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# An Assessment on the Roles and Accountability of Adjacent Local Communities in Decentralized Forest Management System in Mufindi District, Iringa, Tanzania

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## Abstract

**Purpose**: This study was undertaken in Ihang'ana Forest Reserve to provide an understanding of the roles and accountability of forest stakeholders in decentralized forest management for sustainability. The study was proposed specifically to assess decentralization of forest management approach by identifying the main stakeholders and examine their roles and methods used on management of the Ihang'ana Forest Reserve.

**Methodology**: Multiple research methods were used for data collection which included literature reviews, structured questionnaires survey; institutional and key informant interviews, transect walks and observation and focus group discussions. The study adopted a mixed methods approach with simple and purposive sampling procedures. Quantitative data were analysed through SPSS with support of content analysis for qualitative data. Three villages adjacent to Ihang'ana forest were studied as target population Igeleke, Kibengu and Mwatasi with a total of 102 sampled respondents.

**Findings**: The key findings of the study revealed that the major stakeholders in the management of Ihang'ana forest reserves were the local communities adjacent the forest reserves, the government and non-governmental organizations. The roles played by these stakeholders were guarding and patrolling done by local communities, education provision on forest management and facilities provision of seminars and workshops. The methods used to conserve and manage forest resources in Ihang'ana forest were afforestation, reforestation, agroforestry, destocking, implementation of enacted by-laws and the use of alternative energy. Several factors that led to effective management of the Ihang'ana Forest were implementation of forest by-laws, community inclusiveness, and strictness of the forest committee and application of deterrent penalties. The study concludes that local community participation in decentralized forest management bottom up approach is of paramount. The inclusiveness of the local community had led to effective management of the forest.

**Unique contribution to theory, practice and policy:** The study recommends that, decentralized bottom-up approach forest management should be maintained for the forest sustainability. Also the central government should continue supporting the local communities in conservation activities of the forest, maintaining the existing fire breaks and timing for clearing the fire breaks is crucial.

**Keywords:** *Decentralized Forest Management Approach, Ihang'ana Forest Reserves, Community Based Forest Management, Joint Forest Management, Bottom Up Management.*

## 1. Introduction

The need for effective management of forest resources has prompted change from government controlled management to involvement of stakeholders (Adhikari *et al.,* 2004). Developing countries in the world are pursuing some forms of decentralized forest management (FAO, 2002), which involve local people. Different systems are used to describe involvement of various stakeholders in forest management which includes, community forest managed by adjacent communities, collaborative forest management (CFM) by community and government, participatory forest management (PFM), which includes forests that are co-managed by communities, groups or individuals under a wide range of conditions, decentralized forest management, community based forest management (CBFM), whereby forests are managed by community and joint forest management (JFM) that is done in collaboration with government and communities (Leach *et al*., 1999).

In order to make forest management effective, different countries have made efforts to include different stakeholders and experts in forest management. In Africa, some countries are using forest experts as stakeholders to build awareness to communities on how they should manage forests and be accountable since they are included in policies as major stakeholders in the forest sector. The act of including forest experts as stakeholders in forest management has produced positive change on forest health and vitality (Mbwambo, 2000). Democratic republic of Congo for example, is one of the countries that have implemented participatory forest management through Community Based Forest Management (CBFM). Nearly a quarter of the country's national forests have been handed over to Community Forest Groups for management (Maharjan *et al*., 2009). As a result, community forests have improved in condition by becoming more densely forested. Forest management in Uganda also has been decentralized to local communities in order to enhance effective management and protection. The decentralization of forests in Uganda came as a result of the Forest policy formulated to manage forests for the public (Hamilton, 1989). Until the late 1990s, forest management in Uganda was mainly a public matter, more or less confined to forest reserves (Government of Uganda, 2003). The Uganda National Forestry and Tree Planting Act of 2003 directed the management of forests and created a semi-autonomous National Forestry Authority (NFA) that is responsible for all aspects of forestry in the country and protecting all resources found in forests for the future use in collaboration with communities through CBFM (Government of Uganda, 1995). Kenya also has integrated forest management and supervision from local level to high authorities as stipulated in the Forest Policy and Forest Act of 2005 (Joel *et al.,* 2007).

Analysis of the impact of community forests in Kenya has shown improvement and effectiveness both by increasing rural incomes and ensuring forest conservation (Bray *et al.,* 2005). In particular, where there is local participation, forests have generally shown positive impact (Bray *et al.,* 2005). The existence of local government authority (LGA) in Tanzania plays a great role in forest resources management, accountability among forest stakeholders and forest department as well as governance. These roles include management of local government reserves, creation

of new forest reserves, promotion of tree planting and seedling production, law enforcement, coordination of extension services and revenue collection (URT, 2007). Accountability in forest sector is done through an interactive mode.

To enhance and make effective participation of stakeholders in managing forests and their resources, Forest Policy, Laws and Acts have been formulated to influence accountability and participation of stakeholders by supporting improvement in the forest governance. Tanzania introduced decentralized forest management in the early 1990s through the 1998 Forest Policy with three policy objectives of improving forest quality, livelihoods and governance at local level (Blomley *et al.*, 2008). The decentralized forest management was through PFM using two approaches: Joint Forest Management (JFM) and Community Based Forest Management (CBFM). JFM resulted from a shift from State Ordinary to State-JFM arrangements and it takes place in Central and Local Government Forest Reserves. The major aim of shifting from the State-Ordinary to State-JFM was to allow communities to sign joint forest management agreements with government and other forest owners as well as the enhancement of management (Iddi, 2002). State-Ordinary is the inherited Centralized Management (CM) and State-JFM entails the current shift to management partnerships with communities. Under State-Ordinary the state is the sole owner and manager of the forestland while in State-JFM arrangements the state owns the forestland and enters into joint management agreements (JMAs) with adjacent communities (URT, 2003). JFM can also take place in private forests where private owners enter into management and use agreements with adjacent communities.

