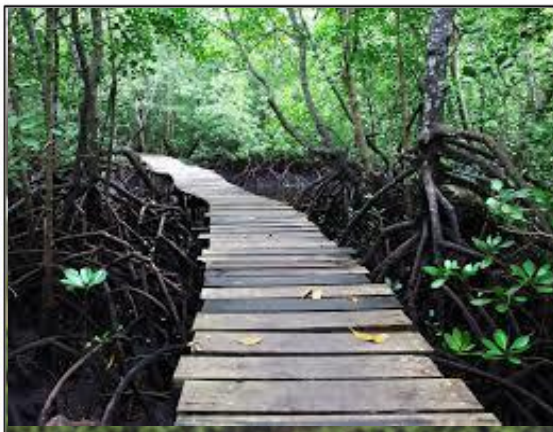
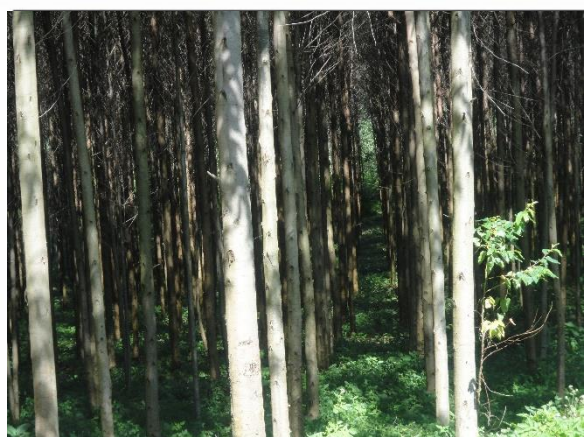




A PLATFORM FOR STAKEHOLDERS IN AFRICAN FORESTRY

## SUSTAINABILITY OF LAND MANAGEMENT APPROACHES AND PRACTICES APPLIED IN EASTERN AFRICAN FORESTS



VOLUME 5

ISSUE 7, 2022

Copyright © African Forest Forum 2022. All rights reserved. African Forest Forum  
P.O. Box 30677 00100 Nairobi GPO KENYA Tel: +254 20 7224203 Fax: +254 20  
722 4001. E-mail:[exec.sec@afforum.org](mailto:exec.sec@afforum.org) Website: [www.afforum.org](http://www.afforum.org). Twitter @  
africanff. Facebook / African Forest Forum. LinkedIn / African Forest Forum (AFF).

Citation: Kitula R. (2022). *Sustainability of land management approaches and practices applied in Eastern African forests*. AFF Working Paper. African Forest Forum, Nairobi.

Cover photos (L-R): Eucalyptus woodlot on farm in Kericho County, Kenya © Joshua Cheboiwo/KEFRI; Mangrove boardwalk at JCBNP and Biosphere Reserve, Zanzibar © Rukia Kitula; Sustainable land management practice in Morogoro Tanzania © AFF.

## Disclaimer

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the African Forest Forum concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries regarding its economic system or degree of development. Excerpts may be reproduced without authorization, on condition that the source is indicated.

# **Sustainability of land management approaches and practices applied in Eastern African forests**

Rukia Kitula

# TABLE OF CONTENTS

<b>LIST OF TABLES .....</b>	<b>6</b>
<b>LIST OF FIGURES.....</b>	<b>6</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>7</b>
<b>1.0 INTRODUCTION .....</b>	<b>9</b>
1.1 Background .....	9
1.2 Description of the objectives .....	10
1.3 Terms of Reference (ToR) .....	10
1.4 Methodology .....	10
1.4.1 <i>The study sites</i> .....	10
1.4.2 <i>Sampling procedure</i> .....	11
1.4.3 <i>Data collection</i> .....	11
1.4.4 <i>Data analysis</i> .....	11
<b>2.0 LAND MANAGEMENT APPROACHES AND PRACTICES APPLIED IN MANGROVE FORESTS .....</b>	<b>12</b>
2.1 Type of land degradation adjacent to mangrove forests.....	12
2.2 Existing land management practices applied in mangrove forests .....	12
2.2.1 <i>Soil management measures</i> .....	12
2.2.2 <i>Vegetative measures</i> .....	14
2.2.3 <i>Structural measures</i> .....	15
2.2.4 <i>Management measures</i> .....	15
2.3 Existing land management approaches applied in mangrove forests.....	17
2.5 Policies guiding land management approaches and practices in different forest type areas in Eastern Africa .....	18
<b>3.0 SUSTAINABILITY OF PROMISING LAND MANAGEMENT APPROACHES AND PRACTICES IDENTIFIED UNDER SECTION 2.0 ABOVE .....</b>	<b>25</b>
3.1 Indicators for measuring sustainability of promising SLM approaches and practices .....	25
3.2 Sustainability of promising land management practices .....	26
3.2.1 <i>Sustainability of zoning land as forest reserves</i> .....	26
3.2.2 <i>Sustainability of tree planting</i> .....	27
3.2.3 <i>Sustainability of ecotourism</i> .....	27
3.2.4 <i>Sustainability of traditional practices</i> .....	28
3.2.5 <i>Sustainability of agricultural practices</i> .....	29

3.3 Sustainability of promising land management approaches in the study areas.....	32
<b>4.0 COMPATIBILITY OF IDENTIFIED LAND MANAGEMENT APPROACHES AND PRACTICES WITH THE DEVELOPMENT OF FORESTS AND PROTECTION OF FORESTS AND DEVELOPMENT AND PROTECTION OF TREES OUTSIDE FORESTS.....</b>	<b>35</b>
4.1 Measuring compatibility level of SLM approaches/practices with forestry development, protection of forests, and development and protection of trees outside forests .....	35
4.2 Compatibility of land management practices with development, protection of mangrove forests, and development and protection of trees outside forests .....	36
4.3 Compatibility of the identified land management approaches with development and protection of mangrove forests, and development and protection of trees outside forests .....	39
4.3.1 Ecological criteria .....	39
4.3.2 Economic criteria .....	41
4.3.3 Social criteria .....	44
<b>5.0 THE EXTENT TO WHICH FOREST STAKEHOLDERS ARE INCORPORATING SUSTAINABLE LAND MANAGEMENT APPROACHES AND PRACTICES IN THEIR FOREST PLANS AND ACTIVITIES .....</b>	<b>46</b>
5.1 Adoption of good practices by communities adjacent to mangrove forests .....	46
5.2 Adoption of good practices by local authorities .....	47
5.3 Adoption of good practices by the administrative and technical services of the State .....	49
<b>6.0 GENDER ROLES IN PROTECTING FOREST LANDS AND ADOPTION OF APPROPRIATE SLM APPROACHES AND PRACTICES IN MANGROVE FORESTS .....</b>	<b>50</b>
<b>7.0 INSTITUTIONAL, POLICY, LEGAL MECHANISMS AND OTHER ASPECTS THAT CAN BE EMPLOYED TO ENHANCE PROTECTION OF FOREST LANDS IN THE STUDY AREAS .....</b>	<b>52</b>
<b>8.0 CONCLUSIONS .....</b>	<b>54</b>
<b>9.0 REFERENCES .....</b>	<b>56</b>
<b>ANNEXES.....</b>	<b>61</b>
Annex 1: Questionnaire on Sustainable Land Management (SLM) Practices and Approaches .....	61
Annex 2: Checklist for Focus Group Discussions.....	72
Annex 3: Checklist for key informant interviews .....	76

# LIST OF TABLES

Table 1: A list of land management approaches applied in mangrove forest, Eastern Africa.....	17
Table 2: Sustainability of promising agricultural practices in Mozambique.....	31

# LIST OF FIGURES

Figure 1: Soil management measures applied by farmers in the Eastern African countries.....	13
Figure 2: Management measure applied by farmers in the Eastern African countries ....	16
Figure 3: Sustainability level of zoning land as forest reserves in Tanzania .....	26
Figure 4: Sustainability of trees planting activities in Tanzania.....	27
Figure 5: Sustainability level of ecotourism activities in Zanzibar, Tanzania.....	28
Figure 6: Sustainability level of traditional practices in Tanzania .....	29
Figure 7: Sustainability of promising agricultural practices in Kenya .....	30
Figure 8: Sustainability level of promising agricultural practices in Tanzania.....	32
Figure 9: Perceptions of respondents on sustainability of promising land management approaches in Tanzania .....	33
Figure 10: Ecological criteria of assessing compatibility of identified SLM practices with forests in Kenya .....	37
Figure 11: Economic criteria of assessing compatibility of the identified SLM practices with forests in Tanzania and Mozambique .....	37
Figure 12: Ecological criteria of assessing compatibility of the identified SLM practices with forests in Tanzania and Mozambique .....	38
Figure 13: Social criteria of assessing compatibility of the identified SLM practices with forests in Tanzania .....	38
Figure 14: Ecological criteria of assessing compatibility of the identified SLM practices with mangrove forest in Tanzania .....	40
Figure 15: Economic criteria of assessing compatibility of the identified SLM practices with forests in Tanzania .....	42
Figure 16: Economic criteria of assessing compatibility of the identified SLM practices with forests in Kenya .....	43
Figure 17: Social criteria of assessing compatibility of the identified SLM practices with forests in Tanzania .....	44
Figure 18: Social criteria of assessing compatibility of the identified SLM practices with forests in Kenya .....	45
Figure 19: The extent of incorporating SLM approaches and practices in the forest plans and activities by communities adjacent to mangrove ecosystems in Eastern African countries.....	48
Figure 20: Distribution of equity in responsibility, decision making and access to land resource, and the needs of women and youth in SLM practice, Kenya .....	51
Figure 21: Women and youth need in relation to good practice in Tanzania .....	52

# EXECUTIVE SUMMARY

The African Forest Forum (AFF) has implemented a project on “Strengthening management and use of forest ecosystems for sustainable development in Africa”. The project aimed to sustainably manage forest resources in Africa in a way that enhances ecosystem goods and services through sustainable land management (SLM) approaches and practices. In respect to mangrove forests, which receive particular attention in this report, the overall aim was to assess SLM approaches and practices in order to inform the adoption of land use systems that enable land users to maximize the economic, social, and ecological benefits from the land while protecting mangrove ecosystems in the Eastern Africa. Specifically, the following tasks were implemented (i) to identify and document land management approaches and practices, including policies, institutions and legal measures guiding them, applied in mangrove forest areas; (ii) to assess the sustainability of promising land management approaches and practices identified under no. 1 above; (iii) to evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with (a) the development of forests and (b) protection of forests and (c) development and protection of trees outside forests; (iv) to assess the extent to which forest stakeholders are incorporating the identified SLM approaches and practices in their forest plans and activities; (v) to assess gender roles in protecting forest lands and adoption of appropriate SLM approaches and practices in mangrove forests; and (vi) to identify institutional, policy, legal mechanisms, and other aspects that can be employed to enhance protection of mangrove forest lands in the study areas.

Data for the study were specifically collected in three countries: Kenya, Mozambique and Tanzania. Data were collected through focus group discussions, household questionnaire, key informant interviews, participant observations and literature review. Quantitative data were analysed using Excel and Statistical Package for Social Sciences (SPSS) and presented in frequency distribution tables and graphs. Content analysis was used to analyse qualitative data.

Sustainable Land Management (SLM) approaches and practices applied by farmers adjacent to mangrove forests consist of conservation measures such as agronomic, vegetative, structural and management measures. They were applied on farms to address land problems related to soil fertility mining, soil erosion, loss of biodiversity, compaction/ soil sealing and crusting, salinity, water degradation, soil pollution and climate variability. Own innovations, contact farmers, field visits, Farmer Field School (FFS), Participatory Forest Management (PFM), meetings, and demonstration plots were the approaches used to promote best SLM practices. Selection of the best practices and approaches in the Eastern African countries has based on specific land degradation problems. The Eastern Africa countries have a range of policies which are relevant in the promotion of SLM approaches and practices.

It is important to note that not all SLM activities are best practices and those that are technically effective or suitable for one specific site/location are not necessarily the best option for other sites/locations with different biophysical constraints and socio-economic contexts. The best practices are characterized by being profitable, cost-efficient, easy to learn, socially and culturally accepted, effectively adopted and taken up, environmentally friendly, and are appropriate for all stakeholders. Sustainability of SLM approaches and practices was determined by assessing their effectiveness, efficiency, relevance, ethical soundness, level of community involvement, partnership and collaboration, political commitment, sustainability, and replication and adoption.

Based on these indicators, FFS, PFM and own innovations were found to be the best approaches

in enhancing crop productivity and mangrove forest protection and they were sustainable. Land management practices such as zoning land as forest reserves, trees planting, ecotourism, traditional practices, and agricultural practices were the best in promoting forest protection, addressing the problem of soil and land degradation, and they were sustainable.

