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Table of Contents: Volume 8 Number 8, August 2016

ARTICLE

- Implication of participatory forest management on Duru-Haitemba and Ufiome Forest reserves and community livelihoods** **115**
Naima A. M. Hersi and Richard Y. M. Kangalawe

Full Length Research Paper

Implication of participatory forest management on Duru-Haitemba and Ufiome Forest reserves and community livelihoods

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The fate of the forest is usually connected with forest management systems, societal demands as well as exposure to major disturbances such as wildfires, heavy browsing animals. Since the early 1990s, Tanzania have adopted participatory forest management (PFM) approaches, namely Community Based Forest Management (CBFM) and Joint forest management (JFM) to effectively and adequately protect the forests. In Manyara region where this study is based, Duru-Haitemba and Suledo forest reserves are managed under CBFM, while Ufiome forest reserve is managed under JFM. This study analyses forest management systems and their implication on Duru-Haitemba and Ufiome forest Reserves. The research methods used in this study included household surveys, focus group discussion, key informant interviews and field observation. Finding from the study showed that both JFM and CBFM approaches have been effectively implemented in the two forest reserves. It was also found that some of the traditional ceremonies undertaken in the forest also support the forest management efforts, since areas where such activities take place are considered sacred and are always left intact. Therefore, collective results from forest management approaches and cultural activities have greatly minimised illegal forest based activities such as timber harvesting and forest fires and the once heavily degraded forests have significantly recovered. Such success has been attributed to increased sense of ownership and control over the forest resources as the community feel more responsible for protection of the forest after realising the benefits brought by their efforts. Those benefits include enhanced availability of water and local herbs, easy collection of firewood, protection of their homes and farms from strong wind and more reliable rains that give them a stable economy from agriculture. Although, the forest status has improved significantly, there are still challenges in managing more remote parts of the forest where misconducts are hard to be spotted. Among the reasons that have contributed to the far distance misconduct, are poor accessibility, inadequate financial resources, necessary working gears and protection of social relations. Therefore, there is a need to further ensure enforcement of the regulations, sensitization of the local community participation in forest management related activities, as well as unswerving support to forest patrols.

Key words: Community based forest management, forest degradation, deforestation, community participation, livelihoods, Babati, Tanzania.

INTRODUCTION

The fate of the forest is usually connected with forest management systems, societal demands as well as

exposure to major disturbances such as wildfires and heavy browsing animals (Duncker et al., 2012).

Participatory approaches in forest management were adopted in Tanzania since the early 1990s as measures to effectively and adequately protect forests to avoid the high rate of deforestation and encroachment. Prior to establishment of Participatory Forest Management (PFM), management of forest resources in many parts of Tanzania was undertaken by the government. Due to inadequate resources, forest reserves under the jurisdiction of the central and local government could not be effectively managed in a sustainable manner, leading to high rate of deforestation through encroachment and over-utilization (URT, 2010; Blomley and Iddi, 2009). According to Hass (2015), land conversion for agriculture, informal and formal settlements, natural disasters are key drivers for deforestation, while on the other hand, commercial selective logging, energy demands, continuous harvesting, and invasive species are drivers for forest degradation. As for induced forest fires, they are a key driver for both deforestation and forest degradation. The danger of disappearance of some tree species can be used as indicator of forest degradation, mainly due to selective logging. It was reported by MCP (2006) and The Guardian (2015) that due to selective harvesting of *Dalbergia melanoxylon*, *Pterocarpus angolensis* and *Podocarpus latifolius* tree species, there is a danger of them becoming extinct. Forest degradation is also associated with habitat degradation which threatens disappearance of various animal species from tropical forest (Marshall, 2007). According to Plotkin et al. (2000) and Marshall (2007) more than half of the world's species are found in tropical forests, which make forest degradation a global concern.

In Tanzania mainland, forests were estimated in 2005 to cover 35.3 million hectares, accounting for 39.9% of total land area (FAO, 2007; URT, 2013a). Out of this area, 16 million hectares comprise of reserve forests, 2 million hectares are forests in national parks and the remaining 17.3 million hectares (49% of all forestland) are unprotected forests in general land (URT, 2013a; Ndyamkama et al., 2014). However, the rate of deforestation has grown from 0.4% annually between 1981 and 1985 (OSSREA, 2015), to 0.99% between 1990 and 2000 (Mongabay, 2015), and increased to 1.1% by 2005 (Blomley and Iddi, 2009). Such rate of deforestation and degradation has been aggravated by societal demands for biomass and income generation activities (Zahabu et al., 2005; Yanda, 2012). As the societies grow so will the demands, and are likely to lack coherent land use plans and non-adherence to existing ones, which will contribute to further deforestation (Blomley and Iddi, 2009). The high rate of deforestation and degradation is also associated with environmental degradation such as erosion, reduced underground water

flows, increased spread of pesticide contaminant and sedimentation of water sources, changes in climatic conditions, impede nutrient cycle and affect availability of natural resources (Masese et al., 2012; Marshal, 2007). Environmental degradation mostly affects those who depend directly and indirectly on agricultural production for their livelihoods, and even the economy of the nation. The underlying cause of forest degradation and deforestation is alleged to be inadequate community participation in forest management, which contributes to lack of the sense of ownership (Far, 2011). However, a number of approaches have been taken regarding protection of water and forest resources, such as eviction or relocation of pastoralist and their livestock's from water catchment areas, awareness raising, increased community participation in identifying environment and natural resource issues and in integrating them into local plan and budgets (Mwandosya, 2006). Tanzania has also embarked on Reduced Emissions from Deforestation and Forest Degradation (REDD+) initiatives aimed at ensuring sustainable forest management and supporting poverty alleviation among forest adjacent communities (Ndyamkama et al., 2014).