CBFM takes place in forests on surveyed village land as per Village Land Act No. 5 of 1999 and are managed by the Village Council (URT, 2007). The full ownership and management responsibility is vested in villagers for an area within their jurisdiction declared by village government as a Village Land Forest Reserve and registered by the District Council (Blomley *et al.*, 2007) interactive mode. The higher authority, which is the national forest department under national forest director, directs on what should be done to enhance forest sustainability. Social accountability can improve forest governance where it changes cost-benefit perceptions on illegal logging (Kajembe *et al*., 2000). The Local Government Authority as the responsible supervisor of local forests has given forest user groups power to make decisions on how community forests can be managed and utilized based on full participation of all members through management or operational plan. Individuals in a community have to cooperate with each other for collective management of their forest. The community forestry program in Tanzania has empowered the traditional forest user groups not only to protect and manage the forest but also to utilize products (Kajembe *et al*., 2000).

In order to achieve forest health and vitality and make communities enjoy forest services and resources, ideas for improving forest governance and accountability are of importance. Management and accountability should originate from the people who battle with illegality from local communities and civil-society watchdogs, government officials, and timber merchants to ensure forest sector exists for both present and future generation use (Blomley *et al.*, 2008). To

ensure that there is vitality and a healthy forest for the current and future generation, there is a need to plant more trees in forest (afforestation and reforestation), enforce by-laws and include forest stakeholders in the governance of forests (Mayer, 2000). Such forest stakeholders include government forest agencies, the judiciary system and other departments as well as ministries; civil society as representative of community 6 groups, social and environmental as well as non-governmental organizations (NGOs); and the private sector as representative of companies, industry and trade associations. Accountability in forest sector by stakeholders is part of their responsibilities that assist in management and developing forest by using strategies and efforts that enhances forest health and vitality (Mayer, 2000). These strategies include using media, civil society activities, and legal mobilization. The activities of planting trees, patrolling, demarcating forest perimeter, making and passing by-laws that protect the forest should start at the local level at which the forest is found (Bass *et al.,* 2001). Accountability of forest officials should base on giving feedback to stakeholders about forest resources and their management through organized channel of autonomous organization for monitoring activities.

Management in forest departments is oriented towards accountability as every stakeholder has been vested with powers of making sure that forests are in good condition including resources found within (Michael, 2005). The set goals of maintaining forest should always be checked and implemented properly as every stakeholder acts as a watchdog of the other. These goals and objectives of forest management should be disseminated to rank-and-file officials. Forest officials are evaluated and held accountable to the central government for failures to meet stated goals that might lead to the destruction of the forest (Michael, 2005). Ihang'ana Forest Reserve is part of the Udzungwa Mountains ecosystem located in Southern Highlands of Tanzania being also under community based management. It is on ranges of the Udzungwa Mountains ecosystem that falls under the Eastern Arc Mountains (EAM) that extend from Southern Kenya to the Southern Tanzania, and comprise of Taita Hills (in Kenya), North and South Pare, West and East Usambara, Nguu, Nguru, Ukaguru, Rubeho, Uluguru, Malundwe, Udzungwa and Mahenge (in Tanzania) (Burgess *et al.* 2000). Ihang'ana Forest Reserve is regarded as a plateau forest (Mallango *et al.* 1997) as opposed to escarpment forests referring to those forests that occur along the Udzungwa mountains escarpment.

From the global conservation point of view, the EAM together with the coastal forests of Tanzania and Kenya have been recognized as an Eastern Afromontane biodiversity hotspot, being part of the world's 25 biodiversity hotspots (Mittermeier *et al.* 2004). The primary vegetation remaining within the biodiversity hotspots covers less than 2% of the planet's land area, and yet accounts for 44% of all vascular plant species (Linder *et al.* 2005). It should be noted that Ihang'ana FR is the source of Kihansi River downstream which is the second largest Hydro Electric Power (HEP) plant in Tanzania (after Kidatu). At its full capacity, this HEP plant produces 180 MW of electricity that enters into the national power grid. The forest landscape is heterogeneous such that the vegetation is distributed on hill slopes, valley bottoms, wetlands and springs. On the other hand, Ihang'ana FR is surrounded by five villages, namely: Kibengu,

Igeleke, Mwatanzi, Usokami and Mwatasi. With regard to its relatively small size, one cannot deny that it is under pressure from the surrounding communities. It is feared that some of the plant species under exploitation by the local communities might disappear from this forest even before they are documented by scientists. In many places, the forest is now heavily fragmented, and Ihang'ana is isolated on the plateau, and no longer connected to the forests found along the main escarpment of the Udzungwa to the east (see Ndangalasi *et al*. 2014).