Measuring compatibility of SLM approaches and practices to forestry development was achieved by using sustainable forest management indicators namely ecological, economic, and social indicators. The results showed that planting trees, agroforestry, afforestation, ecotourism, and beekeeping were compatible with the development of mangrove forests, protection of mangrove forests, and development and protection of trees outside forests.

Likewise, PFM, FFS and own innovations were the best approaches in addressing development of mangrove forests, protection of mangrove forests, and development and protection of trees outside forests. Generally, PFM and FFS approaches have been successful in the study areas as farmers have been able to adopt better forest conservation and agricultural practices. The study established that the adoption of good SLM approaches, and practices are crucial in addressing problems associated with soil and land degradation. They are also important in the contributing to increase in mangrove vegetation cover through planting trees and enforcement of laws. Regardless of gender, all community members have equal opportunities to participate in the implementation of the good practices. Sensitization, financial support, and material support are required to enhance capacity of youth and women practicing SLM.

Compatibility of SLM approaches and practices to forestry development can be determined through analysis of ability of SLM approaches and practices to meet sustainable forest management (SFM) and this can be achieved by using appropriate indicators namely ecological, economic, and socio-cultural indicators. The adoption and investment in SLM are crucial in reversing and controlling land degradation and deforestation, rehabilitating degraded lands, and ensuring the optimal use of land resources for the benefit of present and future generations. Women in Africa play significant roles in protecting forest land. They play roles in tree improvement, agroforestry, watershed management, and forest protection and conservation.

The presence of a legally constituted multi-sectoral coordinating and management body to oversee the development and implementation of SLM interventions at national and local levels is important. Such a body is most effective since it consists of key officials of the local government and the stakeholders. However, there is a need for assessing the potential of this framework to generate information for recommendations for its improvement and adoption in all Eastern African countries as a way to enhance forest protection in the region.



# 1.0 INTRODUCTION

The term Sustainable Land Management (SLM) refers to as knowledge-based procedure that facilitates integration of land, water, biodiversity, and environmental management to meet rising food and fiber demands while sustaining ecosystem services and livelihoods (World Bank, 2006a). It involves preserving and enhancing the productive capabilities of land in cropped and grazed areas; sustaining productive forest areas and potentially commercial and noncommercial forest reserves; and maintaining the integrity of watersheds for water supply and hydropower generation needs and water conservation zones and the capability of aquifers to serve farm and other productive activities. In a simple term SLM is about people looking after the land for the benefit of present and future generations. Strategies and practices of SLM can enable farmers and communities to become more resilient to climate change by increasing food production, conserving soil and water, enhancing food security, and restoring productive natural resources (Pender *et al.*, 2004). Improper land management can lead to land degradation and a significant reduction in the productive and service (biodiversity niches, hydrology, and carbon sequestration) functions of watersheds and landscapes (World Bank, 2006a; WOCAT, 2011).

In recognizing the importance of SLM, the African Forest Forum (AFF) has implemented a project entitled “*Strengthening management and use of forest ecosystems for sustainable development in Africa*”. The project sought to generate and share knowledge and information through partnerships in ways that provide inputs into policy and decision-making options and capacity building, for improved forest management that better address poverty eradication and environmental protection in Africa. One of the key project objectives is to enhance the capacity of key stakeholders to sustainably manage the forest resource base in ways that enhance the supply of ecosystem goods and services, including through SLM approaches, interventions to contain loss of forest cover, wise and efficient use of forest resources, and sustainable management of forests in Africa.

## 1.1 Background

Africa is characterized by a very rich diversity of natural ecosystem resources, including soils, vegetation, water, and genetic resources that constitute the region’s main natural capital and the foundation for sustainable development. These ecosystems are valuable sources of food, water, wood, fibers, industrial products, and essential ecosystem services and functions. However, in the pursuit for development to meet demands of a growing population, Africa’s forest resources are threatened. Increasingly, development negatively impacts on the forest landscape and the capacity of forest ecosystems to supply goods and services. The two key challenges facing Africa’s forests are deforestation and forest degradation; and they directly impact on forest cover. Often, it is the poorest in rural and urban communities that are most dependent on forests, therefore deforestation and forest degradation increases their vulnerability, and hampers efforts to improve their livelihoods.

To reverse the current trends in deforestation and forest degradation in Africa, strategies need to be designed and implemented that address extra sectoral drivers that negatively impact forestry (including those in agriculture, energy, urban expansion, mining, and land policies). It is very important that an acceptable balance between economic development and environmental conservation at all levels is achieved that ensures the survival of forests, and by extension their capacity to supply forest ecosystem goods and services to enhance the livelihoods of forest-dependent communities. This can be attained through SLM approaches and practices that can

integrate key sectors related to forestry. Land use planning is the preoccupation of many African governments that aims to harmonise national and local goals for the long term. To this end, African governments have also developed policies, strategies, and plans to address the loss of forest ecosystem services and of biodiversity; albeit the results have not been sustained. This calls for a concerted approach to the management of forest and tree resources through viable land management systems that explicitly incorporate biodiversity and ecosystem services, conservation needs, and integrate environmental and socio-economic considerations at the landscape level. A deep understanding of the existing land management approaches and practices, and their capacity to protect forest lands is critical to inform best SLM practices for sustainable management of forests.

## **1.2 Description of the objectives**

The study aimed to identify and promote opportunities for protecting and sustainably managing the Eastern African forest resource base in order to enhance the supply of ecosystem goods and services; and dwelling more on mangrove forests. The task involved collecting, analysing, and disseminating information on the SLM approaches and practices applied in different forest type areas, assessing their sustainability and potential to protect forest lands, and existing institutional arrangements in that regard.

## **1.3 Terms of Reference (ToR)**

The overall objective of the study was to assess land management approaches and practices around the eastern African mangrove forests to inform the adoption of land use systems that, through appropriate management practices, would enable land users to maximise the economic, social and ecological benefits. Specific objectives were to:

- i) Identify and document land management approaches and practices, including policies guiding them as applied in mangrove forests;
- ii) Assess the sustainability of promising land management approaches and practices identified under no. 1 above;
- iii) Evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with (a) the development of mangrove forests and (b) protection of mangrove forests and (c) development and protection of trees outside forests;
- iv) Assess the extent to which forest stakeholders are incorporating the identified SLM approaches and practices in their forest plans and activities;
- v) Assess gender roles in protecting mangrove forest lands and adoption of appropriate SLM approaches and practices in mangrove forests; and
- vi) Identify institutional, policy, legal mechanisms, and other aspects that could be employed to enhance protection of mangrove forest lands in the study areas.

## **1.4 Methodology**

### **1.4.1 The study sites**

The study was carried out in three countries of the Eastern Africa namely Tanzania, Mozambique and Kenya. Selection criteria were based on presence of mangrove forests and political stability. Due to its geographical location, three areas with mangroves were visited for detailed study in Tanzania such that two in Mainland Tanzania (Mtwara and Tanga) and one in Zanzibar. Two areas (Maputo and Quelimane) with mangroves were visited for detailed study in Mozambique and two areas (Kwale and Mombasa counties) in Kenya.

### **1.4.2 Sampling procedure**

Cross sectional research design was employed in this study because it is relatively cheap in terms of time and cost as it allows collection of data on more than one case at a single point in time. The study adopted a mixed methods approach; employing household questionnaire surveys, focus group discussions (FGDs), key informant interviews, and participant observations. Purposive sampling was used to identify participants of the study, particularly targeting community members involved in agricultural activities adjacent the mangrove forests.

### **1.4.3 Data collection**

- Household questionnaire (Annex 1) was used to capture quantitative data on the existing land management practices and approaches in the study areas. A total of 60 farming households were surveyed in Kenya, 61 in Mozambique and 90 in Tanzania.
- Focus group discussions (FGDs) were done with representatives of local communities engaged in implementing SLM solutions. The groups comprised a maximum of seven people in each area, to enable active participation and for easy management of the group members. Gender balance was taken into considerations in this exercise. A list of questions was prepared to guide the discussions (Annex 2)
- Key informant interviews were done and these provided an insight into the roles of the duty bearer in SLM, while highlighting gaps and opportunities for enhancing SLM within their respective areas of jurisdiction (Annex 3). Respondents to this tool were from government departments responsible for lands, forests, agriculture, livestock, and fisheries, as well as from the private sectors.
- Participant observations was done in order to have first-hand information on the best SLM practices and also employed photographing.
- Secondary data were collected through review of relevant literature to address the ToR.

### **1.4.4 Data analysis**

Quantitative exploration of the survey data was analysed using Excel and Statistical Package for Social Sciences (SPSS) and presented in frequency distribution tables and graphs. Content analysis was used to analyse qualitative data.

## 2.0 LAND MANAGEMENT APPROACHES AND PRACTICES APPLIED IN MANGROVE FORESTS

### 2.1 Type of land degradation adjacent to mangrove forests

The most common types of land degradation in the study areas were soil fertility mining, soil erosion, loss of biodiversity, compaction/ soil sealing and crusting, salinity, water degradation, and soil pollution. Households also identified climate change as a general type of land degradation. Specific manifestations such as shortage of rain and flooding were examples of climate change induced land degradation. Similar findings were reported by Republic of Uganda (2013), URT (2014), and Republic of Burundi (2015).

### 2.2 Existing land management practices applied in mangrove forests

Land management practices in this study refer to the way that land is managed (Foley *et al.*, 2005; Verheye, 2006; ACLUMP, 2010). They are physical practices/technologies in the field that control land degradation and/ or enhance productivity. They indicate the 'how' of land use. They are the means by which improvements in land resource condition can be achieved (WOCAT, 2016; ACLUMP, 2010). Four categories of land management practices were identified during the time of this study. These are soil management, vegetative, structural and management measures. Similar categories of land management practices were also reported by WOCAT (2002, 2016) and Dale (2010). Detail description for each category is given below.

#### 2.2.1 Soil management measures

Figure 2.1 gives the results on soil management measures applied by farmers living adjacent to mangrove forests in the study countries. In this study soil management measures encompass soil cover, soil fertility and soil surface treatment. Mixed cropping (Plate 2.1) and mulching were the most common soil cover practices applied in all study countries. Early planting was highly practiced in Tanzania and less in Mozambique and Kenya. Temporary trash lines, retaining more vegetation cover and relay cropping were the most common soil cover practice in Kenya and Mozambique. Cover cropping was also practiced in Kenya and Tanzania. Farmers applied these soil management measures in order to increase infiltration rate and water absorption capacity of the soil as well as to improve agricultural production for food security. Also, they were applied on farms to control the impact of wind and water erosion.



The report by Republic of Uganda (2010) indicated that production practices that emphasize integrated nutrient and water management such as mixed cropping that combines food crops with cover crop legumes can greatly facilitate SLM.

*Plate 1: Mixed cropping in Mozambique (Photo credit by Langa, A.A.A., 2021)*

Application of organic or inorganic fertilizers into the farms was the most common practice in all study countries (Fig. 2.1). They were applied in order to improve soil fertility for better crop productivity. Green manure cropland and crop rotation were the most common way of improving soil fertility in the Eastern African countries. Farmers were practicing crops rotation in order to improve soil fertility, optimize nutrients in the soil and combat pest and weed in the plot. Application of soil conditioners such as lime and gypsum were used in Kenya to improve soil fertility. Legume inter-planting were mostly used in the rotation in Kenya and Tanzania to supply additional nitrogen to the following crop. Furthermore, soil waste management and crops residue were used in the Eastern African countries to improve soil fertility for better harvest.

