
| College and university | 0 | 0 | 4 | 4 | 4.4 |

Malimbwi et al. (2001) goes to great length to emphasize that sufficient quality education levels are important in determining successful adoption of new management innovations. Thus, little literacy level could expect to be a challenge on the practices of JFM. In this case, more knowledge might be required to educate the local communities on forest conservation and alternative activities which may not deteriorate forest resources.

3.1.3 Gender

The findings depicted that males were more (63.3%) than females (36.7%) in the study area (Table 3). This situation could have happened just by chance.

**Table 3. Gender of the Respondents**

| Gender | Villages name | | | Total | % |
|---|---|---|---|---|---|
| | Mkupuka | Mangwi | Muyuyu | | |
| Male | 20 | 18 | 19 | 57 | 63.3 |
| Female | 12 | 12 | 11 | 33 | 36.7 |

Presence of many males than females could be associated with the fact that most households were male headed. Traditionally, males are decision makers on many issues including natural resources in many African societies (Meshack et al., 2006). Dominance of the male headed households in Tanzania influences decisions at the family level. This could be also a case associated with more involvement of the males in contributing views on the JFM practices.

3.1.4 Economic Activities

Results pointed out that 43.3% of the respondents depended mainly on agriculture (Figure 2). Other economic activities included charcoal burning, livestock keeping, fishing, and formal employment (such as teachers). These results imply that agriculture and charcoal burning were the most economic activities practiced in the area which could devastate the conservation of forest resources. Increasing number of agriculture fields, charcoal burning, and livestock keeping proximity to the forest reserves affect the conservation of the forest resources.

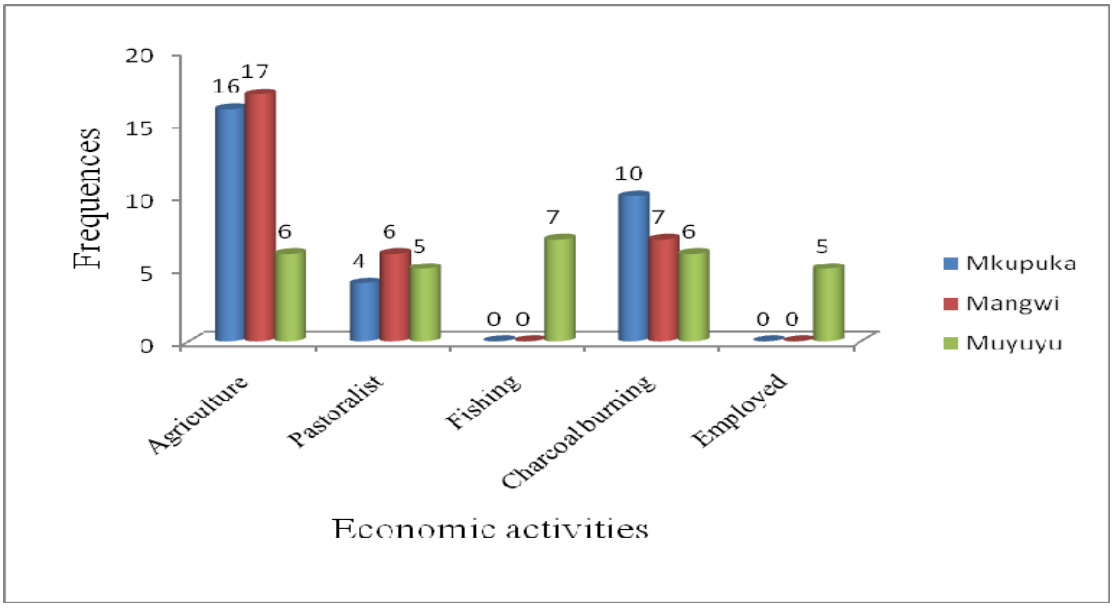


**Figure 2. Economic Activities of the Respondents**

*3.2 Community Livelihood Benefits Associated with Ngumburuni Forest Reserve*

Respondents were asked to mention livelihood benefits which they get from participating in JFM activities. The findings disclosed that limited livelihood options were realized. Results in Table 4 unveiled that 57% (n=90) of the respondents said that they were not benefiting from the JFM in view of the fact that what they accessed from the forest after the introduction of the JFM was not different from what they were getting from the forest before the initiation of JFM.