Tanzania experiences several macro and micro policy changes with trickle down effects shaping the management of forest resources by communities adjacent to forest. The introduction of the 1998 Forest Policy is the major significant change, which introduced the management of forests by communities through the programme of Community Based Forest Management (CBFM) and Joint Forest Management (JFM) (Blomley et al., 2007). The Forest Policy of 1998 provides guidelines on how local communities can manage the forest resources sustainably. Ihang'ana forest reserve in Mufindi is among the JFM programme in the country which raise concerns as large part of this forest reserve is now heavily fragmented and being isolated on the plateau, and no longer connected to the forests found along the main escarpment of the Udzungwa to the east. However, because it exist as forest "island" in a "sea" of pine plantations with lumbering activities taking place, small-scale farms and human settlements, with limited connectivity to larger forests, it is less studied and its usefulness for conservation are less well known. As such, an assessment of the stakeholder's accountability on Ihang'ana forest reserve conservation is required because has a designation of as Joint forest management (JFM) and not much has been done to evaluate if the forest is effectively managed by the local community as per the guidelines provided by the 1998 policy.

In particular, what has contributed to its fragmentation and to what extent is the effectiveness and successfulness in management of the forest which is not known. Ndangalasi *et al*. (2014) argue that the forest is primarily moist with closed canopy, but with some areas of the forest edge having relatively shorter canopies as a result of forest disturbance or degradation. In addition not much information is available on who the main stakeholders of Ihang'ana forest area are and how accountable they have been in the management of the forest. This study, therefore, seeks to provide an understanding of the roles and accountability of community and other stakeholders in the management of Ihang'ana forest and the factors that have led to its effective management. The overall aim is to track sustainability of Ihang'ana forest reserves from socio-economic and natural related shocks; it aims to capture the following;

- To identify the main stakeholders and examine their roles in management of the Ihang'ana forest reserves
- To examine the methods used by stakeholders to conserve and manage the forest resources in Ihang'ana and what factors that have led to effective management of Ihang'ana forest with increasing pressure from community.

## 2. Theoretical Perspectives

This study was guided by decentralized forest management approach. The approach was useful as it argue on managing forest through participatory method by incorporating various stakeholders mainly through Joint Forest Management (JFM) and Community Based Forest Management (CBFM). The approach is useful to natural resource management by, for and with local communities with the objectives of improving forest resources by incorporating people, empowering them, and enhancing management efforts on forests.

JFM and CBFM started making news in Tanzania in the mid-1990s. The success of decentralized forest management is shown by communities that have been planting trees on the affected areas, protecting forest degradation through collaborative guarding with local soldiers famous as "sungusungu". Further, communities are responsible to report all issues that seen to destroy forests. CBFM in Tanzania takes place in forests on Village Land (land which has been surveyed and registered under the provisions of the village Land Act (1999) and managed by village council). Under CBFM, villagers take full ownership and management responsibilities for an area of forest within their jurisdiction and are declared by Village and District governments as a Village Forest Reserve. CBFM has shown positive impact on forest resources development as Communities around forests have been participating in nursery tree growing for afforestation of land. Livelihoods of the people have also changed due to forest utilization as a flash back of their efforts in which employment opportunities have been created. Communities are the first-hand managers and governors of the forest through their local authority in maintenance of environment including forests. Management plans have been developed, activities have been implemented, and regular forest committee meetings are now held to discuss management issues.

Overall, the use of CBFM was useful in this study because the forest sustainability is linked to the stakeholder's engagement, since nature supports different livelihood activities of the people while at the same time the sustainability of resources depend on institution. Therefore, despite the substantial amount of researches that has been done in Mufindi and other parts of Tanzania, as illustrated by the reviewed studies, none of them considered sustainability of forest reserves through exploring roles and accountability of forest stakeholders in management of decentralized forest particularly the Ihang'ana forest reserve. For example the study of Bukhi (2011) focused on participation and benefit sharing under JFM in Nou Catchment forest reserve in Babati District. Also the study of Kajembe et al. (2003) focused on how to make community based forest management work within the Duru-Haitemba village forest reserve. It is, therefore, in this view that this study was undertaken so as to document roles of stakeholders' participation in decentralized forest management in Ihang'ana forest reserve.

## 3. MATERIALS AND METHODS

### 3.1 Study Area

Ihang'ana FR is located in Mufindi District, about 70 kilometres east of Mafinga town, and about 30 kilometres North-West of the escarpment at Uhafiwa and Ukami villages. It is found between latitude 08°12'30" and 08°20'00"S and longitude 35°42'30" and 35°50'00"E (Figure 1).

Ihang'ana FR is one among the central government's forests gazetted through Government Notice Number 105 of 1931 (with a Job Number J.B. 21) (Mallango *et al.* 1997). The total conserved forest area is 1206.8 ha and is surrounded by croplands, settlements and grasslands. This forest is the main catchment and the source of Kihansi River that flows to the east. The forest is moist with closed canopy trees but with patches on the edges having different vegetation community types. The forest floor is wet and covered with various species of fungi, bryophytes and tperidophytes.