Forest management systems in Tanzania depend highly on the authority that owns and manages the forest. According to MNRT (2006), the ownership and management is reflected in the forest policy and legislation through the introduction of PFM systems into the Forest Act of 2002. The Act provides a clear legal basis for communities, groups and individuals across mainland Tanzania to own, manage or co-manage forests under a wide range of conditions. The law recognizes two different types of PFM. The Community Based Forest Management (CBFM), enables local community to declare and ultimately gazette village, group or private forest reserves (MNRT, 2006), and the Joint Forest Management (JFM), which allows villagers to enter into agreements to sharing responsibilities for the management with the forest owner (the government). The total area reserved by National or Local Government under some forms of JFM agreement is 12.8%, while that in public land forests under CBFM is 11.6% across Tanzania mainland (MNRT, 2008). For CBFM, forest reserves can be either village land forest reserves, private or community forest reserves. Under JFM, forest reserves can be either National Forest Reserves (NFRs) which are under Central Government or Local Authority Forest Reserves under the District Council. Manyara region where this paper is based comprises about 46,420 ha (0.33%) under JFM and 209,494 ha (1.04%) of public land forests under CBFM arrangements (MNRT, 2008). Babati district is one of the districts in Manyara region practicing PFM. In the district, the forest reserves under

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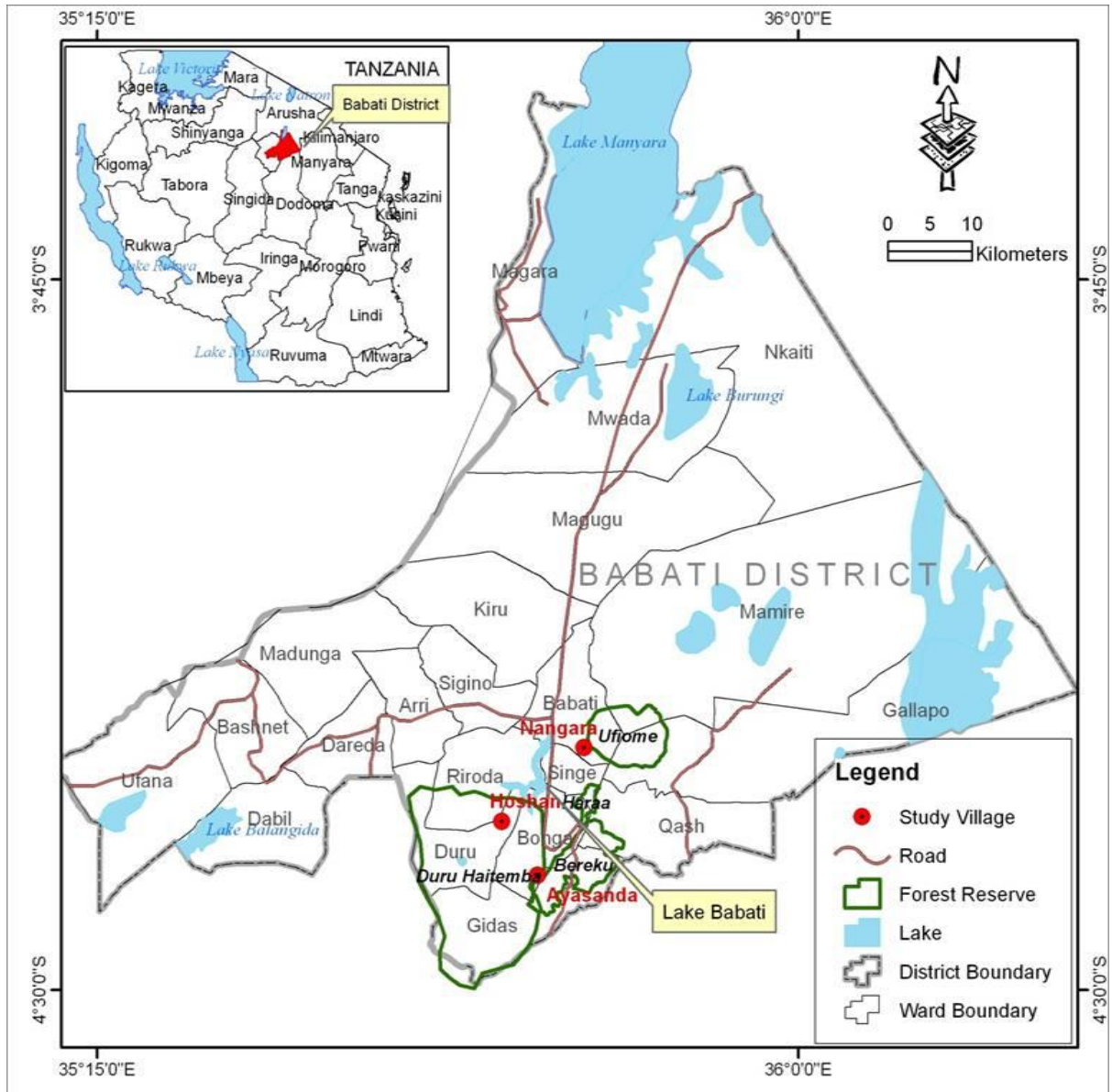


Figure 1. Babati district map showing forest reserves near Lake Babati and study areas. Source: IRA GIS Lab, 2013.

JFM are Nou, Ufiome and Bereku (Katani and Babili, 2012). The only CBFM arrangement in Babati district is the Duru-Haitemba Forest Reserve (MNRT, 2006; Katani and Babili, 2012). The expansion of the Duru-Haitemba forest area under CBFM from 3000 ha of land covered with forest in early 1990s to 9000 ha of forest at present demonstrate the potential for enhancing forest management if communities surrounding forests participate in their management (Blomley and Iddi, 2009). However, there are several challenges facing PFM which include weak enforcement of by-laws.

This paper is based on a study whose main objective is to assess the impacts of PFM practices in Duru-Haitemba and Ufiome forest reserves with particular focus on the

status of the forest, community awareness, engagement and motivation towards forest management as well as effects of cultural and livelihood activities in forest management.

METHODOLOGY

The study area

This study was conducted in three villages surrounding Duru-Haitemba and Ufiome Forest reserves located in Babati district, namely Hoshan, Ayasanda and Nangara (Figure 1) located in Manyara region. Babati district is located below the Equator between latitude 3° and 4° South and longitude 35° and 36° East (Khan et al., 2014). It covers an area of 6069 km² (Lupala, 2009).

The Manyara receives dual rainfall regime of an average rainfall between 450 and 1,200 mm per year. It has an average temperature of 13°C during the cool and dry seasons and an average of 33°C during rainy seasons (URT, 2013b). The district is within the region's average temperature ranging between 17-27°C (Khan et al., 2014).