**Table 4. Benefits Associated with JFM at Ngumburuni Forest Reserve (%)**

| Challenges | Mkupuka | Mangwi | Muyuyu | Total (%) |
|---|---|---|---|---|
| No benefits | 22 | 16 | 19 | 57 |
| Grazing | 5 | 1 | 4 | 10 |
| Building poles | 4 | 2 | 0 | 6 |
| Traditional herbs | 0 | 1 | 3 | 4 |
| Firewood | 8 | 6 | 9 | 23 |

The possible reason for the limited livelihood benefits from the JFM may be due to the poor implementation of the JFM strategies and poor awareness creation to the surrounding community. This concurs by the argument of one of the respondents in Mkupuka village during household survey that:

"*…Normally we are getting firewood, building poles, medicine, fruits, and areas to graze livestock, but poor implementation strategies made the JFM failure to provide us reasonable conservation benefits…*" **(**Respondent in Mkupuka Village).

On the other hand, 23% of the respondents mentioned firewood as a benefit from the JFM (Table 4). Respondents avowed that they were allowed to access firewood from the forest two times in a week under the escort of the patrol scouts. However, it was reported by the Mkupuka Village Natural Resource Committee Chairperson that some villagers took firewood from the forest illegally. During field site visits, no dry woods (standing or fallen) were observed in the forest. This could plausibly an indication of the intensity of the firewood collection in the forest. This reflects the argument from Village Natural Resource Committee Chairperson (VNRC) when responding on how local people benefited from participating in JFM:

"*…Villagers are allowed to access firewood from the forest under the escort and the supervision of the village game scout; if people are found in the forest without permition, they have to be punished by paying fines and what found with them have to be taken to the local government office…*" (VNRC Chairperson in Mkupuka Village).

In addition, respondents identified grazing areas as the benefit they get from JFM (Table 4). Report from all Villages' Natural Resource Committees' Chairpersons and Ward Executive Officer disclosed that livestock grazing was allowed during the period of 1st June to 31st December. Kajembe and Kessy

(2000) ascertain that grazing may also serve as fire control insofar as it reduce fuel load when forest fires occurs.

*3.3 Conservation Impacts Associated with the JFM*

Respondents were further asked to give their views on the trend of forest resources use after having JFM. Answers were limited to increasing, decreasing, and normal. Overall, in the three villages combined, 82.2% (n=90) of the respondents had the views that the trend of forest resources use was increasing even after having JFM initiative (Figure 3). This indicates little contribution of the JFM in minimizing deforestation in the study area.