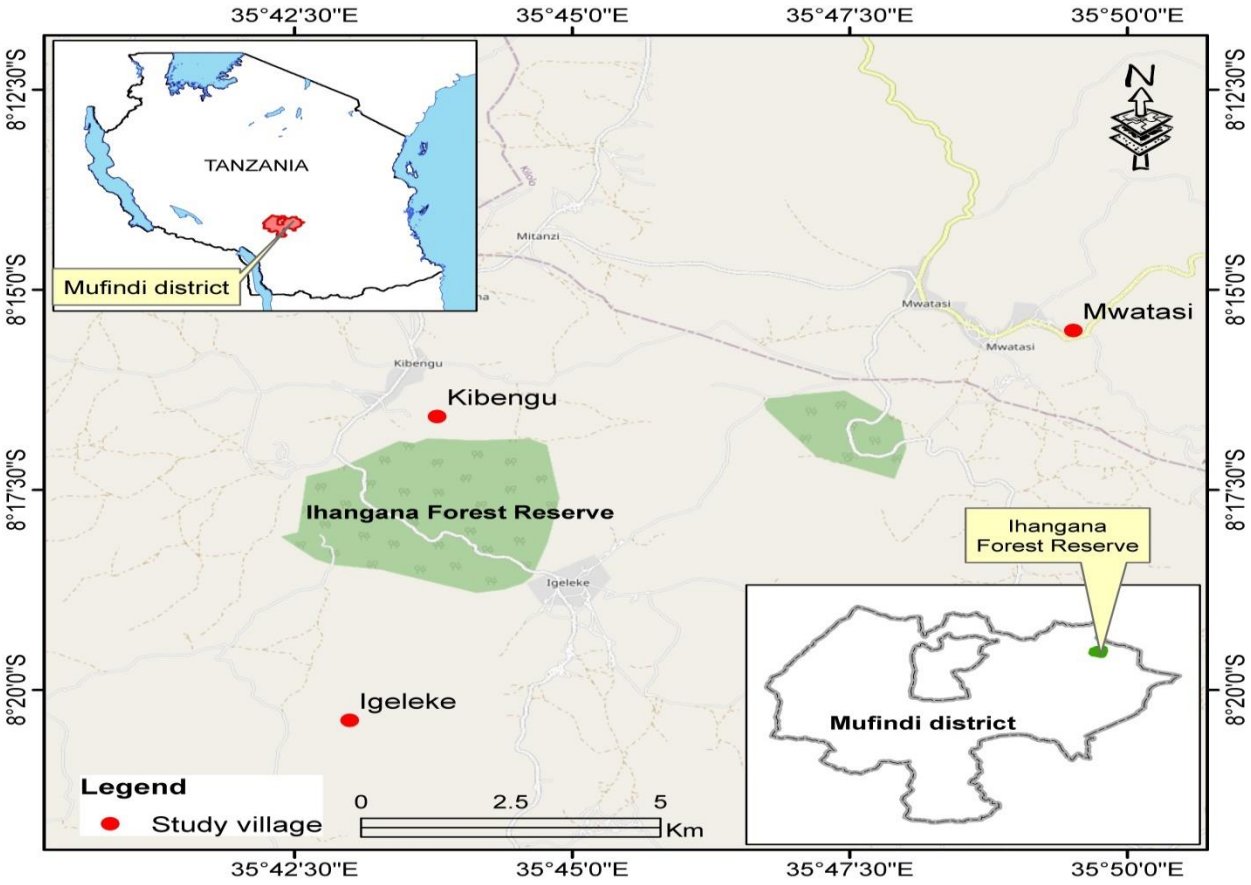



**Figure 1**: Map of Ihang'ana Forest Reserve

**Source:** GIS Laboratory, IRA - UDSM, 2023

### 3.2 Study Approaches and Design

The study adopted a mixed research design which allows for the triangulation of methods for a better understanding of the sustainability of Ihang'ana forest reserves and the position of stakeholders on forest resources management. Trust (2004) insists that combining the two approaches plays an important and complementary role in knowledge building. The qualitative approach was used for eliciting participant accounts of meaning, experience or attitudes and perceptions towards decentralized forest management in Ihang'ana forest reserves including involvement of local communities on establishment of the reserve, livelihoods sustainability that

were collected through in-depth interviews with purposefully selected adjacent respondents to the reserve. The qualitative approach was used for eliciting participant accounts of meaning, experience or attitudes and perceptions towards decentralized forest management. Quantitative research design was used in order to describe variables and the relationship between the variables to meet the targeted goals of the study (De Vos et al., 2002). Thus, the mixed research design was helpful in realizing the objectives of this study.

### 3.3 Sample Size and Sampling Procedures

A pilot study was conducted to identify the villages which were adjacent to the Ihang'ana forest reserves. Therefore, Ihang'ana FR is surrounded by five villages, namely: Kibengu, Igeleke, Mitanzi, Usokame and Mwatasi with a total population of 26,160 people (Bureau of Statistics 2022). A sample of 102 heads of household was selected for the study, and these were involved in a household survey. This was because, in most cases, they were the decision-makers at the household level; and was believed to be more knowledgeable about the study theme. In this study simple random sampling technique was used for household survey. The procedures used to obtain households sample in the study villages, where by 10% of households were selected randomly from total number of households (N) in each villages. The total number of households (N) in each village was divided by 10% in order to obtain a sample of a village.

**Table 1: The Households and sample size**

| Wards | Villages | Number of Households | Sample size 10% |
|---|---|---|---|
| **Kibengu** | Kibengu | 231 | 23 |
| | Igeleke | 569 | 56 |
| **Bomalang'ombe** | Mwatasi | 234 | 23 |
| **Total** | | **1034** | **102** |

**Source:** Field survey, 2023

### 3.4 Data Types and Data Collection Methods

The study used both primary and secondary data sources. Secondary data was collected from reading different published and unpublished literatures, obtained from different sources of information. The sources comprised of papers published online by scientific and reputable journals, books, and unpublished documents from local government offices. Also, visits were made to the main library of the institute of accountancy Arusha and the Ministry of tourism and natural resources, government documents for various institutions including reports and official documents for TANAPA, District council, wards, and village records were reviewed. Primary

data was collected through a household survey, in-depth interviews, focus group discussions (FDGs) and field observation.