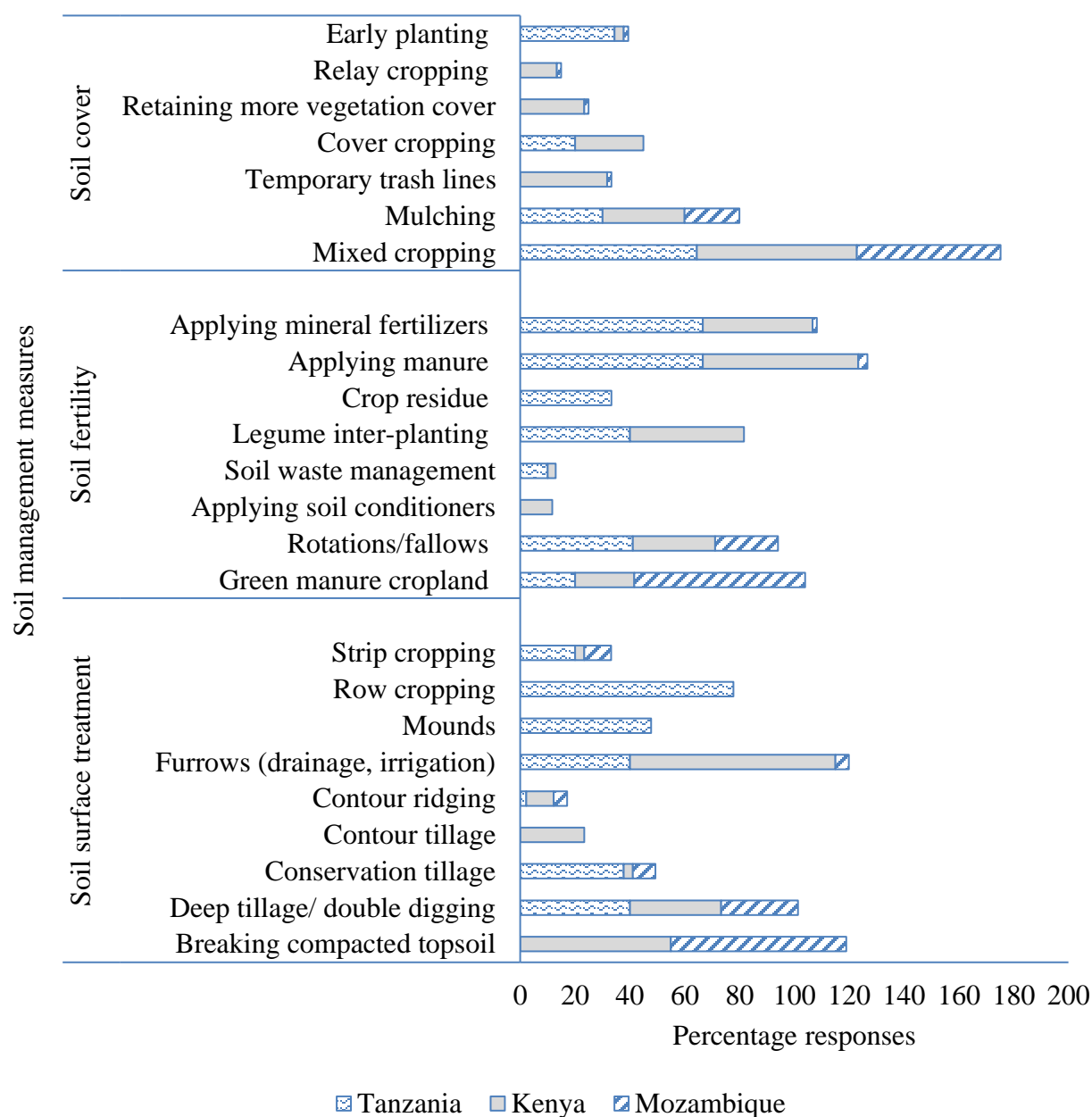


Figure 1: Soil management measures applied by farmers in the Eastern African countries



Deep tillage/double digging was the most common soil surface treatment applied by farmers in the study countries (Fig. 2.1). Breaking compacted top soil was the soil surface treatment applied in Kenya and Mozambique. The main soil surface treatment applied by farmers in Kenya were contour tillage, contour ridging and conservation tillage. Row planting, conservation tillage, mound tillage, ridge tillage and minimum tillage were the other soil treatment used by farmers in Tanzania. These results compare well with findings by Etsay *et al.* (2019) who observed that farmers in Ethiopia are applying agronomic measures on their farms to improve crops productivity. Republic of Uganda (2010), Schwilch *et al.* (2014) and Republic of Kenya (2016) have indicated application of soil management measures enable farmers increase food production, conserve soil, enhance food security and restoring productive natural resources.

### 2.2.2 Vegetative measures

Tree planting was the common vegetative measures applied in the study countries. More than 67% of farmers grow tree crops including coconuts, cashew, and fruits mainly for sale. Farmers left trees during farm preparations to provide shade, firewood, building materials, fruits, spices, border demarcation and to reduce soil erosion. Mangrove trees were also planted in the deforested and degraded areas in order to increase the vegetation cover. Trees such as *Grevillea robusta* were planted in woodlots to provide poles and firewood for sale (Plate 2.2). Trees planting was introduced in order to relieve pressure in the mangrove forests. According to Republic of Uganda (2010), Schwilch *et al.* (2014) and Republic of Kenya (2016) applying land conservation measures such as tree planting can prevent land degradation, restore degraded lands, and reduce the need for further conversion of natural forests and grasslands.



Plate 2: Woodlots established for poles and firewood in Tanzania (Photo credit by Kitula R.A. 2021)

The use of vegetation strips along rivers and vegetable farms as well as putting up hedges were the most used vegetative measures in farm in the study countries. They were applied to provide protection of the farms against pests and diseases. Other vegetative measure applied by farmers in the study countries were protection of natural tree vegetation/farmer-managed natural regeneration, putting up fire breaks, tree nurseries development, retaining more vegetation cover, agroforestry and afforestation. These practices were applied by farmers in order to return lost forests as well as protect their land from erosion. Republic of Uganda (2010) has indicated that application of vegetative measures on farms can significantly facilitate SLM.

### **2.2.3 Structural measures**

The study revealed that the most common cited structural measures used in farms in Kenya include earth bunds (33%) and stone and earth walls with planted vegetation (19%). Terraces were used by farmers in Tanzania (72%) and Kenya (27%). The most common mentioned structural measures used in farms in Mozambique were retention/infiltration ditches (44%), barriers (30%), earth bunds (16%) and palisades (1.6%). Earth bunds (20%) were also used by farmers in Tanzania.

### **2.2.4 Management measures**

Figure 2.2 presents the results of land management measures applied in the study countries. Irrigation of high value vegetables for sell have become common management measure especially in Tanzania and Kenya. About 40% of respondents in Tanzania were cultivating high value vegetables on small plots throughout the year through irrigation. Out of these, water efficient irrigation system such as drip irrigation (Plate 2.3) was practiced by 41.7% of respondents to avoid water loss and increase crop productivity. About 31% of respondents were irrigating their crops manually by using buckets. Of the participating respondents, about 31% have indicated to irrigate their crops by water pumps. Irrigation of high value crops for cash have greatly helped to reduce the need for further conversion of natural forests and grasslands. Moreover, they enabled farmers to become more resilient to climate change by increasing food production, conserving soil and water, enhancing food security, and restoring productive natural resources (Republic of Uganda, 2010; Schwilch *et al.*, 2014; Republic of Kenya, 2016).



*Plate 3: Drip irrigation of high value crops in Zanzibar (Photo credit by Kitula, R.A. 2021)*

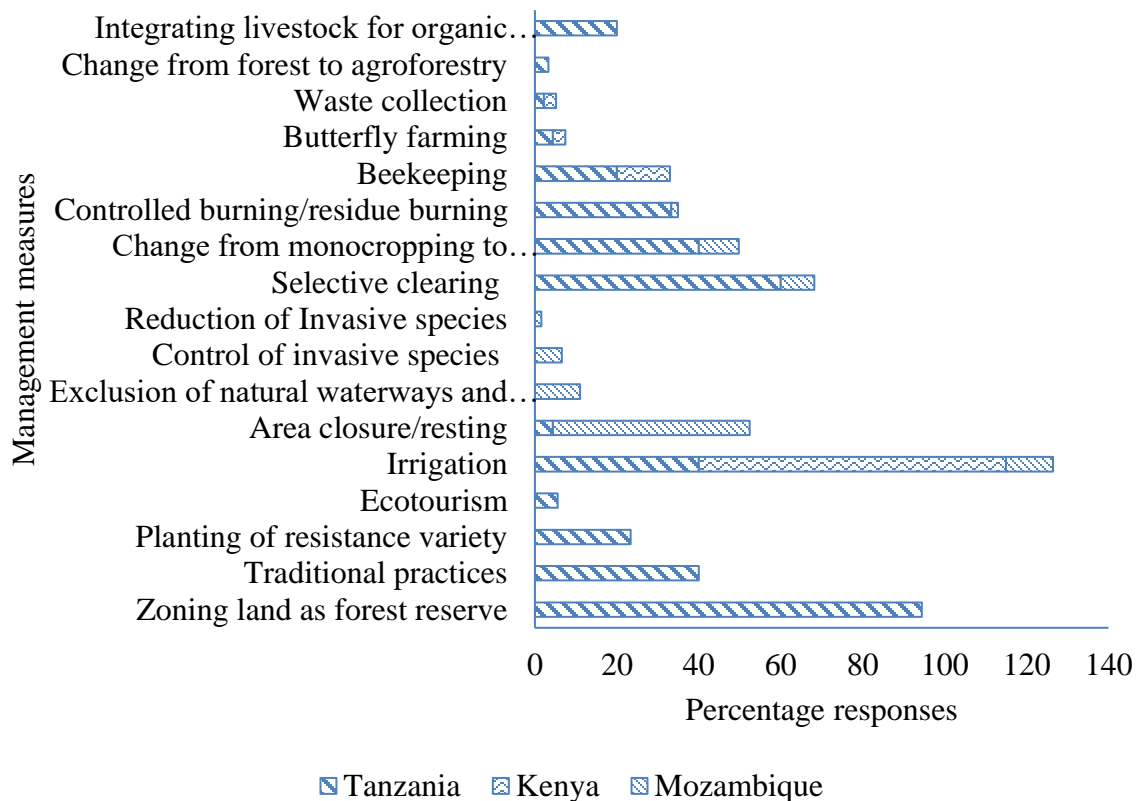


Figure 2: Management measure applied by farmers in the Eastern African countries

There existed many traditional practices of land management in Tanzania (Fig. 2.2). They were mostly based on cultural norms and beliefs. These practices included beliefs in sacredness of trees like big baobab tree, beliefs in sacred forests, respect of cultural forests, protection of plants at the burial sites, selective harvesting, and collection of deadwood for firewood. Water catchment areas such as caves and forests have also been kept protected by adhering to taboos regarding to the use of water. Area closure or resting, control of invasive species and exclusion of natural waterways and hazardous areas were the most common management measure applied on farms in Mozambique; while planting of resistance variety, integrating livestock for organic fertilization, change land use type from forest to agroforestry, and reduction of invasive species were the other management measures applied in Tanzania.

The study by Republic of Uganda, 2010) showed that SLM practices such as agroforestry can increase supplies fodder and fuel, which in turn helps to reduce pressure on natural forests. Beekeeping, butterfly farming and waste collection were the other management measures applied in Tanzania and Kenya. Selective harvesting, controlled burning/residue burning and changing land use practice from monocropping to rotational cropping were also applied on farms in Tanzania and Mozambique.

Other management measure that was identified by respondents in Tanzania included ecotourism in the mangrove forest. Part of mangrove forest in Jozani-Chwaka Bay National Park (JCBNP) and Biosphere Reserve in Zanzibar has been conserved for ecotourism activities (Plate 2.4).





Ecotourism has been developed in this area because there is interesting natural scenery to attract tourists and there are many kinds of birds and endemic animals; as well as the location is easily accessible by road. Zoning land as forest reserve was the most common cited management measures applied in mangrove forest in Tanzania. All mangrove forests in Tanzania are forest reserves owned by the state. Some areas of mangroves in Kenya are managed as forest reserves.

*Plate 4: Mangrove boardwalk at JCBNP and Biosphere Reserve, Zanzibar (Photo credit by Kitula R.A. 2021)*

### 2.3 Existing land management approaches applied in mangrove forests

The term approach in this study was used to describe the ways and means used to promote and implement a SLM technology and to support it in achieving better and more widespread SLM (Dale, 2010; WOCAT, 2016). A list of land management approaches that were identified during the survey are presented in Table 2.1. The results showed that own innovations, contact farmers, and field visits were the most common cited land management approaches applied in all study countries to spread new agricultural innovations for improved productivity. Own innovations were basically the local methodologies used by farmers to achieve widespread land management practices. Under contact farmers approach, all farmers and extension officer were required to register their particulars such as full names and mobile numbers in the village register for easy communication purpose. Field visits is a routine work of extension officers, and it involves visit to farms, listen to farmers' challenges and provide solutions. On the other hand, farmer field school (FFS) was the most common approach used to spread agricultural technologies in Tanga (Tanzania) and Zanzibar. In FFS approach, farmers were able to learn land management practices that were associated with land preparation, use of manure and fertilizers, organic farming, promotion of high value crops, soil fertility, and erosion control. The learning under FFS followed the seasonal cycles (from land preparation to harvesting) of the land management practice being investigated and they were based on comparison of different treatments. Other approach used in Tanga to spread agricultural innovations was setting up demonstration plots in the selected villages. Meetings with farmers was the most cited land management approach used to implement agricultural technologies in Mtwara region (Tanzania). Participatory forest management (PFM) approach was the most way used to promote forest protection, including mangroves in Tanzania.