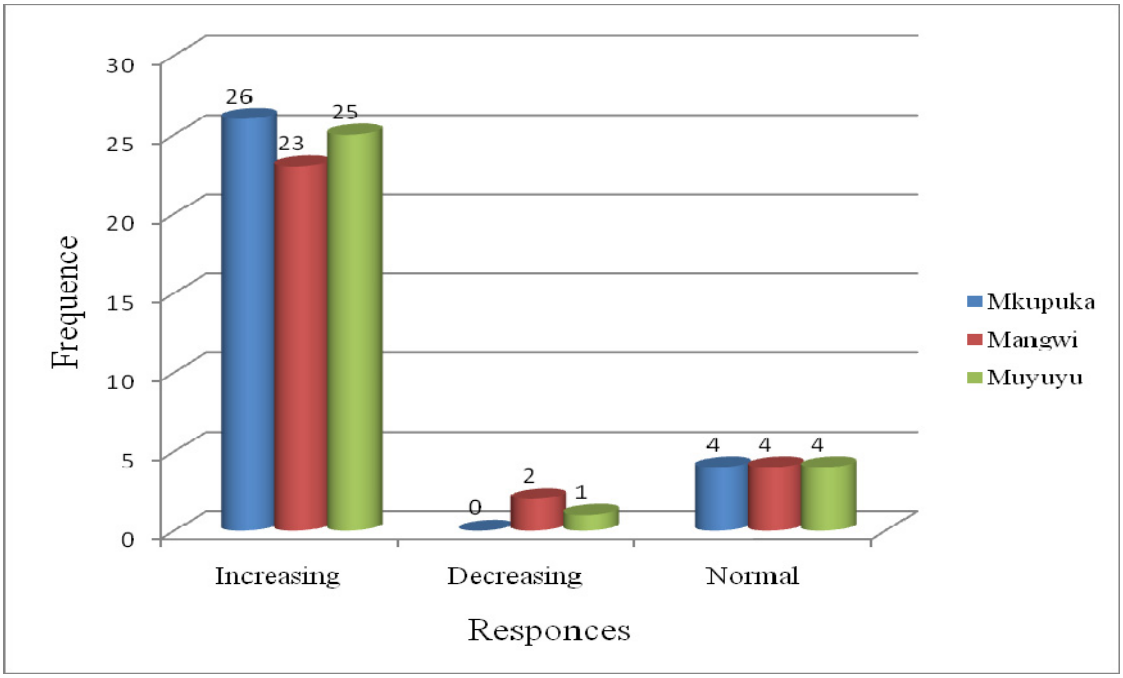


**Figure 3. The Trend of Forest Resource Use after Having JFM**

Records from Rufiji District Natural Resource office revealed that the number of trees reported to be illegally harvested increased from 1350 tree species in 2008 to 3782 tree species in 2010. This trend reveals a substantial increase of the timber harvesting with the years after having JFM. Meanwhile, records by the Rufiji Project report (2012) indicate that the amount of the trees harvested between 2008 and 2010 valued Tsh. 38.5 million which is equivalent to 12.8 million per annum. This implies a substantial increase of the trees harvesting by 1.2 million per annum compared to the losses in 2004 to 2006 which were 11.6 million per annum.

Moreover, results revealed that there were aspects constituted in the JFM (like patrol of the forest reserve) which were not effectively implemented hence constrained conservation of the forest resources in the study area. During the course of FGD, Village Game Scout (VGS) affirmed that weak and inadequate equipments like guns, boots, uniforms, and little payments to deal with encroachers entail illegal exploitation of forest resources to increase in the forest reserve. This view is supported by the

statement from VGS when giving the reasons for increasing illegal activities in the forest reserve.

"*…lack of equipments and little payments for a long time influence some of us to perceive forest conservation as an issue which has not been given the upper priority in our area…*" (VGS in Rifiji District).

Meshack and Raben (2007), advances that the well funded anti-poaching units are vital tool to improve forest resource conservation in Sub-Sahara Africa. Clearing of large trees, promotes the grass and other herbaceous vegetation where by subjecting the forest to become even more prone to bush fires and excessive biodiversity loss (Cauldwell & Zieger, 2002).

Furthermore, arguments from the District Forest Officer and the Village Natural Resource Committee Chairpersons exposed that forest fires were escalating in the area. Bushfires were reported as a common feature in almost every activity being undertaken in the forest reserve, such as clearing the bushes for logging, preparing farms, charcoaling, harvesting honey, and poaching wild animals. These findings support the arguments presented by the forest officer when commenting the status of forest resources conservation after the JFM that;

"*….Since having the JFM, species of trees and animals in the forest are continuing decreasing with time due eruption of the forest fires and increase of the illegal harvesting of trees in the forest…*" (RUFIJI District Forest officer).

Records from Rufiji forest office showed that by the year 2009 an outbreak of the forest fire destroyed 376 hectors of the forest compared to the 129 hectors of the forest which were destructed in 2007. Also, in the year 2011 and 2013, 78 events of bushfires have been reported in the study area. Thus, species of trees and animals of the NFR were decreasing with time due to the increasingly of the open grasslands, farmlands, and eruption of the forest fires caused by the human activities in the forest.

However, the study findings portrayed positive impacts associated with the implementation of JFM in the study area. Rising of the people's awareness on conservation was reported by the respondents from all study villages. Results in Figure 4 informed that 74.4 % of the respondents hold that JFM help them to be aware on forest conservation and environmental friendly activities that support conservation of forest resources like beekeeping, agro-forest, and energy efficient use.