The main type of vegetation in Babati is categorized as open grasslands without woody species around lakes, Acacia woodland found in drier areas, Miombo woodlands found mainly in the southern of Lake Babati including parts of Ufiome highlands and Montane Rainforest in the higher altitudes (IRG, 2000). Babati district has 40,525 ha (25.8%) out of total 156,938 ha of central government forest reserves in Manyara region (Ntenga and Mugongo, 1991; Minja, 2006). Duru-Haitemba Forest reserve covers an area of 9,000 ha of land, and known to be among the few remaining Miombo woodlands in otherwise well settled and cultivated District (IRG, 2000; Kajembe et al., 2003). It comprises typical dry Miombo woodlands in the Rift Valley, and is situated about 20 km south of Babati Township (Kajembe et al., 2003). Ufiome Forest Reserve is located 3 km from Babati town at Mt. Kwaraa, and it covers an area of 5,635 ha (Backlund, 2006). Ufiome forest reserve is divided into three different zones. The lower zone that consists of shrubs and scrubs; middle zone with more tree coverage of height less than 25 m; and upper zone with taller trees of more than 25 m (Far, 2011). The major economic activities in the district are livestock keeping, crop production and forestry (Ntenga and Mugongo, 1991; IRG, 2000). A more detailed account of the demographic and socio economic characteristics of the areas is provided in the results section.

Data collection and analysis

Several methods were used in this study to collect both primary and secondary data. The methods included household questionnaire interview, focus group discussion (FGD), key informant interview and field observations. Except for field observation, set of questions were prepared and used to extract information on demographic, economic activities, culture, history of the forest, forest related activities, forest management practices forest management practices, community participation community participation and uses of forest resources. For the household interviews, 54.8% were females, 45.2 % were males. The age of the respondents ranged from 18 to above 80 years, with majority (94%) of the respondents being above 30 years, while 6% were range between 18 and 30 years. The age above 30 years was targeted because of their high chance to provide valuable insights into the history of the forest status and reasons for changes. Since the study also involved aspects of climate change, it was appropriate to focus on the age above 30 years who could have witnessed various climate change events, over a period of not less than 30 years, which is the required period for any meaningful climate change detection. The below 30 years may have limited knowledge on the forest changes and other environmental issues over the decades as compared to the older ones.

Simple random sampling technique was used to select 10% of households from the three study villages, involving a sample of 166 households, with proportional representation of the sub-village in each village. The random sampling performed in such a way that each household had an equal chance of being selected. Purposive sampling was used to select participants for both FGD and key informant interview. Purposive sampling was based on age and demonstrated knowledge of the forest management activities among the key informants selected. Three FGD were conducted, one in each village, involving 10 participants, aged between 40 and 75 years. The importance of this targeted age group was their first-hand knowledge on forest transitional stages for past three decades. Key informant interviews were conducted with the District

Forest Officer (DFO), District Environmental Management Officer (DEMO) and District Agriculture, Irrigation and Cooperative Officer (DAICO), giving room for free expression of opinion and views and probing to get more detailed information. A checklist of issues was used as tool for conducting the key informant interviews. Qualitative data collected from FGD and key informant interviews were grouped according to their content and verified with observations from transect walk. Quantitative data from household survey were sorted, coded and analysed using the Statistical Package from Social Sciences (SPSS) version 16.0 and Microsoft Excel and were displayed using frequency distribution and cross tabulations so as to establish various patterns that characterise the study areas. Results were obtained were presented in various forms including text, tables, charts and figures.

RESULTS AND DISCUSSION

Socio-economic characteristics and implications in forest management in the study area

Demographic profile and resource extraction of the population in study area

The age groups of respondents ranged from 18 to above 80 years with majority being between thirty one and seventy years (Figure 2). The lowest range is considered young and currently their ability to cause extractive harm to the resources is still limited. The age group between 30 to 70 years is considered economically active (URT, 1997) and comprised 80.7% of the respondents. Based on household interviews, the active group engage themselves in crop production, livestock keeping and beekeeping among other activities. Therefore, with this kind of activities, their interaction with natural resources such as forests is quite high. The age structure of the respondents shows that a large proportion of the population in the study area is in the resource extractive group. Thus, if their interaction with natural resources is not managed sustainably, may lead to considerable environmental challenges related to resource degradation. Therefore, for enhanced sustainability, this calls for more sensitisation and effective implementation of the participatory natural resource management approaches such as CBFM and JFM.

Ethnicity and implications on forest management in the study area

About 22 ethnic groups were found in the study area, where the Iraqw, Gorowa and Rang'i were found to be dominating (Figure 3). These three major groups accounted for about 70.4% of all ethnic groups in the study area. Other groups with considerable proportions included the Barbaigs, Chagga, Meru and Nyaturu. The remaining 15 ethnic groups contributed about 12.6% of the people in the study area and originate from various parts of the country. The diversity of ethnic groups in the study area indicates that this place is attractive for many

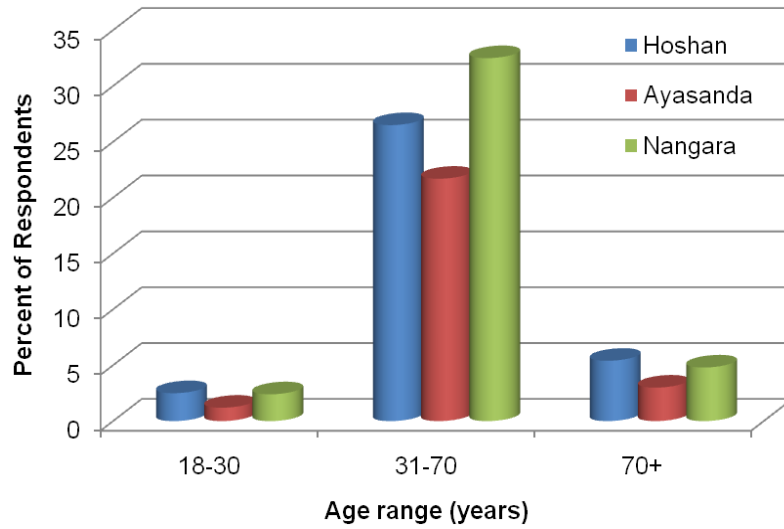


Figure 2. Distribution of respondents by age groups. Source: Fieldwork, March 2013.