*Table 1: A list of land management approaches applied in mangrove forest, Eastern Africa*

SLM approaches	Tanzania			Mozambique		Kenya	
	Mtwara	Tanga	Zanzibar	Maputo	Quelimane	Kwale	Mombasa
- Own innovations	AP	AP	AP	AP	AP	AP	AP
- Contact farmers	AP	AP	AP	AP	AP	AP	AP
- Field visits	AP	AP	AP	AP	AP	AP	AP

SLM approaches	Tanzania			Mozambique		Kenya	
	Mtwara	Tanga	Zanzibar	Maputo	Quelimane	Kwale	Mombasa
- FFS	NA	AP	AP	NA	NA	NA	NA
- PFM	AP	AP	AP	NA	NA	NA	NA
- Meetings	AP	AP	AP	NA	NA	NA	NA
- Demonstration plots	NA	AP	NA	NA	NA	NA	NA

Key: AP = Applied; NA = Not applied

Source: Own survey data, 2021

## 2.4 Origin of SLM approaches and practices applied in mangrove forests

The majority (72%) of respondents in Kenya said that the origin of land management approaches and practices was through their own innovations or family traditions. Only 5% cited government departments/institutions, while 2% cited projects as the source of the approach or practice. Likewise, most (61%) of the approaches and practices identified in Mozambique were developed through own innovations, while 26% were introduced through projects like Coastal City Adaptation Project (CCAP) financed by non-governmental organizations (NGOs). About 13% of land management approaches and practices were introduced by government departments/institutions. Similarly, in Tanzania, most of land management practices were originated through farmers own innovations while the origin of land management approaches such as FFS, contact farmers, meetings, field visits and PFM were the government departments/institutions. For example, the Agricultural Services Support Programme (ASSP), the Agriculture Sector Development Programme-Livestock (ASDP-L), Agriculture Sector Development Programme - Phase 1 (ASDP 1) and Ingredients Project (*Viungo* project) were the government programmes developed to promote FFS as a more effective approach to extend practical based knowledge to farmers. Likewise, PFM approach had been largely supported by donor funding channeled through the government to promote forest protection in Tanzania. Mangrove Management Project (MMP) was the government project initiated in the mainland Tanzania to promote participatory approaches in the management of mangrove forest. Key informant interviews revealed that ASDP-L and ASSP were implemented from 2007 to 2017 in Zanzibar while Mainland Tanzania from 2007 to 2015. Mangrove Management Project (MMP) was implemented from 1994 to 2006.

## 2.5 Policies guiding land management approaches and practices in different forest type areas in Eastern Africa

The Eastern Africa countries have a range of policies which are relevant in the promotion of SLM approaches and practices. Also, the countries have comprehensive plans, institutions, legal measures and strategies guiding SLM approaches and practices. Reviewing the major legal instruments based on their relevance, effectiveness, efficiency, durability, sustainability, and gender in addressing SLM is important for understanding their capability to enhance adoption and scaling up SLM in forest landscapes.

### Burundi

The study done by Koyo (2004) revealed that management of forests and trees in Burundi are under the Ministry of Water, Environment, Territory Management and Urbanism. The government governs all forests, regardless of ownership, and sets various restrictions on forest use. However, the country has limited institutional capacity to manage its forests. Forests in Burundi are thus

subjected to unrestricted illegal harvesting, clearing for agriculture, and collection of fuelwood. Burundi is the only country in the Eastern Africa where women have no inheritance rights (Collins *et al.*, 2013) and illiterate poor women operate at the margins of the agricultural value chain representing the weakest voice in the production link (Pedro, 2011).

National Agricultural Investment Plan (NAIP) for 2012-2017 was developed in Burundi to strengthen the agricultural sector of the country to increase food production and generate revenues. The plan is comprised of four main goals: provision of food security for all, boosting household incomes, increasing revenues, and producing more raw materials for industrial sector while creating jobs in agricultural processing and services. The plan is focused on promoting sustainable agriculture practices such as agroforestry and the production of animal fodder crops that can help address declining soil fertility and land degradation (Koyo, 2004). The analysis by Curtis (2014) revealed that NAIP lacks explicit focus on a labour saving technologies to help smallholder farmers, especially women farmers, prioritization of staple crops over cash crops as they constitute a backbone of countries' food security; in addition to national support to women farmers through priority investment and policy reforms in key services such as extension and training, rural credit programs, and agricultural research, as well as improved access to land ownership.

Ministry of Agriculture and Livestock is the principal ministry responsible for Burundi's agriculture. Agriculture provides basic food, fiber and shelter, as well as serves as the backbone to Burundi's economy. Despite being the most important sector of the economy, agriculture continues to rely on subsistence farming, which heavily relies on women as the primary land users. The agricultural services provided by the Ministry include extension services, technological innovations for food processing and agricultural research. The government extension service has a mandate to serve the whole country. However, Government of Burundi has inadequate and under-resourced human and institutional capacity to serve farmers, especially subsistence-based. There is a strong development argument to focus investments in agriculture on women-farmers. Yet, in Burundi women do not have a right to own or inherit land nor do they have equal access to productive resources, extension information, new technologies, and credit; these combine to limit their potential to pull Burundi from persistent poverty and hunger.

### **Eritrea**

The Republic of Eritrea has set the Land Degradation Neutrality Target Setting Programme (LDN TSP) as part of the continued efforts of the Government of Eritrea for SLM. The identified LDN leverage opportunities have been based on the current realities in Eritrea and they include: improve productivity of cropland; improve soil organic carbon (SOC) in cropland and grasslands; rehabilitate degraded and abandoned land for crop production; halt the conversion of forests and wetlands to other land cover classes; restore indigenous forest land; increase forest cover; reduce the rate of soil erosion; and increase SOC in cropland through SLM practices. The Government recognizes that it is important to build upon and consolidate the past co-operation with development partners to create an enabling environment for increased financing and investments into SLM/LDN. The programme is using social mobilization as an innovative approach to address developmental challenges through SLM practices. Various sectoral policies such as agriculture, environment, climate change, infrastructure development, land tenure and land use and land cover, and mining promulgated by the Eritrean Government are in coherence with the objectives of SLM and the principles of LDN. There is coherence of development partners' cooperation frameworks because a number of Investment Programmes and Initiatives directly related to SLM/LDN are supported by different international development partners. The ministries

responsible for Land, Water Resources and Environment, and the Ministry of Agriculture provide political support and influence other ministries to support LDN initiatives. At national policy and planning levels, the line ministries that mainly deal with national planning, financing, investment issues, and international relations such as Ministry of Finance, and National Development are responsible in ensuring that Sustainable Development Goals (SDGs) and LDN targets are mainstreamed in the national development planning framework and sectoral policies and programmes. In order to ensure sustainability of LDN, transformative projects and programmes and opportunities have been identified. These include short term and potential long-term transformational projects that are environmentally, socially and economically sustainable. These new transformational projects are based on previous experience and lessons learned which can help inform design and implementation of interventions. The most important concepts to be addressed through long-term action to achieve LDN include land classification/land distribution, renewable energy, promotion of dry land products through sustainable land management and enhanced market access and trade, role of private sector, community empowerment and capacity building, and financial sustainability. The framework recognizes that there is no way LDN could be achieved without ensuring healthy lives and inclusive and equitable quality education and promoting lifelong learning opportunities for all, by also achieving gender equality and empowering of all women and girls.

### **Ethiopia**

The Environmental Policy of Ethiopia (EPE) of 1997 aims to maintain the health and quality of life of all Ethiopians and to promote sustainable social and economic development. It seeks to do this through the sound management and use of resources and the environment as a whole, in accordance with the principles of sustainable development. It considers the rights and obligations of citizens, organisations, and government to safeguard the environment. The EPE is a comprehensive document that defines policies for ten separate environmental sectors, covering soil and agriculture, forest and woodland, biodiversity, water, energy, minerals, human settlement, industrial waste, climate change and cultural heritage. It also includes policies for ten cross-sectoral issues that need to be considered for effective implementation: population, community participation, land tenure, land use, social and gender issues, environmental economics, information systems, research, impact assessment, and education. It guides the sustainable development, use and management of the natural resources and the environment. It provides that species and their variants have the right to continue existing, and are, or may be, useful now and/or for generations to come. It proclaims that the wealth of crop and domestic animal as well as micro-organism and wild plant and animal germplasm is an invaluable and inalienable asset that shall be cared for.

The Ethiopian Strategic Investment Framework for SLM (ESIF-SLM) was developed to serve as an umbrella framework for all land management on the basis of all actors and partners in land management. The goal of the framework is to align and harmonize efforts, approaches and technologies on land management. This strategy was formulated with the goal of serving as a national level strategic planning framework to guide the prioritisation, planning, and implementation, by both the public and private sector, of current and future investments in SLM with the aim of addressing the interlinked problems of poverty, vulnerability, land degradation, and climate change impacts at the rural community level. It aims to improve the livelihoods and economic well-being of the country's farmers, herders and forest resource users by scaling up SLM practices with proven potential to restore, sustain, and enhance the productivity of Ethiopia's land resources. It also aims to rebuild Ethiopia's natural capital assets by overcoming the causes and mitigating the negative impacts of land degradation on the structure and functional integrity

of the country's ecosystem resources. The framework aims to ensure that there is increased tenure security among male and female farmers issued with land certificates.

### **Kenya**

The Kenya Strategic Investment Framework on SLM (KSIF-SLM) 2017-2027 provides a strategy for enhancing investments, interventions and actions for the management of the country's natural capital in a sustainable manner. The goal of KSIF-SLM is to provide a national level strategic planning framework for guiding the intersectoral coordination, planning, prioritization, and implementation of integrated approaches; as well as stimulating cost effective investments and budgetary support for SLM. This strategy will contribute to the attainment of Kenya Vision 2030 targets on economic development, food security, and sustainable livelihoods. The development objective of the KSIF-SLM is to restore, sustain, enhance, and protect the productivity of the Kenya's natural capital through improved investments, sector coordination, and scaling up of SLM interventions. Environmental objective of the KSIF-SLM is to rebuild Kenya's natural capital assets by overcoming the causes and mitigating the negative impacts of land degradation, while also building long-term ecosystem sustainability, facilitating climate change resilience and environmental health. The KSIF Guiding Principles are increased land productivity; improved livelihoods; ecosystem sustainability; economic viability; financing; socio-economic relevance; social and cultural sustainability; institutional sustainability; multi-sectoral approach; participation and inclusiveness; sensitivity to gender, minorities and vulnerable groups; knowledge management; and international responsiveness.

Implementation of SLM interventions will be mainly undertaken at county level, as agriculture and environment are devolved functions. It is therefore vital that county governments be facilitated to build structures for implementing SLM from policy to farm level interventions. Just as in the national government, SLM issues at county level in many cases fall across more than one department. In this regard, there will be need to create forums for inter departmental consultation and coordination for SLM planning, investments, and actions. There has been considerable reorganization between the national and county governments on respective roles, responsibilities, resource flows, and utilization. An inter-governmental mechanism will provide a structured framework for consultation and coordination of SLM issues between the two levels of government. This will ensure that SLM issues are well taken care of. Many counties have steering committees for agriculture, environment, or other issues related to SLM. The mandates of these committees will be expanded to include the SLM agenda. Where such committees do not exist, new County SLM Committees will be created to perform requisite functions in the implementation of the KSIF.

The overall goal of the Kenya Forest Policy of 2014 is sustainable development, management, utilization, and conservation of forest resources and equitable sharing of accrued benefits for the present and future generations of the Kenyan. The specific objectives of the Kenya Forest Policy of 2014 are to:

- i. Increase and maintain tree and forest cover of at least ten percent of the land area of Kenya.
- ii. Establish an enabling legislative and institutional framework for development of the forest sector.
- iii. Support forestry research, education, training, information generation and dissemination, and technology transfer for sustainable development.
- iv. Promote public, private, and community participation and partnership in forest sector development.
- v. Promote investment in commercial tree growing, forest industry, and trade.

- vi. Enhance management of forest resources for conservation of soil, water biodiversity, and environmental stability.