A household survey was used to collect quantitative data from heads of household using a semi-structured questionnaire, which had both open-ended and close-ended questions. The data collected included the historical background of Ihang'ana forest, the size of the forest, implementation of the forest policy directives, how Ihang'ana forest reserve was established, Joint Forest Management groups working in Ihang'ana forest through the VFMA and factors influencing the success in managing Ihang'ana forest. Data on available forest resources such of plant and animal species were gathered through personal communication with District Catchment Forest Officer (DCFO) documented in office database. Regional Forest Office, District Forest Office, District Catchment Forest Office were the sources of secondary data.

In-depth semi structured interviews ,focus group discussion and observation methods were used to capture primary data .The data collected in this study focused on the methods used in managing Ihang'ana forest and its resources, factors leading to effective management, awareness on forest management, utilization of the resources and the by-laws governing the Ihang'ana forest. Furthermore, information on the challenges local communities faced in managing the forest and solutions they use to overcome them was also collected from respondents during data collection through the use of questionnaire, focus group discussion and observation. Three FGDs were conducted one in each village. About 6-10 individuals were involved and participated in the discussions in each village and the participants were selected purposively including village chairperson and executive office.

### 3.5 Data Analysis Techniques

#### 3.5.1 On field data analysis

Qualitative data collected through in-depth interviews and direct observations were analyzed and summarized systematically by comparing the findings with findings from other sources of data (respondents). Also extensive discussions with focus group (FGD) members and key informants were done within the study area including interpretation of data (content analysis) in order to bear the targeted meanings. Yin (2009) suggests content analysis method to suffice qualitative evidences collected from case study. The qualitative data were analyzed through description and presented in the form of pictures.

#### 3.5.2 Off field data analysis

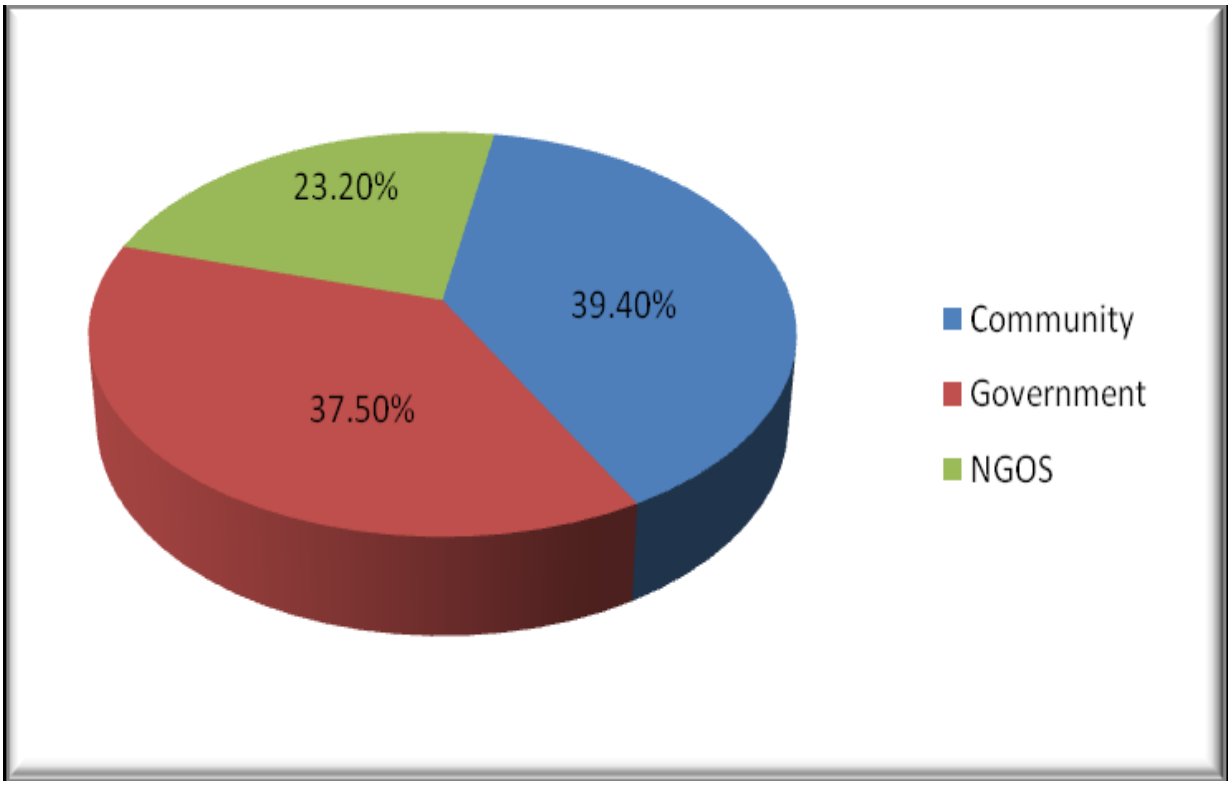
After the field survey, data related to forest management were edited into manageable units to reduce bulkness. Editing is the process of examining the collected raw data to detect errors and omissions so as to correct them (Kothari, 2004). After editing, the data obtained through questionnaires were coded and entered in a computer and analyzed using the Statistical Package for the Social Sciences (SPSS) version 16. This process generated descriptive and inferential statistics and cross-tabulation was undertaken to analyze quantitative data on level of education of respondents and their perception/knowledge on forest management. Descriptive statistical