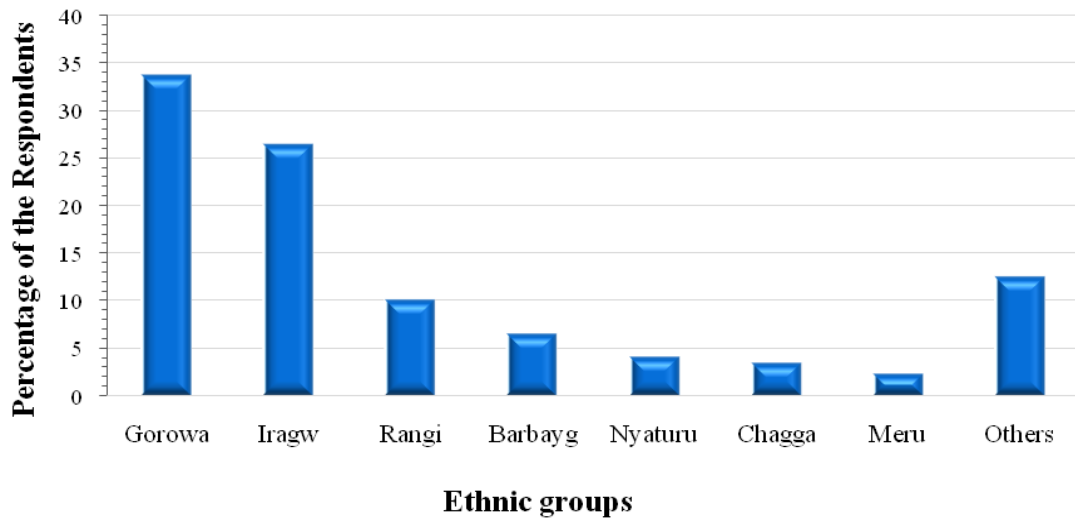


Figure 3. Distribution of ethnic groups in the study area. Source: Fieldwork, March 2013.

people across the country. This may have consequences on how the natural resources of the area are managed.

Ethnic grouping and cultural traditions may have some considerations related to forest management in the area. For instance, Gorowa’s have traditional ceremonies in the forest called *Mandah* where they conduct male circumcision in special locations in the forest. This ceremony is strictly for Gorowa men only. For Mang’ati tribe, they have dung’ee ceremony which they also conduct it in the forest, sometimes it is conducted at home. Ufiome women conduct a ceremony known as Oyee in the forest during female circumcision. In this place, no man is allowed to enter. These places are

highly respected and are always left intact, that is, no trees are cut or any development is to be made. Due to the fact that there are several such places scattered all over the forest, they may be an effective way of protecting the forest from mismanagement. However, the sizes of such areas are relatively small, measuring not more than one acre each (about 0.405 ha) to have a significant impact.

Economic activities and implications on forest in the study area

Several economic activities are taking place in the study

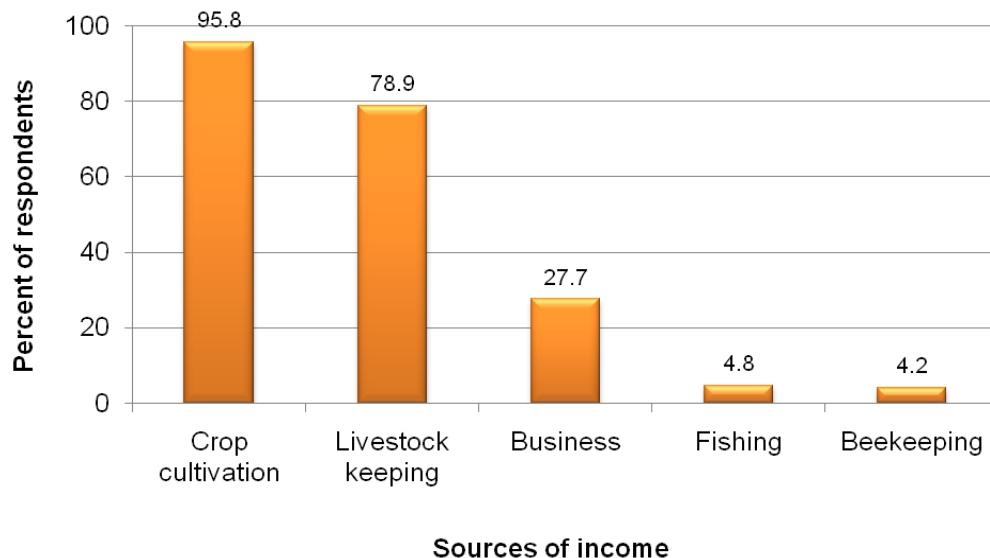


Figure 4. Major source of household income in the study area. Source: Fieldwork, March 2013.

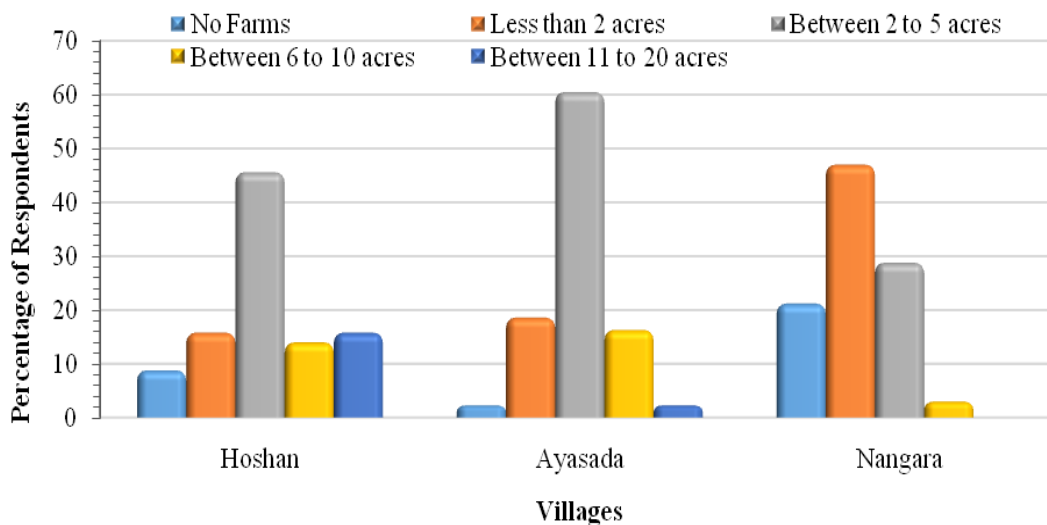


Figure 5. Land owned by the interviewed households. Source: Fieldwork, March 2013.

area, the major sources of income for most of the households being crop cultivation and livestock husbandry (Figure 4). About of 95.8% of the respondents were involved in crop cultivation. At the village level, all respondents from Hoshan and Ayasanda and 89.4% from Nangara were crop cultivators. The subsistence crops included pigeon peas, maize, banana, fruits such as watermelon, avocado, oranges, lemons, cucumber, while cash crops grown included beans and sunflower.