The Kenya Forest Policy of 2014 emphasizes implementation of participatory approaches in forest conservation and management to ensure that the relevant government agencies, county governments, private sector, civil society and communities are involved in planning, implementation and decision-making processes. The Forest Policy provides a framework for improved forest governance, resource allocation, partnerships and collaboration with the state and non-state actors to enable the sector to contribute to meeting the country's growth and poverty alleviation goals within a sustainable environment. The national and county governments have to play their part in providing enabling environment, effective extension service, forestry research, and allocation of funds to the sector.

The National Environment Policy of 2013 recognizes that human activities including unsustainable land use practices, poor soil and water management practices, deforestation, overgrazing, and pollution are contributing to degradation of the Kenya's scarce natural resources such as land, fresh and marine waters, and biodiversity; thereby threatening the livelihoods of many people in the country. This Policy provides a framework for an integrated approach to planning and sustainable management of Kenya's environment and natural resources. It advocates for strengthening the legal and institutional framework for good governance, effective coordination and management of the environment and natural resources. The Policy will ensure sustainable management of the environment and natural resources, such as unique terrestrial and aquatic ecosystems for national economic growth and improved livelihoods. The National Environment Policy, 2013 recognizes that gender plays an important role in the management of the environment and different social groups and demographics are impacted differently by environmental challenges. They also play unique roles in managing the environment given their unique capabilities, experiences, and knowledge relating to the environment. Access to and ownership of natural resources should be enhanced for all gender, people living with disabilities, marginalized, and minority groups.

The National Land Use Policy of 2016 represents an important resource for the economic life of a majority of people in Kenya. The overall goal of this policy is to provide legal, administrative, institutional, and technological framework for optimal utilization and productivity of land related resources in a sustainable and desirable manner at national, county, and community levels. The policy is premised on the philosophy of economic productivity, social responsibility, environmental sustainability, and cultural conservation. Key principles informing it include efficiency, access to land use information, equity, elimination of discrimination, and public benefit sharing. To ensure efficient, productive and sustainable use of land, key measures shall be taken by the government (both national and county) and all land users. These include: sound land use practices, conservation, enhancement of the quality of land and land-based resources, and the proper management of demographic and health parameters. The Government shall institute mechanisms designed to induce land owners to put their land to productive use and encourage the application of efficient technology for the intensification of land use. Urban land use will be improved through measures such as establishing transparent, accountable, sustainable, comprehensive, and participatory governance structures and decision-making processes.

### **Mozambique**

Mozambique has a law (Forest and Wildlife Law N° 11/99 of 7<sup>th</sup> July 1999, and Decree N° 12/2002 of 6<sup>th</sup> June 2002) that establishes the basic principles and rules on the protection, conservation,

and sustainable use of forest resources and fauna in the framework of an integrated management, for the economic and social development of the country. The law establishes the principle of balance which states that policies for economic development, preservation and conservation of biodiversity, should involve local communities, the private sector, and civil society in general, with the aim of achieving sustainable use for present, without compromising the future generation. However, the Forest and Wildlife Law is not specific on the management of mangrove forests.

To overcome the absence of specific legal instrument for the mangrove forest management, the government has started a commitment to protect mangrove forests by developing a Mangrove Management Strategy (MMS) for the years 2020-2024. With this instrument, Mozambique aims at contributing to biodiversity maintenance of the ecological functions of the mangrove ecosystem and reducing the effects of global warming. The major goal of the MMS is to establish a participatory, satisfactory, and efficient system of mangrove ecosystem management under the following guidance. Each of the following pillars will guide the implementation of the MMS.

- 1) Management, protection, and sustainable use of mangrove ecosystem  
The aims are to: Ensure the management and use of the mangrove in a participatory manner; Promote the ecological protection, conservation, and restoration of the mangrove; Diversify the means of subsistence of communities dependent on the mangrove ecosystem and its resources, through the promotion and dissemination of technologies that promote an effective management of this ecosystem; and Identify and implement sustainable financing mechanisms for mangrove conservation.
- 2) Increased surveillance and create specific legislations for mangroves  
The objectives include: Review existing legislation and create specific legislation on the mangrove; Disseminate specific legislation on mangrove management and conservation; and Promote monitoring of the mangrove ecosystem and associated resources.
- 3) Capacity building and institutional framework  
The aims are to: Strengthen the capacity of students to intervene in the mangrove ecosystem; Promote and realize public awareness of the mangrove.
- 4) Public awareness and environmental education  
The objectives for this pillar are: Develop students' interest in the mangrove ecosystem; and Promote and carry out public awareness of the mangrove.
- 5) Research and dissemination of research findings and indigenous knowledge  
The aims are to: Develop applied research to reinforce knowledge about the mangrove and support decision-making; and Create and disseminate a mangrove database.

The implementation of the MMS is under the coordination of Ministry of the Sea, Inland Waters and Fisheries (MIMAIP). MIMAIP will designate an internal body that will have the function of coordinating, harmonizing, monitoring, and evaluating the implementation of the strategy. The coordination will also take place at provincial, district, and municipality levels. However, the composition of the bodies must be adjusted to reality of the specific location and will be required to incorporate, among others, NGOs, existing community-based associations, and private companies with an interest in the mangrove.

## **Somalia**

The Somalia National Adaptation Programme of Action on Climate Change (NAPA) focuses on three programme areas namely SLM, integrated water resource management, and disaster management. The strategy recognizes the importance of combining SLM practices with integrated water resources management concepts and interventions, proposing efforts towards land degradation neutrality that consider the management of land as it relates to access to and use of overlapping resource units. The NAPA priorities are aligned with the UN Convention to Combat Desertification (UNCCD) Ten-Year Strategy and clustered into three programme areas: integrated



land and water management; access and rights to communal land and; zoning and urban land use. This strategy will contribute to the attainment of Sustainable Development Goals number 15 (*countries to protect, restore, and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss*) and number 17 (*environment, social change, and economic development*). Special consideration has been made to incorporate the goals into the Somalia NAPA to contribute to achieving land degradation neutrality and also to facilitate future linkages in planning and programming. The Programme recognizes that women and children in rural areas are some of the most vulnerable groups in Somalia due to the adverse impacts of desertification, land degradation, and drought. Sexual division of labour, unequal access to both material and non-material resources, and women's diminished participation in decision making in both political and private domains further contribute to the vulnerability of women. In rural Somalia, women usually undertake many household tasks, including collection of firewood and water, and preparation of food for the family. These resources get scarce in degraded ecosystems and put more of a burden on women and girls as they attempt to fulfil their duties. Mainstreaming gender issues in the NAPA is essential and should lead to the recognition that women have a significant role to play in environmental decision-making processes.

### **Tanzania**

The National Environment Policy of 1997 defines the environmental policy framework which is relevant to SLM. The Policy has identified six major problems: land degradation; lack of accessible, good quality water for both urban and rural inhabitants; environmental pollution; loss of wildlife habitats and biodiversity; deterioration of aquatic systems; and deforestation. The Policy empowers communities to participate in activities to avoid the degradation of life supporting land, water, vegetation, and air. It is understood that the environmental problems are dispersed throughout the country and continue to have adverse impact on the quality of human life and health. The Policy recognizes the necessity to exercise a bottom-up approach in environmental problem identification, project planning, implementation and monitoring. This is due to a fact that interventions which are likely to have positive impacts are those which enjoy the greatest support from grassroots. It is also recognized that ideal interventions are those that are based on the people's own initiatives, and for which solutions are geared towards felt needs, thereby diminishing the gap between theory and practice. The Policy emphasizes that the fundamental prerequisites for achievement of sustainable development is broad public participation in decision making including the participation of individuals, groups, and organizations in environmental impact assessment issues and in decisions, particularly those which potentially affect the communities in which they live and work. Participation of communities in forest management programme encourages communities to set up forest reserves from the general lands for economic and conservation activities. These initiatives provide an excellent opportunity for ownership and sustainable management of land resources as well as increasing land productivity.

The Policy also clarifies the role and responsibilities of districts, wards, and villages in the management and conservation of natural resources and the environment. A National Environmental Trust Fund was established to support the implementation of activities related to combating land degradation (including deforestation) and poverty. The main functions of the fund include, among others, facilitation of environmental research, fostering capacity building, provision of scholarships, and promoting and assisting community based environmental management programmes. Activities under this fund also relate to the rehabilitation of degraded lands, and sustainable land and forest management. The policy recognizes that women are the natural resource managers in the society. Their knowledge, experience and traditional skills in the management of resources and households should be tapped for increased environmental action.



The role of women in environmentally related activities will be incorporated and promoted with a view to achieving increased women's involvement and integration in all environmental management areas.

The National Forestry Policy (1998) aims to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of her natural resources. The Policy calls for the involvement of local level institutions such as district councils, wards, villages, and individuals where new forms of partnership with the central government are being promoted for improved conservation and income generation. Income generating activities such as beekeeping are being introduced to help improve the incomes of communities in line with the Tanzania overall development goals. A programme of Participatory Forest Management has been introduced and operationalized through the Joint Forest Management (JFM) and Community Based Forest Management (CBFM) processes across the country. Since forests play an important role in catchment management, especially with respect to amelioration of the flow of water, PFM will be used as a vehicle for the re-establishment of the integrity of catchment forests as an input into SLM. Under JFM, agreements between community groups and the Government have been developed with a view to promoting the participation of communities in the management and utilization of forest resources. The CBFM programme encourages communities to set up forest reserves from the general lands for economic and conservation activities. These initiatives provide an excellent opportunity for ownership and sustainable management of land resources as well as increasing land productivity.

## **3.0 SUSTAINABILITY OF PROMISING LAND MANAGEMENT APPROACHES AND PRACTICES IDENTIFIED UNDER SECTION 2.0 ABOVE**

### **3.1 Indicators for measuring sustainability of promising SLM approaches and practices**

Sustainability is a concept, making its evaluation not straight forward. Therefore, appropriate indicators must be chosen to determine sustainability of promising SLM approaches and practices. Indicators can be qualitative or quantitative measures against some aspects of performance of SLM approaches and practices to be assessed. Ideally indicators should be comparable across time and space within one evaluatory exercise. To assess change over time requires that one can determine whether current measurements differ from those previously made. In this study, sustainability of promising SLM approaches and practices were measured by using nine indicators developed by Liniger *et al.* (2011). These are effectiveness, efficiency, relevance, ethical soundness, community involvement, partnership and collaboration, political commitment, sustainability, and replication and adoption.

- i. Effectiveness – this is evident when the SLM approach/practice being used has worked to attain measurable results
- ii. Efficiency – results of using a SLM approach/practice achieved in a reasonable time and with available resources
- iii. Relevance - refers to the way the SLM approach/practice being used has addressed issues of interests

- iv. Ethical soundness describes the way the SLM approach/practice being used has respected the local norms, traditions, and rules of ethics; and has taken into consideration the local knowledge and local practices
- v. Community involvement describes level of involvement and participation of local communities where the SLM approach/practice has taken place, and encouragement of local ownership
- vi. Partnership and collaboration mean the approach/practice being used has been promoted among all stakeholders
- vii. Political commitment indicates whether the approach/practice being used has received support from the relevant national or local authorities
- viii. Sustainability means the approach/practice being used has long term impact
- ix. Replication and adoption refer to extent of up-scaling of the approach/practice.

### 3.2 Sustainability of promising land management practices

The identified land management practices under section 3.1 were grouped into five areas: (i) zoning land as forest reserves, (ii) planting trees, (iii) ecotourism, (iv) traditional practices and (v) agricultural practices. The grouping system was based on commonality of the practices.

#### 3.2.1 Sustainability of zoning land as forest reserves

The results on sustainability level of zoning land into forest reserve are summarized in Fig. 3.1. Respondents felt that the idea of zoning mangroves as forest reserve was highly effective, efficient and relevant. Key informant interviews revealed that this practice was introduced in order to conserve the remaining mangrove forests (i) that were previously degraded due to increased anthropogenic activities, (ii) that have high ecological value and, (iii) to improve livelihoods of coastal communities. Focus group discussions revealed that the zoning land as forest reserves has contributed to the increased mangrove forest protection which in turn improved vegetation cover in the mangrove forest reserves. Also, the move was able to solve the problems associated with (i) mangrove forest degradation and deforestation, (ii) conflicts between communities and wildlife (in Zanzibar), and (iii) improve livelihood of adjacent communities. Key informant interviews revealed that communities adjacent to the mangrove forest reserve are encouraged to establish woodlots, use improved cooking stoves, and adopt best agricultural practices in order to improve household income and reduce pressure in the mangrove resources.