techniques were useful in analyzing the quantitative data. Microsoft Office Excel 2010 was used to give frequencies and percentages. Qualitative data from key informants, interviews and FGDs were analysed through content analysis and presented through descriptive statements and direct quotations. Quantitative data collected from the household survey was coded, processed and analysed using the Statistical Package for Social Sciences (SPSS IBM, version 23) and Microsoft excel version 2016. The procedure involved checking the data for consistency, preparation of a coded template in IBM SPSS, data entry, and analysis of descriptive statistics.

## 4. Results and Discussion

### 4.1 Stakeholders identification and their roles in managing Ihang'ana Forest reserve

The respondents were asked to identify the Ihang'ana Forest reserve stakeholders and the roles they played in forest management activities. Stakeholders that were mentioned by respondents are local communities adjacent the forest reserves, the government and non-governmental organizations (NGOs and Farm Africa). Other stakeholders mentioned by respondents were the community itself and the government. Majority of the respondents mentioned community as the main stakeholder (Figure 2).




**Figures 2: Stakeholders involved in managing the Ihang'ana forest reserve**

**Source: Field study 2023**

The respondents were asked to mention the main roles that were being played by stakeholders. The roles mentioned were Guarding and patrolling done by communities, education and facilities

provision by NGOs and building awareness on forest management through seminars and workshops (Table 3). These findings concur with Ostrom, (1990) who observed that the roles of preparing seedlings within the forest perimeter so as to replace endemic tree species that are disappearing due to change in climate and human illegal activities was under community. Village environmental committees manage village forests on behalf of village councils (URT, 2003).

**Table 2:** The roles of forest stakeholders in management of Ihang'ana forest reserves

| **Roles mentioned** | **Frequency** | **Percent** |
|---|---|---|
| Guarding and management | 97 | 39.9 |
| Education and facilities provision | 89 | 36.6 |
| Building awareness on forest management through seminar and workshops | 37 | 23.5 |
| **TOTAL** | **243** | **100** |

**Source:** Field study 2023

The villages surrounding Ihang'ana forest were engaged in forest management activities as the first managers of the forest. The village forest committees were given the authority to make sure that the forest and its resources were properly managed in collaboration with local traditional guards known as "sungusungu". They had also been given the power to ensure that the forest was protected, to implement the by-laws and even give punishment to offenders where necessary. It was envisaged that people would participate in all JFM activities such as meetings and even in making decisions on how to utilize the forest. They engaged in reforestation activities and nursery preparations, demarcating forest perimeter, guarding the forest through local guards as well as proposing punishment through the VFCs. The community as the main stakeholder has the role of guarding and protecting the forest within the village forest area against any damage in accordance with the village by-laws. Each village has set out clear rules on how Village Forest Management Areas (VFMA) may be used. Activities such as grazing, firewood collection and lumbering, which had led to the degradation of the forest, have been banned. The major activities, which were mostly being done by communities, were nursery and tree planting, which accounted for 43.72% (Table 4) and fire line construction that can protect the forest from catching fire in case it happened. Other activities are forest demarcation to show its perimeter and patrolling the forest by traditional guards called sungusungu in collaboration with VFC.

**Table 3:** The activities done by communities in management of Forest reserve

| Activities mentioned | Respondents(f) | Percentage |
|---|---|---|
| Fire line constructions | 29 | 28.57 |
| Demarcating forest boundaries | 22 | 21.64 |
| Patrolling the forest to prohibit illegal business | 7 | 6.06 |
| Nurseries preparations and trees planting | 44 | 43.72 |
| **TOTAL** | **102** | **100** |

**Source: Field study 2023**

This study has also observed that each village rehabilitates damaged springs and stream banks inside their VFMA and each village has extended conservation management to degraded forest areas. In Tanzania, for example, the study by Nyeme (2010) shows the roles of community in forest management as the major way of maintaining forest and their resources.

The major roles of government in forest management were to provide education and provision of facilities. It was stated by respondents that the role of providing regular education on how to manage the forest was vested in central government, however, inadequate funds from the central government to run seminars and workshops related to forest management remain a big challenge. An interview with the Mufindi-District Catchment Forest Officer (DCFO) revealed that the central government was the ultimate authority, he also added through DCFO the government had the responsibility of providing technical support to the villages and other facilities used to protect the forest where necessary and even paying wages but nothing had been done because of inadequate financial capacity of the forest sector