Despite the fact that most of the households depend on agriculture as their major source of income, land owned by individual households is very small. About 70.2%

of the interviewed households at Hoshan, 81.4% at Ayasanda and 97% at Nangara reported to have less than 5 acres (about 2.02 ha) of land (Figure 5). This was claimed to be associated with the villagisation processes that took place in 1974, where small portions of land were distributed among the people who were concentrated in common places known as villages. It was claimed by respondents that the land distributed was 2 to 5 acres (about 0.81 to 2.02 ha). The same land has been passed on through a couple of generations, making the effective land owned to get increasingly smaller, and fragmented. This was reported to have contributed to increasing

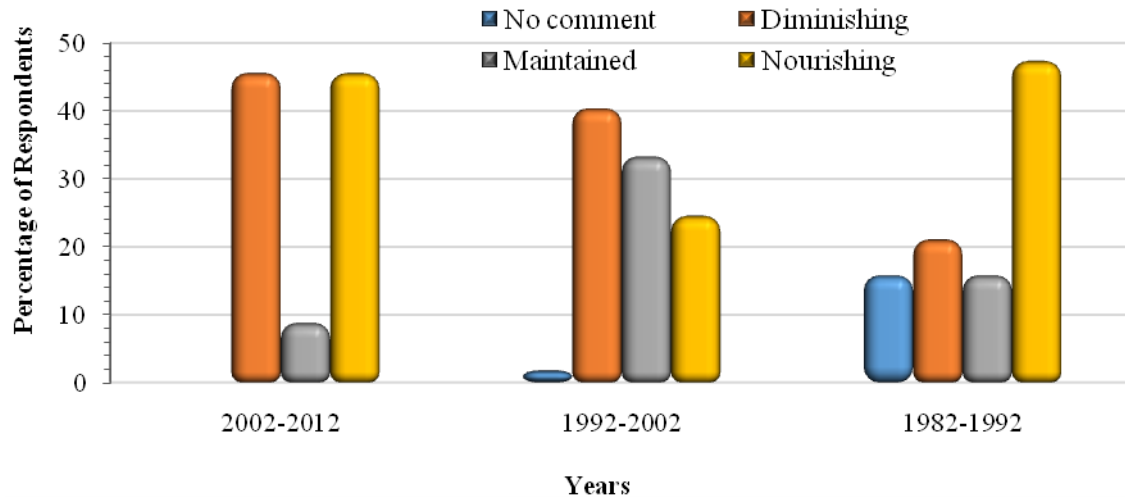


Figure 6. Locally perceived trend of the Duru-Haitemba forest at Hoshan village. Source: Fieldwork, March 2013.

encroachment into surrounding forests for farm expansion or for obtaining non-farm sources of livelihoods.

Livestock keeping is the second major source of income in the study area. About 73.7% of the respondents from Hoshan, 88.4% from Ayasanda and 77.3% from Nangara reported to keep livestock. The livestock found in the area included cattle, goats, sheep, which are mainly used for food and business, and donkeys for carrying water.

Some households depended mainly on business that entailed buying and selling cereals, small shops, furnitures and motorbike transportation as their source of income. Most of those indicating business as one of their important economic activities were from Nangara ward, mainly because of its proximity to town. About 43.9% of respondents from Nangara reported to depend more on business, unlike Hoshan and Ayasanda villages where only 22.8 and 9.3% of respondents, respectively mentioned business as their economic activity and source of income. It is expected that as the town expands, so will the engagement in business. This might lead to shift from being cultivators or livestock keepers to business people. On the one hand, the increased engagement of communities in such non-farm activities is likely to relieve the pressure on the land and hence enhance conservation of surrounding forests that would otherwise be cleared to open up new agricultural farms. On the other hand, it is also possible that the dynamics might lead to expansion of agricultural land to accommodate increasing food demand in the growing nearby towns at the expense of forests.

Beekeeping activities are still at an infancy stage in the study villages, and most people from these villages do not depend on beekeeping as a major source of income

despite being surrounded by big forests. Among the reasons, is strict regulation and low market for honey that discourages people from investing in honey production. It was claimed by the respondents from Nangara that most of fire outbreaks at Ufiome forest were caused during honey harvesting. Fire outbreaks is known to be among of the main causes of grassland, bush, woodlands and forest degradation in the Manyara and other parts of Masai steppes (Senyagwa et al., 2011; URT, 2014).

Locally perceived trends of the forest cover for the past 30 years

Community perceptions towards the trends of Duru-Haitemba for the past 30 years are presented in Figure 6. The figure shows that the forest is perceived to be diminishing with time. This could be attributed to inadequate knowledge on the importance of the forests, especially during the 1982-1992 period and before the PFM arrangements started. Although, there are already some damages caused to the forest, the impact was not as extensive in coverage as compared to 1992-2002, mainly due to the low population in 1980s.

The impact of population increase on forest was particularly intensive during 1992-2002, when population increased the demand for forest resources and land for agriculture also increased. Household interviews and focus group discussions conducted as part of this study revealed that before CBFM, villagers in Babati with large herds of livestock used to invade forests to get pastures. This view was also reported by Pietikäinen (2006). Villagers also harvested tender (young) trees for building materials and firewood. In addition, they also striped tender tree barks and used them as ropes to tie firewood