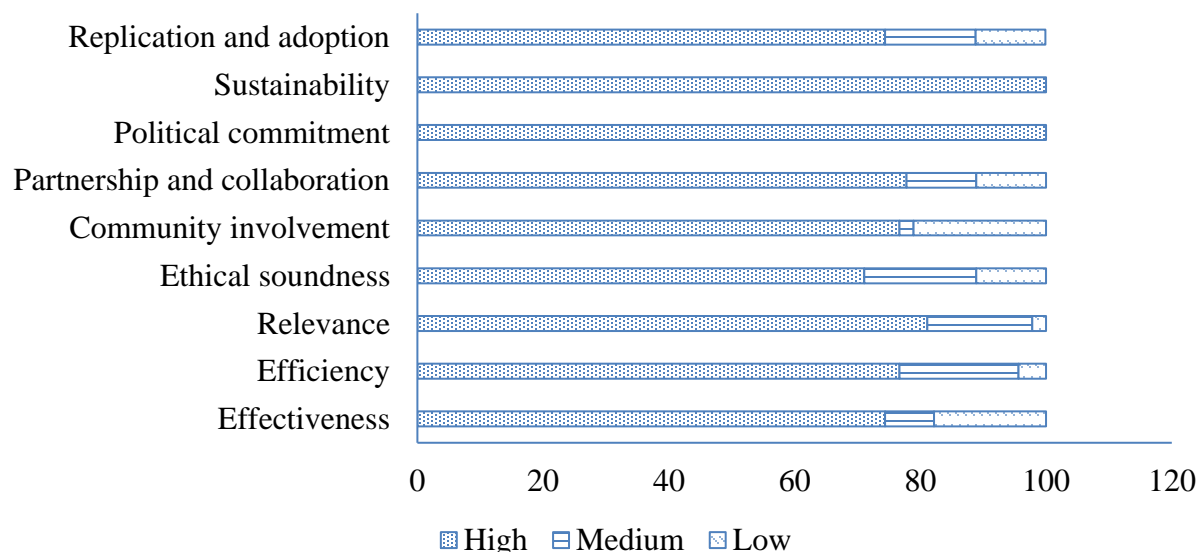


Figure 3: Sustainability level of zoning land as forest reserves in Tanzania

Source: Own survey data, 2021

The majority of respondents felt that creating mangrove forest reserves adhered to the local norms, traditions, and rules of ethics; and took into consideration of the local knowledge and local practices. Discussions with conservation committees in Zanzibar revealed that local communities were involved in surveying and demarcating land for reserve. There was high collaboration between local communities and forest managers in patrol, environmental conservation awareness raising, and settling disputes arising from illegal activities in the mangrove forest. Political commitment for creating mangrove forest reserves was found to be high in Tanzania as the move received support from the relevant authorities during its implementation. Sustainability level of this practice was rated high because it is a long-term programme. This practice has been promoted in all mangrove forests in Tanzania (Fig. 4.1) (URT, 1991) and some parts of mangroves in Kenya.

### 3.2.2 Sustainability of tree planting

Respondents' perceptions on sustainability of tree planting activities are presented in Fig. 3.2. The study revealed that trees growing to improve mangrove vegetation cover and livelihoods was highly effective in Tanzania. Various tree species have been and are being grown or left on farms to provide shade, fruits, firewood, poles, medicines, and timber. This practice has stimulated the establishment of tree nurseries by individuals and government for planting in woodlots or around homestead. Woodlots were established in Tanzania as the means of raising trees for providing firewood and poles for both sale and household use in order to protect mangrove forests. More than 70% of respondents perceived that planting trees was highly efficient since communities were able to improve household income from sale of poles and firewood. Also, planting of fast-growing trees was deliberately promoted by the government and non-governmental organizations in order to reduce harvesting pressure that were previously exerted into mangrove forests. Tree planting was found to be highly relevant as the practice was introduced to contribute to biodiversity conservation by protecting standing forests and assisting in natural regeneration of mangrove forests. Level of community involvement in tree planting activities was rather high. Planting of mangrove trees in the degraded and deforested areas was mostly done by conservation committee members and few other community members. Planting of non-mangrove trees were done by the majority of community members for various purposes. There was high collaboration between local communities, government, and non-governmental organizations regarding tree planting activities in Tanzania. According to WOCAT (2016) a successful SLM effort is characterised by being people centred, responsive, and participatory; as well as it relies on stakeholder support and integration of stakeholder knowledge (Lange *et al.*, 2015). Political commitment on tree planting activities was found to be low. Sustainability of tree planting was high. Replication and adoption of tree planting was high. Results from participant observations revealed that tree planting activities for various reasons have been promoted throughout the study sites.

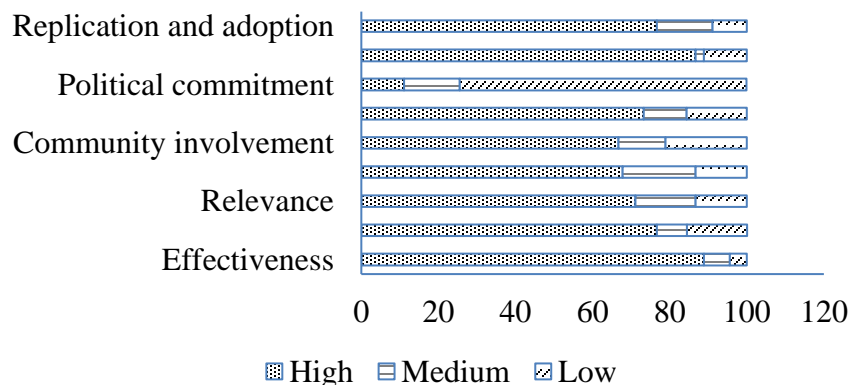


Figure 4: Sustainability of trees planting activities in Tanzania

Source: Own survey data, 2021

### 3.2.3 Sustainability of ecotourism

Respondents' perceptions on sustainability level of

ecotourism project activities are presented in Fig. 3.3. Ecotourism activities in mangrove forests were evaluated in Zanzibar. More than 76% of respondents had the feeling that ecotourism activities in the mangrove forests were effective, 90% efficient, and 80% relevant. This could mean that ecotourism contribution to the conservation of mangrove forest reserve was significant. The undertaking of ecotourism activities in the mangrove forests adhered to the local norms, traditions, and rules of ethics; and took into consideration of the local knowledge and local practices, indicating that ecotourism ethical soundness was rather high. The ecotourism project was implemented by the communities themselves, indicating that local communities were involved, and they participated fully and owned the enterprise. There was high collaboration between government and local communities in running mangrove ecotourism project. The establishment and implementation of the mangrove ecotourism project were supported by the JCBNP and Biosphere Reserve Authority, indicating that political commitment was high. Replication and adoption of ecotourism activities in the mangrove forest was reported to be low. These results compare well with the findings by Lange *et al.* (2015) and WOCAT (2016) who observed that an effective SLM practice encompasses: involvement and roles of different stakeholders at all levels (policymakers, administrators, experts, technicians, and land users); inputs (labour, material, and financial); know-how (technical, scientific, and practical); and the enabling environment (socio-cultural, legal, and political).

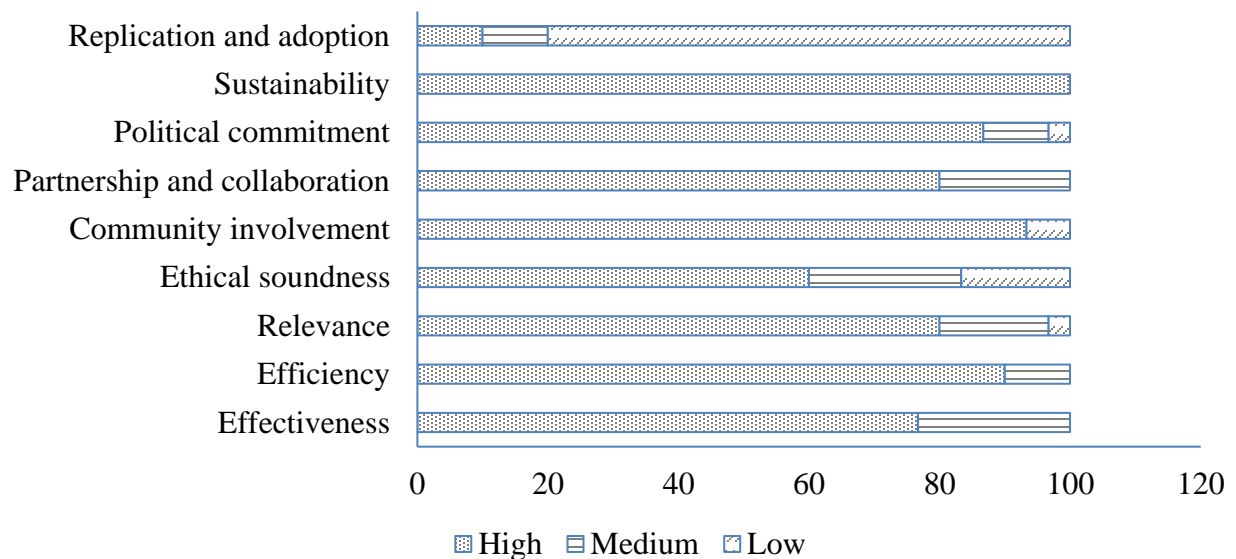


Figure 5: Sustainability level of ecotourism activities in Zanzibar, Tanzania

Source: Own survey data, 2021

### 3.2.4 Sustainability of traditional practices

Respondents' perceptions on sustainability of traditional practices are presented in Fig. 3.4. The level of effectiveness of traditional practices was perceived to be high by about 67% of respondents interviewed. Although traditional practices were not established for the protection of the forest, however, through taboos and beliefs attached to sacred mangrove forests, they indirectly help in the forest protection. There are some parts in the mangrove forests in Tanzania used for performing ritual ceremonies, and they have remained intact. This indicates that traditional practices are also contributing to the conservation of mangroves. It was reported by 90% of respondents interviewed that efficiency level of traditional practices was high. Traditional practices were found to be highly relevant. There was high level of ethical soundness associated with traditional practices. Communities are adhering to the local norms that are attached to the

traditional practices. Community engagement in the traditional practices was perceived to be low. There was low collaboration between healers and local communities in conservation of sacred sites. Political commitment was perceived to be low by 90% of respondents interviewed. Sustainability of traditional practices was high. Replication and adoption of was reported to be high.

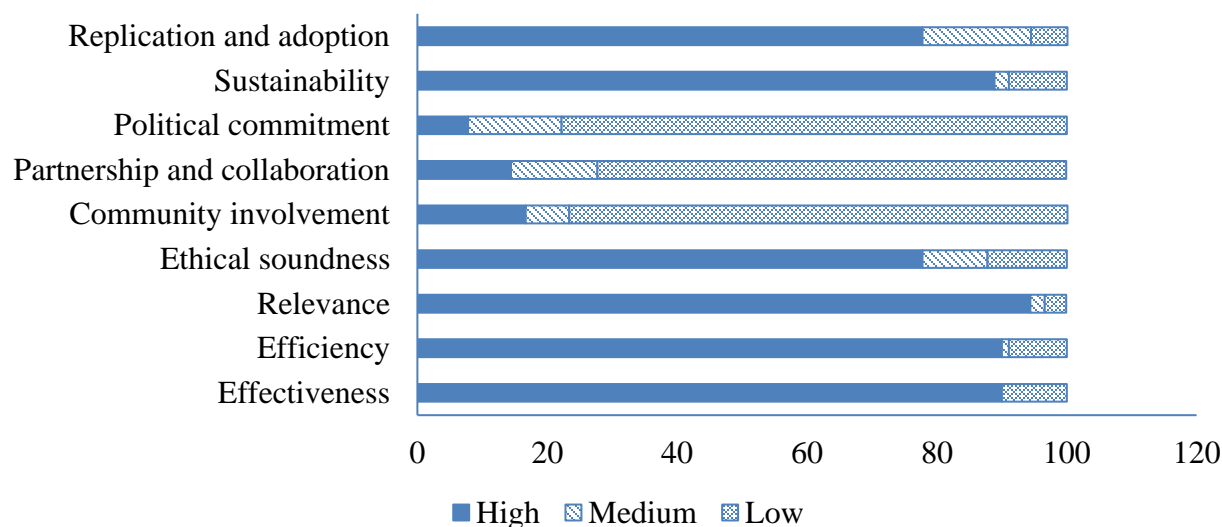


Figure 6: Sustainability level of traditional practices in Tanzania

Source: Own survey data, 2021

### 3.2.5 Sustainability of agricultural practices

The study revealed that the identified agricultural practices in Kenya and Tanzania were rather effective (Fig. 3.5 and 3.6). The most highly rated practice in Kenya being the use of earth bunds (Fig. 3.5). This could mean that the SLM practice being used works and attains measurable result. Respondents in Tanzania and Kenya felt that agricultural practices were efficient, indicating that results of using a SLM practices were achieved in a reasonable time and with available resources. The majority of respondents (Fig. 3.5 and 3.6) felt that the agricultural practices being used were able to address the main issues in the two countries. The implementation of the identified agricultural practices adhered to the local norms, traditions, and rules of ethics; and take into consideration of the local knowledge and local practices, indicating that ethical soundness was rather high. There was high level of community engagement in the implementation of the identified agricultural practices (Fig. 3.5 and 3.6). Respondents felt that partnerships and collaboration involved in promoting new agricultural practices were low (Fig. 3.5, 3.6 and Table 3.1). This could be contributed by the phasing out of the district agricultural development projects since 2015 for the Mainland Tanzania and 2017 for Zanzibar. The only extension services that have remained are those provided by local governments. Unfortunately, political commitment was ranked low by the majority of respondents (Fig. 3.5, 3.6 and Table 3.1). Respondents in Kenya and Tanzania cited the SLM practices were highly sustainable. In the area of replication and adoption, the majority of respondents felt that SLM practices were replicable and adoptable (Fig. 3.5 and 3.6).