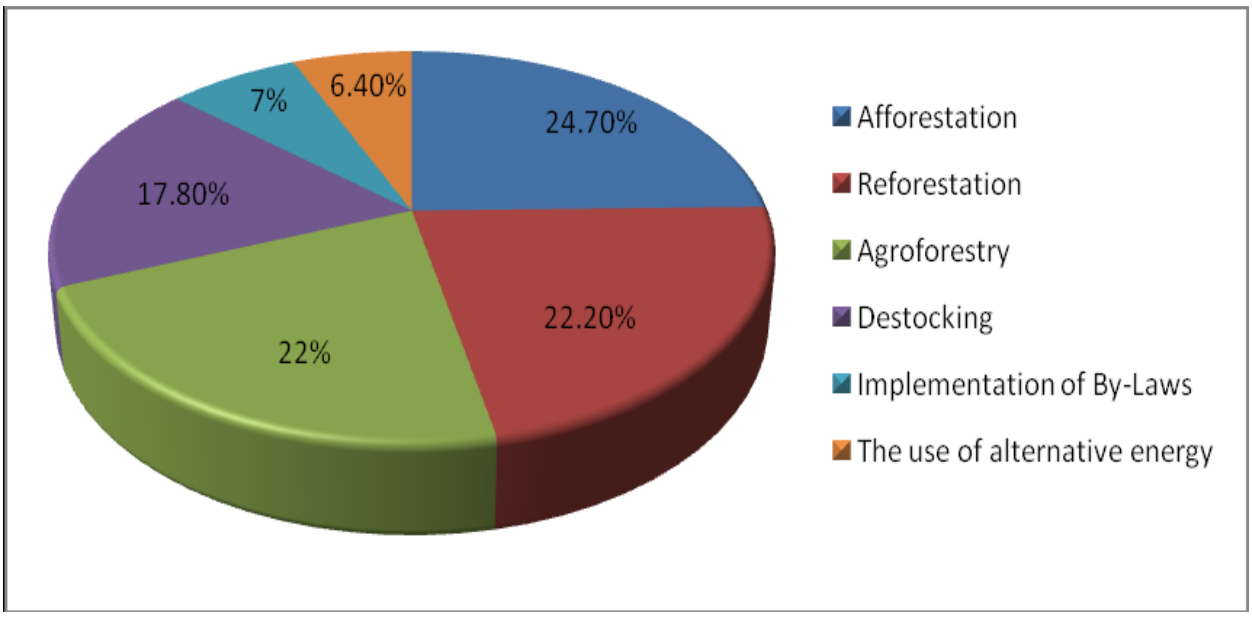
The NGOs, which were mentioned by respondents as stakeholders in the management of Ufiome forest were Land Management and Planning (LAMP), Farm Africa and Friendship in Development (FIDE). Their roles are to build awareness and capacity support to the communities that surround the Ihang'ana forest has pioneered proper forest management, raising awareness of community on the importance of land management, resources conservation and the practices of zero grazing. An interview with the Iringa Regional Forest Officer, demonstrated that the presence of these three NGOs in the region had changed peoples mind set on the exploitation of forest resources in the region. The LGUs have gained increased responsibility for environmental management but their activities are still subject to Government (La Vina, 1999). The LGUs are expected to initiate Community Based Forest Management Areas (CBFMAs), support CBFM

financially and technically, incorporate CBFMAs into local land-use planning schemes, maintain protected areas, and catch and charge those who violate forest protection laws (La Vina, 1999).

From the above results, it is evident that guarding the forest, community awareness and education on the management of forest and its resources has resulted to improved forest condition. The objective of the study has been met as the communities are aware of forest management and are participating effectively in the maintenance of their forest. These findings are supported by other findings from other studies such as of Kajembe *et al*. (2003), Nyeme (2010), Hamilton (1984), Bukhi (2011) and Dugilo (2009). These studies have shown that the integration of community in forest management as the major stakeholders has positive impact on forest management. LGUs have a role to play in developing partnerships between communities and private industries (Emtage, 2004).

### 4.2. Methods Used to conserve and Manage Ihang'ana Forest reserve

Communities around the Ihang'ana forest were asked about methods that were being used in the management of the forest. The respondents mentioned many methods such as afforestation, reforestation, agroforestry, destocking, implementation of enacted by-laws as well as the use of alternative energy sources (Figure 3).




**Figures 3**: Methods used by communities to manage the Ihang'ana Forest reserve

**Source**: Field, 2023

Communities around the forest have been planting trees in areas around the forest that had no trees before. In addition, respondents reported that because of afforestation the amount of water in streams had increased, wild animals were increasing, forest canopy was green and the mountain was now covered with vegetation. The tree species planted were indigenous grown from seedlings obtained from the forest itself. According to the DFO and the FGD with Kibengu

VFC, each year about 7500 trees were planted around Ihang'ana forest by adjacent villages. This shows that there is commitment to afforestation activities in the area. Various methods have been developed in Tanzania to facilitate natural forest management and conservation. These methods include inducement of natural regeneration, enrichment planting, protection of regeneration against weeds, fires and grazing/browsing (URT, 1998).

Reforestation according to the chairman of the forest committee in Igeleke village, the Ihang'ana forest faced a serious problem of deforestation in the 1980s due to the expansion of agriculture. There was cutting of trees for timber and poles for constructing houses as the population increased causing encroachment on the Ihang'ana forest. Nobody at that time took care of the forest as it was under the full authority of the government until 1998 when the Forest Policy was launched. The campaign of reforesting the affected area began by demarcating the forest (zoning the forest) so as to separate the forest land from other lands. From that time to the present village meetings had been convened to discuss what measures should be taken to rescue the forest and allow it to regenerate. These meetings were being convened by village and ward executive officers every quarter of the year to check forest development.