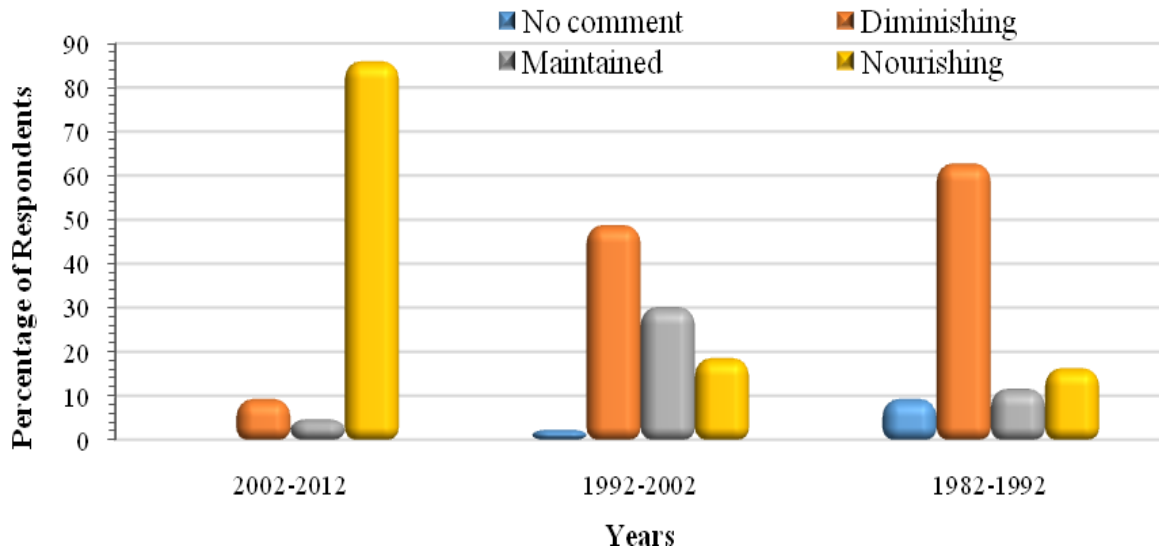


Figure 7. Locally perceived trend of the Duru-Haitemba forest at Ayasanda village. Source: Fieldwork, March 2013.

during collection. Such activities made young trees to die, which had implications in the health of the forest.

In early 1990s, the Land Management Programme (LAMP) began and provided adequate knowledge on proper management of forests and enforced the use of improved agricultural practices such as terracing and zero grazing. It also promoted tree planting, tree nurseries and agroforestry (Senyagwa et al., 2011). Improvement of Duru-Haitemba forest is therefore partly due to the LAMP programme. However, based on Figure 7, there is a probability that LAMP results took long to be realised, which could explain the perceived nourishment of the forest after 2000s.

At Hoshan village, the villagers had contradicting comments on the status of the forest during the period 2002-2012. About 45.6% of the respondents claimed that the forest was depleting because of increased population which imposed high demand for expansion of agricultural fields, coupled with poor monitoring and enforcement of the forest management by-laws. Aging of the trees whereby they die naturally, climatic challenges such as drought restraining growth of new trees were reported by respondents to have contributed to depletion of this forest. Another 45.6% of respondents reported the opposite that Duru-Haitemba forest is recovering as a result of LAMP programme. Under the LAMP programme, villagers exercised more responsibility of ownership and protection of the forest, which activated forest monitoring. Also, during the period, improved housing (using bricks instead of trees poles) contributed to sustainable use of forest resources and therefore improvement in forest status.

In 1980s and 1990s, there was considerable deforestation, with same reasons as elaborated earlier.

However, in 2000s, the LAMP programme showed remarkable achievements in Ayasanda as compared to Hoshan. The reason might be adequate knowledge on forest related issues which communities got from LAMP, which alerted them about the forest and its surrounding environment. Also, several other researches (such as REDD+) that have been conducted in the Ayasanda village have also raised awareness on the importance of sound management of the forests (Babili, 2011). Currently, most people at Ayasanda village feel more responsible for the protection of the forest, especially after realising the advantages of proper forest management, such as enhanced availability of water for domestic use, easy collection of firewood, and more reliable rains that give them a stable economy from agriculture (Malavanu, 2011).

Figure 8 presents the perceived trends for Ufiome Forest Reserve. Depletion rate of this forest was claimed to have increased until few years back, around 2006-2010, mainly associated with timber production, and the use of tender trees for production of firewood and forest fires. However, the situation seems to have changed in the recent years as people are more concerned because they have realised the consequences of misuse and poor management of forest, and have increased their participation in forest management as shown in later.

Local narrative indicated that there is a strict regulation that prohibits crossing boundaries of the forest without permission from Arri Chairman and Arri forest committee (Abdi, 2014). Arri Street is the only street that lies along Ufiome forest boundaries, and became responsible for providing permission of entering the forest so that it becomes easier to monitor ongoing activities in the forest. In addition, people from Nangara, prune their own trees

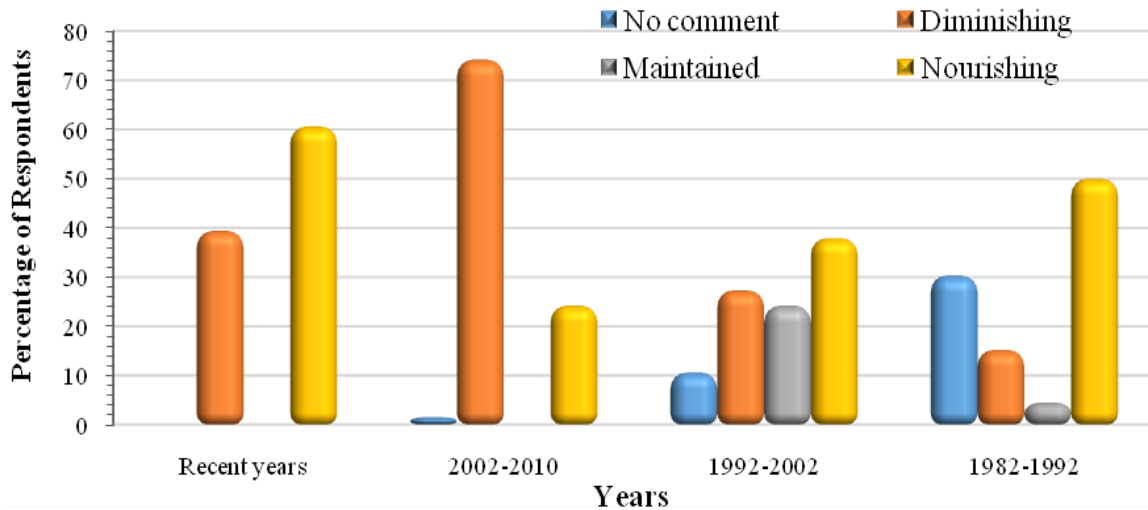


Figure 8. Locally perceived trend of the Ufiome Forest – Nangara ward. Source: Fieldwork, March 2013.

and use pigeon peas stems after harvest as source of firewood and they clear routes to control fire outbreaks. Communities at Nangara ward reported to have begun seeing similar results as those of Ayasanda villagers, such as increased availability of water and local herbs as well as reliable rain.