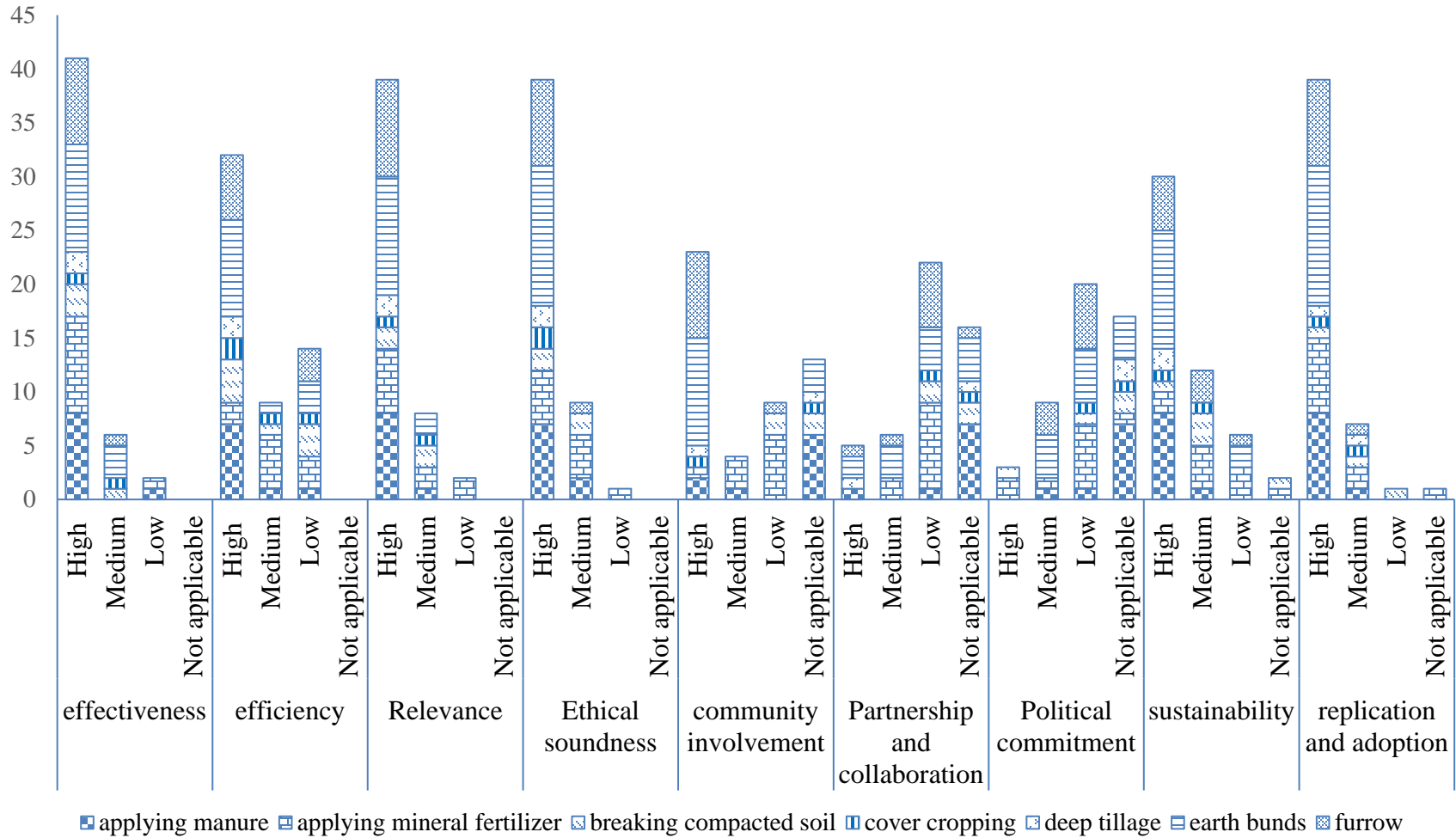


Figure 7: Sustainability of promising agricultural practices in Kenya

*Table 2: Sustainability of promising agricultural practices in Mozambique*

SLM practices	Community Involvement				Political commitment				Sustainability			
	High	Medium	Low	NA	High	Medium	Low	NA	High	Medium	Low	NA
Mixed cropping	21.3	24.6	4.9	0.0	1.6	13.1	34.4	3.3	0.0	1.6	32.8	18.0
Mulching	1.6	18.0	0.0	0.0	1.6	16.4	1.6	0.0	0.0	3.3	16.4	0.0
Green manure cropland	24.6	37.7	0.0	0.0	9.8	45.9	3.3	3.3	0.0	1.6	50.8	9.8
Rotations/fallows	3.3	18.0	1.6	0.0	1.6	14.8	3.3	3.3	0.0	1.6	18.0	3.3
Breaking compacted topsoil	23.0	37.7	3.3	0.0	13.1	42.6	3.3	4.9	0.0	3.3	32.8	27.9
Deep tillage/double digging	1.6	24.6	1.6	0.0	3.3	24.6	0.0	0.0	0.0	1.6	26.2	0.0
Protection of natural tree vegetation/farmer-managed natural regeneration	6.6	18.0	8.2	0.0	1.6	18.0	4.9	8.2	0.0	6.6	16.4	9.8
Retention/ infiltration ditches	16.4	18.0	9.8	0.0	9.8	26.2	6.6	1.6	1.6	4.9	34.4	3.3
Earth bunds	8.2	8.2	0.0	0.0	1.6	6.6	4.9	3.3	0.0	0.0	6.6	9.8
Barriers	1.6	13.1	13.1	1.6	0.0	11.5	8.2	9.8	0.0	4.9	18.0	6.6
Area closure/resting	18.0	14.8	6.6	0.0	4.9	26.2	4.9	3.3	1.6	4.9	26.2	6.6

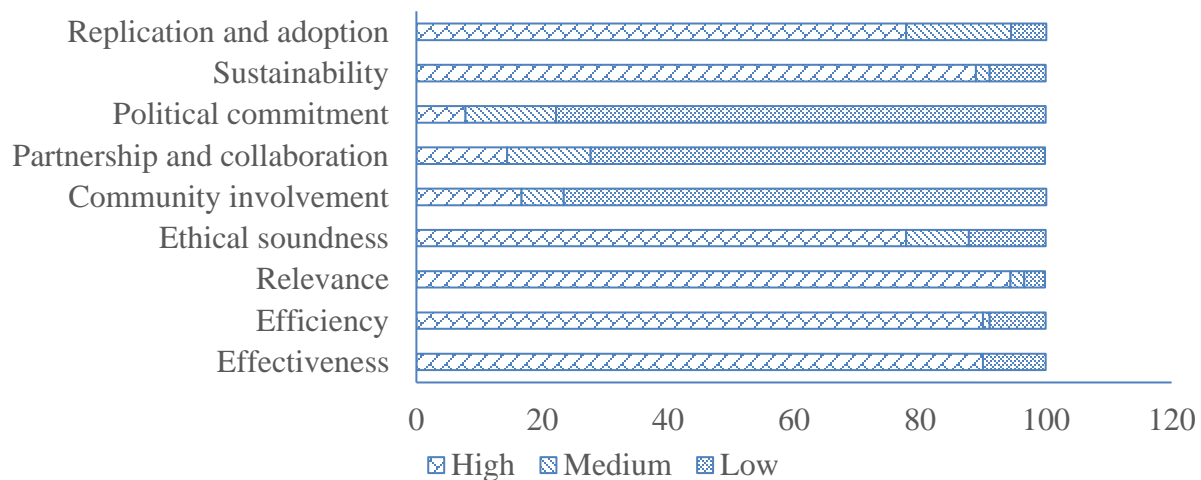


Figure 8: Sustainability level of promising agricultural practices in Tanzania

Source: Own survey data, 2021

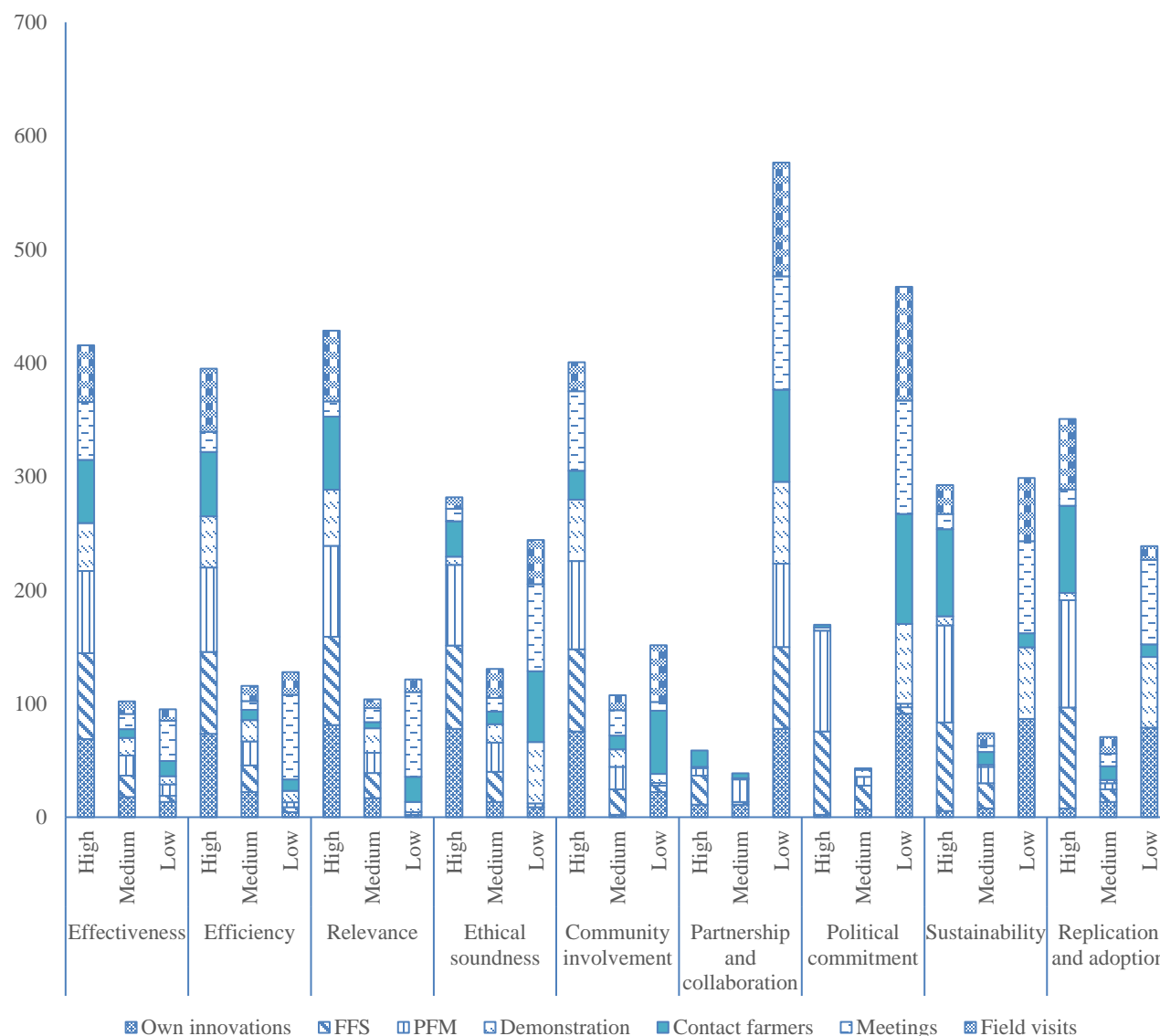
### 3.3 Sustainability of promising land management approaches in the study areas

Figure 3.7 summarizes the results on perceptions of respondents regarding sustainability level of the identified promising land management approaches. The results showed that level of effectiveness of promising land management approaches was rather high, indicating that they were working effectively in promoting agricultural technologies to attain improvement in agricultural productivity as well as to promote mangrove forest conservation and protection. Key informant interviews revealed that implementation of the identified approaches has contributed about 30% to the productivity of crops. Respondents felt that FFS was highly efficient, indicating that the approach enabled farmers to improve farm productivity in a reasonable time, and with available resources. Focus group discussions revealed that the learning of new farming technologies under FFS approach was focused on the soil characteristics of individual farms and available resources by the farmers. For example, in the coral rag areas, crops rotation and minimum tillage were highly encouraged. This situation enabled farmers to practice the skill on their farms easily and realize the productivity with available resources. This shows that the focus of FFS was to build capacity of the farmers on crop management decisions through increased knowledge and understanding of the agroecosystem. The efficiency level of PFM was found to be medium, indicating that there were some improvements in the protection of mangrove forests in the study areas. There seemed to be decreased encroachment in the mangrove forests and unregulated activities such as charcoal burning and harvesting of poles under PFM approach. Respondents perceived that some own innovations, such as beliefs and taboos, were highly efficient in improving agricultural productivity and mangrove forest vegetation cover. On the other hand, respondents felt that meetings were not efficient ways for promoting SLM practices as the meetings basically dealt with theory.