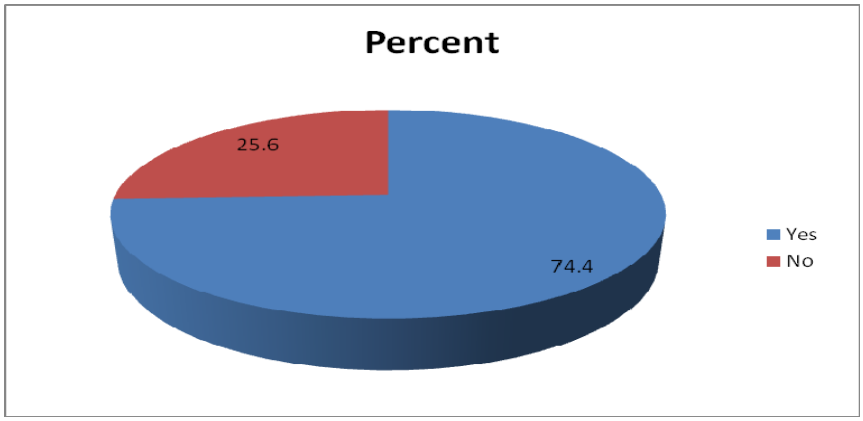


**Figure 4. Awareness of JFM on Conservation of Forest**

Findings from key informants revealed that JFM helped conservation of forest resources by making the surrounding communities living adjacent to the forest to be aware on practices that destruct forest resources. Furthermore, key informant from Rufiji District forest department argued that JFM helped to increase forest conservation governance by devolving power to the village natural resources committee to manage the forest thus minimized the costs of managing forest resources. These findings are also supported by the arguments stated by the forest officer when arguing benefits they get from JFM implementation;

"*...by the way after the establishment of JFM the costs of managing forest have decreased due to the use of local people in checking up illegal users of forest resource near their villages. Costs of using cars to patrol all forest in Rufiji District were very high...*" (Rufiji District Forest Officer).

*3.4 Challenges Facing JFM in Improving Conservation and Local Livelihood*

Several challenges confronted JFM were identified by both respondents and key informants. The major challenges include the expansion of agriculture and an increase of human population (Table 5).

**Table 5. Challenges Facing JFM**

| Challenges | Mkupuka | Mangwi | Muyuyu | Total | Average (%) |
|---|---|---|---|---|---|
| Dependence on external funds | 16 | 16 | 22 | 54 | 18 |
| Human population increase | 21 | 20 | 20 | 61 | 20.3 |
| Development of transport systems | 20 | 21 | 18 | 59 | 19.7 |
| Expansion of agriculture activities | 26 | 24 | 27 | 77 | 25.7 |
| Overdependence forest resources | 19 | 18 | 12 | 49 | 16.3 |

The results revealed that expansion of agriculture affected the success of the JFM. The presence of a high water table in the reserve could be a reason for agricultural encroachments which stretch along the Ikwiriri-Muyuyu road. Water availability has been a major factor which determines direction of

smallholder farmers' activities (Kangarawe et al., 2005). Most of the farmers around Ngumburuni forest reserve were reported to possess farm plots in the wetland area within the reserve locally known as "*Njacha*".

Similarly, respondents aired out that the JFM approach ignored their ideas on establishing sustainable alternative environmental friendly activities such as beekeeping and afforestation instead of agriculture activities. Thus, JFM lack community support in its implementation. This study had found that lack of adequate villager's participation in the preparation of the JFM exacerbated little achievements in conservation and livelihood. Villagers had the perception that the JFM was a property of the government consequently lack their ownership feelings.

Further, respondents had the views that increase of human population impeded the performance of the JFM. Records by the Village Executive Officers indicated that human population in Rufiji district rises from 194,952 as per the population census of 2002 and riches to 217,274 people in census of 2012. The noted cause of this increase involves the immigration of the people from other parts of the country (URT, 2012). Respondents argued that many immigrants from different parts of the country had come to their villages due to the availability of grazing land and fertile agricultural fields. Moreover, Village Executive Officers from the three villages revealed that they registered new villagers who were the *Sukuma* people who came mainly for grazing their cattle's and establishing agricultural fields in place. This immigration made conservation of the forest reserve to be difficult as demand for forest resources raised.

Not only increase of human population, but also respondents perceived that external influences from the donor funder and JFM officials affected the performance of the JFM. Respondents had the views that the allocated fund from donors for conservation was inadequate. Meanwhile, FGD disclosed that local people perceived lack of adequate seminars, meetings, and workshops at village level during the establishment of the JFM was due to the interests of the donor funder (Swedish government) and the Rufiji District Forest Officers. This was demonstrated by the statement from the FGDs in Muyuyu village:

"*...Some villagers blamed that why those funds are not given to them for issues like education and running conservation seminars instead of leaders to use them only for running their meetings...*" (FGDs in Muyuyu village).

Subsequently, these perceptions influenced JFM to get little support from the local community. Benjaminsen and Svarstad (2010) observed that most of the Sub-Saharan Community Based Conservation organizations are not realizing successfulness because conservation plans of these organizations are to a large extent a consequence of an influence from the external donors who subscribe to a win-win discourse of conservation and community development.