Forest management

The management approach undertaken in Duru-Haitemba forest is CBFM, while that of Ufiome forest is under JFM arrangement between the state and community. Management of these forests is guided by the by-laws which are almost similar in both villages. According to the Babati District Forest Officer, the status of the forest before establishment of the PFM was worse because of, among others things, illegal timber harvesting, charcoal production, cutting of trees for firewood and fire outbreaks during honey harvesting. However, following the establishment of PFM, forests have regenerated; water and biodiversity have increased; availability of firewood has also increased. It was reported by the eldest participants in the focus group discussion that Duru-Haitemba forest has become dense like never before because forest management rests on the hands of the community themselves. It is stated in Section 9 (1) of the by-laws for Ayasanda village that every villager has a role to play in guarding the forest by reporting any forest misconduct. People are therefore alert on forest management issues and they have paid special attention to their forest. The presence of village forest committees and patrollers has led to a significant reduction in the number of offences in each village. Furthermore, CBFM has improved group cohesion and provided a platform for other development activities in the

villages. It has also promoted local capacity by forging new social relationships and by redefining old ones (Kajembe et al., 2003).

It was claimed by the respondents, however, that regulations set for management of these forests are sometime violated. Due to extensive coverage of both Duru-Haitemba and Ufiome, it is hard for the security guards to monitor effectively the entire forest. Violators conduct their activities at far distances where it is hard to be spotted by both forest guards and villagers. In addition, some of the villagers have left this responsibility to security guards because they want to protect social relations. Also, forest monitoring is a difficult task due to inadequate financial resources and necessary working gears. Security guards do not benefit financially and also they do not have enough gears to protect themselves from risks such as snakes' bites during forest patrols, which affect their ability to work effectively. According to the household interviews and focus group discussions, sometimes the forest guards take bribes in exchange for not reporting the culprits to the village forest committee. This was claimed to be done as a way of rewarding themselves for the hard work when they find the violators in the forest since they are underpaid.

According to IRG (2000), forest guards are not given salary but rather honorarium when they apprehend offenders. As noted by Kajembe and Malimbwi (1996), it is unrealistic to expect the low-paid forest guards to protect the forest resource effectively from fellow villagers who are in need of forest products for basic subsistence. Forest guards are selected from various sub-villages to protect the forest against both non-villagers and offenders from within the villages. Offenders who violate operational rules are subject to sanctions, depending on the seriousness and context of the offence. Forest guards sometimes treat the offenders with leniency especially

Table 1. Percentage responses on level of participation and individual motivation to participate in the forest management.

Village	Ayasanda	Hoshan	Nangara	Total
Level of participation				
Maximum	27.9	24.6	34.8	29.1
Moderate	32.6	28.0	33.3	31.3
Minimum	39.5	47.4	31.9	39.6
Total	100	100	100	100
Individual motivation				
Yes	73.7	83.7	80.3	79.2
NO	26.3	16.3	19.7	20.8
Total	100	100	100	100

Source: Fieldwork, March 2013.

when someone commits an offence because of a dire need for a prohibited resource. However, the contrary applies to a frequent offenders who have shown little adherence to the rules (Kajembe et al., 2003).

Grazing in the forest area is prohibited by Section 11(viii) of the Ayasanda village by-law. However, due to environmental conditions and scarcity of fodder, some adjustments were made. Ayasanda villagers are only allowed to graze their cattle in the forest area during wet seasons, where the livestock keeper has to pay 100 Tshs for each cattle head. Other livestock such as goats, donkeys and sheep are not allowed because they browse on small trees. This was allowed to sustain the livelihoods of the livestock keepers. Key informant interviews, focus group discussion, as well as household interviews and physical observation all suggested that Duru-Haitemba forest was progressing very well, while Ufiome forest is considered to have improved substantially.

Levels of community participation in forest management

In order for PFM activities to be successful, effective community involvement is necessary. Table 1 presents the perceived levels of community participation in forest management activities as well as individual motivations in the studied villages. Adding up the maximum and moderate participation responses, the perceived levels of community participation amounts to 68.2, 60.5 and 52.7% in Nangara, Ayasanda and Hoshan, respectively. It can be noted from Table 1 that all the three villages registered over 50% level of participation.

The relatively high level of community and individual participation in forest management is an indicator of community understanding on the importance of the forest, which has motivated communities to respond well

to forest management activities. Those who claimed to have experienced minimum participation were either busy raising income for their families even though they have interest of engaging themselves in PFM, or were people who did not want to ruin their social relations or considered it as wastage of time.

Participation was reported to be in form of, among other things, attending village meetings, complying with regulations, reporting anyone who goes against the regulation, conducting forest patrols, and planting trees at the forest and household plots. It was reported by Arri Forest Committee that at April, 2013 at Nangara Ward, over 5,000 trees were planted on gaps left by fire and timber harvesting at Ufiome forest reserve. In the same month, 240 trees were planted at Nangara Primary School by the Tanzania Parents' Association (Abdi, 2014). Many other trees have been planted since 1990s in the gullies to control further soil erosion, in private plots, and in restoration of Ziwani forest. At Ayasanda village, people are also actively involved in planting trees in their farms in the form of agroforestry. However, for Hoshan village, tree planting is rare and they depend a lot on forests to get firewood and other forest products.

High participation is further confirmed by the individual motivations where 79.2% were reported to be well motivated and actually participated in forest management activities, whenever they had an opportunity. Table 1 also presented the percentage responses on individual motivations to participate in forest management activities. This shows that people in the area have adequate knowledge on importance of the forest resources. It was revealed from household survey and focus group discussion, that those who seemed to be not interested in forest management could be because of old age or personal assumption that they had limited contribution in forest management.

As a result of high community participation in forest management even the woodlands, which were in a state of acute decline before local community participation, with loss of area and species, have been transformed into woodlands with boundaries that are intact, where incursion is limited, flora and fauna are recovering and management and protection are effective and at minimum cost. This view is also shared by Kajembe et al. (2003).