Agroforestry it was mentioned by 22% as a method that was used in managing Ufiome forest. Communities in the study area are intercropping crops with trees. Intercropped food crops are like maize, banana tree and beans. The common trees, which are intercropped with food crops in the surveyed area, are those with high capability of nitrogen fixation like Grevillea trees. The villagers argued that they started to practice agroforestry after receiving education on the importance of managing the forest and its resources. Agroforestry leads to increased natural fertilization in the farms as the leaves of trees shed in their farms and add more manure. Furthermore, agroforestry has reduced conflicts in utilizing Ihang'ana forest resources as the villagers are harvesting their own planted trees that have no restrictions compared to community trees, which need special permission before harvesting and using them. Others methods such as Destocking, Enforcement of forest by-Laws and Use of Alternative Energy Sources were used by few people.

### 4.3. Effectiveness of Ihang'ana Forest reserves management

Forest sustainability depends to effectives of the management plans which are influenced by various factors. This study was interested to find out major determinants for effectively management of Ihang'ana forest reserve. These factors were like implementation of forest by-laws, community inclusiveness, and strictness of the forest committee, application of deterrent penalties, education and the use of alternative energy.

**Table 4: Factors that have led to effective management of Ihang'ana forest**

| Factors mentioned | Respondents (f) | Percentages |
|---|---|---|
| Community inclusiveness | 27 | 26.5 |
| Benefits rose from the forest | 22 | 21.6 |
| Strictness of the forest committee | 19 | 18.6 |
| Application of deterrent penalties | 18 | 17.6 |
| Education on forest management | 10 | 9.8 |
| Use of alternative sources of energy | 6 | 5.9 |
| **TOTAL** | **102** | **100** |

**Source**: Field data 2023

The management process of the forest includes needs assessment, planning activities, implementation and monitoring activities. The findings showed that a relatively small proportion of villagers reported to have been involved in needs assessment, planning and implementation. About 21.5% of people were involved during the needs assessment, 22.5% in the planning process, 22.5% in implementation and 33.3% in monitoring. Their participation was through their respective village assembly meetings and some of them were elected to constitute the forest committees. The villagers' participation at various stages of forest management has motivated them to engage more positively in all activities of forest management. Community inclusion during the transformation of the forest has reduced encroachment and introducing settlement in the forest and improved water flow in water sources or streams, reduced illegal activities and consolidated the boundary (VFCs-personal communication). The communities around the Ufiome forest responded positively; management processes started effectively as communities gave their full cooperation.

Benefits arising from the forest, Benefiting from the resource that one cares for improves the commitment over it and enhances community participation in its management. Building materials (30.6%) Rainfall attraction (24%), Climate modification (17.2%), Water source (16.6%), Firewood and pastures or folder (6.5%), and Local medicine (5.2%). These results supports that many benefits, which communities gets increases forest management. The respondents said that the forest was beneficial to them and consequently they felt obliged and responsible for its maintenance.

Strictness of the forest committee in forest management was also mentioned by respondents that the elected forest committee members were serious in performing responsibilities given to them

and they were thankful for that. This was also proved in the FGD conducted with members of these committees in all villages covered. Kibengu VFC members said that sometimes they woke up at midnights to catch poachers and people who were harvesting timber illegally. Furthermore, they noted that they had their own informants who gave them information in cases of any illegal business.

Application of deterrent penalties In the study, 12.8% of the respondents mentioned the use of deterrent penalties to people who are caught destroying the forest and its resources as punishment to warn them not to repeat that habit. They said that the payment of deterrent penalties had led to more health and vitality in the forest as people feared to undertake any unauthorized activities in the forest. The deterrent penalties to wrong doers ranged between Tshs 15,000 and 50,000/= depending on the destruction observed and VFCs decision. People who were caught destroying forest and were unable to pay money were given an area to patrol and construct roads to demarcate the forest zone. Also they were required to replant trees on areas, which lacked trees and care for them for between nine months and three years. The trees to be planted must be of local species. Others were Education on forest management and the Use of alternative sources of energy was mentioned low.

## 5. Conclusion

From the preceding discussion, it can be concluded that different stakeholders play major roles in forest management. Community participation in decentralized forest management in particular is very significant as the inclusiveness of the community had led to effective management of the Ihang'ana forest, although lack of transparency and accountability was seen to limit their participation. The VFCs were also seen working effectively to ensure that the forest was protected against damage without any payments. Non-governmental organizations in collaboration with the community through seminars and workshops on forest resources management brought about positive impact on Ihang'ana Forest reserves. Building awareness and educating the community on the importance of managing the forest and its resources brought about considerable changes to the Ihang'ana Forest reserves with improvement in its health and vitality. The methods used in the management of Ihang'ana Forest reserves indicate that the community has pioneered the development and existence of the forest. Thus it's continued the existence and vitality will depend not only on enhancement of these methods but also on the key factors that have led to effective management of the forest.

However, Ihang'ana FR is still in a pristine condition and recovered from anthropogenic interference. The exceptions being for instance the effects of fires that originate from the surrounding grassland and encroaches the forest edge. Fire has become a big threat to the forest, given the fact that the forest reserve is surrounded by grassland and farmlands all around its borders. So far, maintenance of fire breaks by the local communities under the directives of villages' forest officers has helped to minimize the problem. Also the local communities have been involved in the management conservation of the forest which has contributed much to the recovery of the degraded parts in the forests since the 1980s when licensed timber extraction was

stopped. It is recommended that the central government should continue supporting the local communities in conservation management of the forest, maintaining the existing fire breaks and timing for clearing the fire breaks is crucial.

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