Similarly, results indicated that dependence on forest resources for enhancing local people's livelihood was a challenge confounded the performance of the JFM. FGD revealed that dependence of the forest resources fueled illegal forest resources use. This is supported by the arguments from one member of

the focus group discussion in Mangwi village when responding how illegal activities are handled;

"*…You know, control of illegal harvesting is complicated by increasing demand of the forest resources and the presence of the powerful stakeholders, such as retired government employees and businesspersons with vested interests in illegal timber harvesting*…" (FGDs in Mkupuka village).

Control of illegal harvesting is intricate by the presence of powerful stakeholders, such as retired government employees and businessmen with vested interests in illegal timber harvesting. These stakeholders could have a profound influence on the decision making processes and development of rules at a number of levels.

Similarly, it was reported that the development of transport systems, for example the Mkapa Bridge had speed up illegal activities in the forest reserve due to ease accessibility. At the same time other illegal activities have been shifted to night hours instead of day's hours. This has also added difficulties in protecting the forest and controlling illegal human activities in the NFR.

*3.6 Suggestions for Improving JFM in Enhancing Conservation and Livelihoods*

Local people and key informants were further probed on the mechanisms required to be in place to ameliorate the challenges facing the JFM in order to improve the livelihoods of the local people and enhancing conservation of the forest resources. The most suggested measures included annual implementation of the JFM strategies, awareness rising on the JFM, introduction of the sustainable alternative economic activities, strengthening security of the forest resources, and equal distribution of the benefits (Table 6).

**Table 6. Suggestions for Improving JFM Effectiveness**

| **Villages** | | | | | |
|---|---|---|---|---|---|
| Suggestions | Mkupuka n=30 | Magwi n=30 | Muyuyu n=30 | Total | Average (%) |
| Awareness rising on JFM | 18 | 25 | 28 | 71 | 23.6 |
| Implementation of JFM strategies | 27 | 23 | 24 | 74 | 24.6 |
| Benefits sharing | 19 | 18 | 12 | 32 | 16.3 |
| Alternative economic activities | 18 | 18 | 19 | 49 | 18.3 |
| Strengthened security of forest | 14 | 18 | 19 | 51 | 17 |

The annual implementation for the JFM strategies are significant to achieve set up objectives. Alexander et al. (2010), assert that annual implementation strategies help to strengthen the JFM to enhance conservation and livelihood of local communities, as it help to have both operations and minor reviews of the JFM issues annually. In practice, having both operations and minor reviews in place could also act as an indicator to know the strengths and weaknesses in the JFM, hence annual reforms can be done so as to make the implementation strategies effective to achieve the geared goals.

Community awareness rising on the JFM is an instrumental tool to strengthen the performance of the JFM. Education and training activities can be directed towards building local capacity on forest resource conservation, and increasing public understanding of the JFM. Nyahongo (2010), assert that educating rural villagers in practical skills help them to deal with conservation of natural resources and develop new tools for defending their properties. Similarly, education and training enhance commitment towards conservation to the local people.

Benefits sharing were also suggested by the respondents as mechanism to strengthen the JFM in the study area. Focus group discussion and the key informants interview revealed that the current little benefits associated with the JFM in the study area included firewood collections, building poles, and grazing areas, and fruits. Lack of the sufficient benefits accrued from the forest reserve influence local community to fail to realize the importance of the JFM. Kaswamila (2003), argue that successful conservation in Tanzania is associated with extent community adjacent to forest reserve receive substantial benefits from conservation practices. Similarly Ringo and Kaswamila (2014); Allan and Ringo (2015) assert that benefits community accrued from protected areas encourage local community to engage and support conservation interventions.

## 4. Conclusion

The results of the study unveiled that the JFM has shown little contribution on enhancing conservation and livelihood of the local people in the study area. The JFM provide limited benefits which were comparatively not different from what local people were accessing before the adoption of the JFM. Similarly, conservation shortfalls were still in place fueled by anthropogenic pressures around the forest reserve. Furthermore, challenges faced the JFM to achieve set up goals were exacerbated by the struggles of the people in striking a win-win balance between conservation and development which has never been an easy endeavor. The study recommends that there should be effective implementation of the JFM strategies, value addition of the forest products, effective provision of the conservation education to the people on the broader understanding of the JFM issues, control of the human immigration close to the forest reserve, and devolving of the power to the local communities to address issues and problems of the JFM, especially at the village level.

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