Availability and contribution of forest resource to community livelihoods

Majority of respondents (99.4%) during this study acknowledged that forest resources are available in the study area, with the degree of availability varying from easily available (93.4%) to relatively easy (3.6%) and difficult (2.4%). The 93.4% of the respondents who reported ease of availability of forest resources mentioned edible fruits, wild meat, vegetables, herbs and firewood to be the forest products that are easily

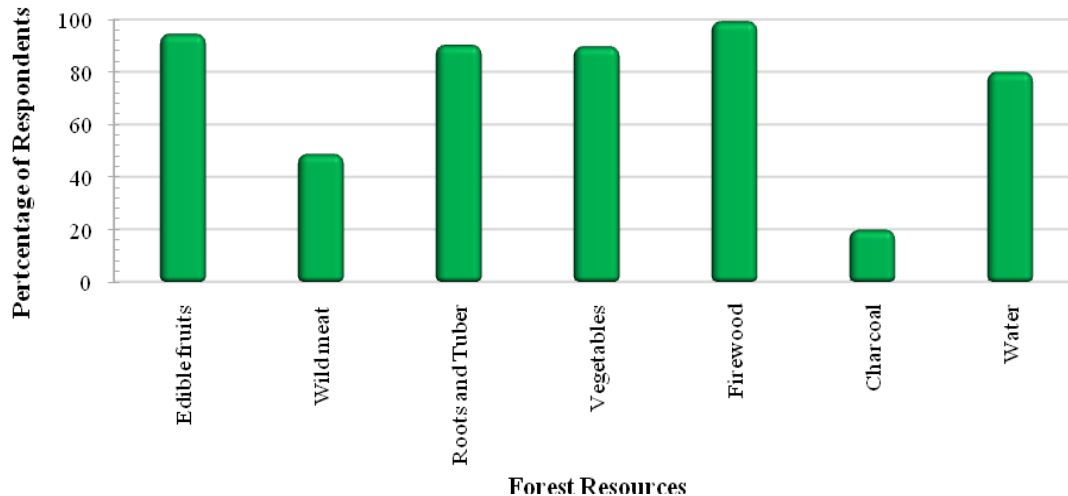


Figure 9. Benefits derived from Duru-Haitemba and Ufiome forests Source: Fieldwork, March 2013.

available. While 3.6% of respondents claimed that the availability depends on the type of the forest resource in question. For the case of wild meat, there were contradicting answers from the respondents, some agreed on rare existence of the wild animals and some agreed on their extinction. Only 2.4% claimed forest goods are hard to find apart from firewood. Villagers located close to Duru-Haitemba and Ufiome forests are provided with wide range of social and economic benefits. Those who are bordering these forests have even better accessibility of the forest resources. The benefits provided by these forests include goods and services (Figure 9). According to the District Forest Officer for Babati district the benefits from forest related activities include beekeeping, grazing, weaving, mushroom farming, tourism, collection of wild fruits, vegetables, firewood and medicinal plants. It was also acknowledged by the residents in the studied villages that the services provided by these forests, included among others, improved climatic conditions, protection of their farms and houses from storm and wind, minimised erosion, and protection from floods. These indirect forest benefits seem to have improved their livelihoods and wellbeing by stabilizing agricultural income through reliable rain.

In Duru-Haitemba, communities are allowed to collect the mentioned resources throughout the year, except for charcoal or timber harvesting. In Ufiome forest, people have to seek for permission to enter the forest for collection of such goods. It was found however, that edible fruits, herbs and vegetables are abundant and easily available but people are not interested to collect them. This was due to adoption of more modern practices than the traditional ones. For instance, residents around Ufiome forest have to a large extent abandoned indigenous ways of treating various ailments by herbal medicine and, instead, go to hospitals and health centres.

There are two government hospitals in Babati town which are Manyara hospital and Mrara hospital, and several health centres to mention a few, Zaki, Amani and Wazazi health centre where they get medical services at affordable cost. Also, residents grow their favourite vegetables in the Lake Babati wetland, so they rarely collect wild vegetables. For the case of edible fruits, it was found at Pongay sub-village, they sell wild fruits from *Phyllanthus engleri* trees (Figure 10) locally known in Iraqw as “*Endahakha*” to business people in large quantities. However, the use of these wild fruits was not established during this study, but generally local utilization of wild fruits was reported to be very small.

Charcoal is another forest product that contributes to local livelihood. It is a second energy source (39.2%) after firewood (99.4%). Although, it is against the regulation to produce charcoal from either of the forest reserves, it was mentioned by some respondents that it is still produced illegally. Smoke was evidently seen coming out of the closed forest in Duru-Haitemba in Ayasanda village; confirming that illegal charcoal production is going on in these forests. However, it was mentioned that most of the charcoal used in the area is brought in from Mamire, Gallapo, Magugu and other distant areas. These areas are well known for charcoal production. Since production is associated with deforestation, it may eventually lead to environmental destruction and the effect is likely to spread beyond the area currently being exploited.

Timber harvesting is only allowed under certain circumstances such as building schools, health centres, village offices or if someone lost his house because of fire or wants to extend household (Figure 11). Suitable trees for harvesting are carefully selected from different parts of the forest so as to minimize the impact. Findings indicated also that people are highly encouraged to plant own trees so as to reduce the load from the natural



Figure 10. Edible fruit named “*Endahakha*” found in Hoshan village. Source: Fieldwork, March 2013.



Figure 11. Use of forest products for the construction of houses and livestock shelters. Source: Fieldwork, March 2013.

forests.

Conclusion

This study has assessed impact of forest management systems on Duru-Haitemba and Ufiome forest reserves and how such systems have influenced local livelihoods. It has been a general community perception that before establishment of participatory forest management, forest areas were heavily degraded and deforested as communities did not feel the sense of ownership of forest. Consequently, forests became depleted as communities continued to make their livelihoods from forest resource, coupled with inadequate knowledge on forest management, poor law enforcements, population increase and demand for natural resources and land for crop cultivation and livestock grazing. Other flaws that led to mismanagement of forest resources have included illegal logging and charcoal production, stripping trees barks and harvesting young trees for building poles and forest fire. It has been found that since the establishment

of participatory forest management arrangements in the early 1990s, there has been significant success in both forests reserves, with both being effectively restored. As a result of enhanced community participation in forest management, illegal forest based activities such as timber harvesting and forest fires have greatly been minimised and the once heavily degraded forests have considerably recovered. Increased engagement of communities in complementary activities such as tree planting in gullies, and in crop farms has reduced the exploitation of the forest resources for firewood and timber. Despite the fact that both Duru-Haitemba and Ufiome forests are progressively being well managed, there are still forest misconduct especially in more remote areas. Therefore, there is a need to ensure enforcement of forest regulations, enhance local community participation as well as unswerving payments to the forest guards.

Conflict of Interests

The authors have not declared any conflict of interests.

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