The study indicated that the promising land management approaches were highly relevant (Fig. 3.7). These results could imply that the contributions of these promising approaches in addressing the problems of poor agricultural outputs, land degradation, and deforestation in the study areas were rather significant. Key informant interviews revealed that FFS was introduced in order to help farmers increase agricultural productivity by learning and practicing new production innovations. The agricultural innovations that were promoted under FFS were found to focus on addressing the problems of soil and land degradation. On the other hand, under PFM approach there was



increased law enforcement efforts by local communities and community participation in the restoration activities. Participatory Forest Management (PFM) approach is emphasizing on planting mangroves and non-mangrove trees in order to increase mangrove vegetation cover and reduce pressure on the natural mangrove forests respectively. Own innovations approach of land management was found to be highly relevant because these approaches were contributing to the solving problems associated with land degradation and deforestation in the study areas.



*Figure 9: Perceptions of respondents on sustainability of promising land management approaches in Tanzania*

Source: Own survey data, 2021

Regarding ethical soundness, FFS, PFM, and own innovation approaches were found to be high in this aspect (Fig. 3.7), indicating that during their implemented they considered the local norms, traditions, and rules of ethics; and took into consideration local knowledge and practices. Traditionally, communities are allowed to perform traditional rituals in the sacred mangrove areas.

Also, in case of emergencies, communities are allowed to harvest mangrove poles for house construction after obtaining a permit from conservation committees.

Under FFS approach, there was a high level of community involvement and participation in learning and practicing of new agricultural innovations. Also, the approach encouraged local ownership of the new agricultural skills and productivity. This approach was focused on participatory methods of training and assisting farmers in their own locality, to adopt and adapt new technologies that could improve their farming practices. Essentially the approach considered farmers' demands as well as their participation in the learning processes. The majority of respondents indicated that involvement and participation of local communities under the own innovation approaches was high, indicating that they were adhering to the taboos associated with forest protection and land management issues.

The level of community involvement under PFM approach was rather high because communities were involved in the protection of mangrove forest resources and the approach encouraged local ownership of the mangrove forests. Communities were responsible for the protection of mangroves found under their jurisdiction. They were empowered to manage mangrove forest resources through natural resources conservation committees. These committees serve as the primary interface between the communities and the government. In the areas of partnership and collaboration, the promising land management approaches scored low (Fig. 3.7). During the time of this study it was found that there were no partnerships and collaboration through the FFS approach, especially in the mainland Tanzania. All FFS had already graduated. There was only Ingredients project (*Viungo* project) being implemented in Zanzibar using FFS approach. However, partnership and collaboration on FFS approach were high before the phasing out of the ASSP project in 2015 for mainland Tanzania and 2017 for Zanzibar. During the lifetime of ASSP project, it promoted FFS approach to all farmers and there was high contact between farmers and extension staff. Farmers who shared common interest were brought together and formed a group and practiced new agricultural innovations on their farms. Likewise, when MMP was active it promoted PFM approach among all potential stakeholders. Own innovations, field visits, meetings, and contact farmers approaches scored low in the area of partnership and collaboration.

Political commitment of FFS and PFM were found to be high in all study sites (Fig. 3.7). The implementation of these approaches received high support from both governments of mainland Tanzania and the Revolutionary Government of Zanzibar. Political commitment of own innovation was found to be low in all study sites. Sustainability level of promising land management approaches was found to be high in all study sites. In areas like Zanzibar it has become a rule for any agricultural programme to apply FFS approach in delivering new agricultural technologies to farmers. The study showed that potential for replication and adoption of FFS and PFM approaches were high. It was evident that the knowledge acquired by FFS members was taken up by non-FFS members through farmer-to-farmer knowledge sharing. Key informant interviews revealed that FFS approach is now being scaled up to cover the whole country of Tanzania. This shows that FFS is the best agricultural approach. Likewise, PFM approach has been promoted in all mangrove forest in Tanzania. The replication and adoption own innovation approach was found to be low.

## 4.0 COMPATIBILITY OF IDENTIFIED LAND MANAGEMENT APPROACHES AND PRACTICES WITH THE DEVELOPMENT OF FORESTS AND PROTECTION OF FORESTS AND DEVELOPMENT AND PROTECTION OF TREES OUTSIDE FORESTS

### 4.1 Measuring compatibility level of SLM approaches/practices with forestry development, protection of forests, and development and protection of trees outside forests

The term compatibility in the context of this study refers to the extent to which SLM approaches and practices address adequately forestry development, protection of forests, and development and protection of trees outside forests for long term human and environmental benefits. The most important hub for measuring the compatibility of SLM approaches and practices to forestry development, protection of forests, and development and protection of trees outside forests is through analysis of ability of SLM approaches and practices to meet sustainable forest management (SFM); and this can be achieved by using appropriate indicators. According to D'Andrea *et al.* (2016) a single indicator cannot be used to evaluate performance of forest management because sustainability is connected to factors related to ecological, economic and socio-cultural aspects. In this study therefore, the compatibility of SLM solution to forestry development, protection of forests, and development and protection of trees outside forests was evaluated by analysing their ecological, economic and socio-cultural indicators. Generally, indicators in forest sectors are tools for assessing trends in forest conditions and forest management. They provide a common framework for describing and evaluating progress towards SFM over time.

Respondents were asked to indicate their perceptions towards SLM approaches and practices in promoting mangrove forest development, protection of mangrove forests, and development and protection of trees outside mangrove forests. Respondents were required to provide their opinions based on a seven-point scale with (1) being very satisfying, (2) satisfying, (3) unsatisfying, (4) neutral, (5) not applicable, (6) no answer and (7) not at all satisfying. Then the responses were minimized by grouping them into three categories, very satisfying and satisfying into *satisfying*, *neutral* was left to stand alone and unsatisfying, not applicable, no answer and not at all satisfying were grouped into *unsatisfying*. In this grouping system, 'satisfying' indicates the relative strength of the approach or practice in contributing to the ecological, economic and socio-cultural aspects of the mangrove forests. On the other hand, 'unsatisfying' indicated areas in which farmers identified weakness of the approach or practice while a 'neutral' position indicated that the approach or practice neither positively nor negatively impacted on the ecological, economic and socio-cultural aspects of the mangrove forests.

#### **4.2 Compatibility of land management practices with development, protection of mangrove forests, and development and protection of trees outside forests**

Most of respondents in Kenya did not see the applicability of land management practices to development, protection of forests and trees outside the forest. Majority of those who saw the applicability were neither satisfied nor unsatisfied with the rate at which they were happening. However, 35% felt satisfied that soil erosion had been minimized (Fig 4.1). On the other hand, respondents in Mozambique and Tanzania were able to associate the identified land management practices with development and protection of mangrove forests as well as trees outside the forest (Fig 4.2 – 4.4). The results showed that respondents were satisfied on the way the identified land management practices are contributing to the protection of ecologically sensitive areas in the mangrove forests, minimizing soil erosion, enhancing natural regeneration in the mangrove forests, protection of endangered plant/animal species in and outside the mangrove forests, minimizing canopy opening and enrichment planting based on indigenous, locally adapted species. The main reasons given were that SLM practices have led to the planting and protection of different trees which include fruit trees, timber trees, and trees for poles and firewood. They have also led to protection of indigenous forests which include the Kayas. Vegetative measures of SLM solutions such as planting trees and agroforestry practices are important in forestry development by supplementing production from natural forests, thus, reducing the pressure on the latter (Dale, 2010; Magigi and Sathiel, 2014; URT, 2014; WOCAT, 2011). Establishment of woodlots for timber and firewood helps to reduce mangrove forest deforestation (Lamb and Don, 2003). Management measures such as banning harvesting within the highly protected areas or proposed protected areas within priority conservation areas and areas containing the last remaining examples of particular ecosystems or species contributes to forest conservation (Dudley and Sue, 2002). Moreover, respondents in Tanzania and Mozambique felt satisfied on the way the identified SLM practices are striving hard on income contribution to households; however they were unsatisfied in the areas of ecotourism, investment in forests and forestry industries, including natural forest conservation, forest recreation and ecotourism and investment in forest education, research and extension (Fig. 4.3), gender access to land use management, and contribution to food security. The practices have also made tenure use rights well defined and upheld, resource use conflicts minimized or settled and contribute to employment in the forestry sector (Fig. 4.4).

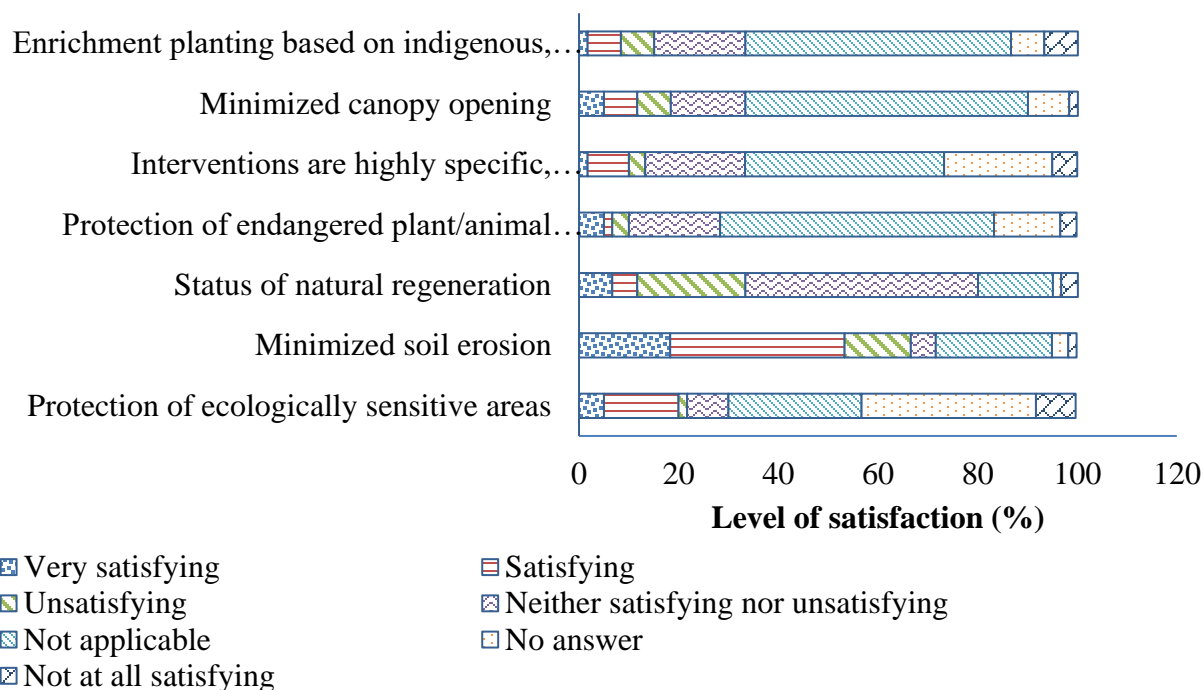


Figure 10: Ecological criteria of assessing compatibility of identified SLM practices with forests in Kenya

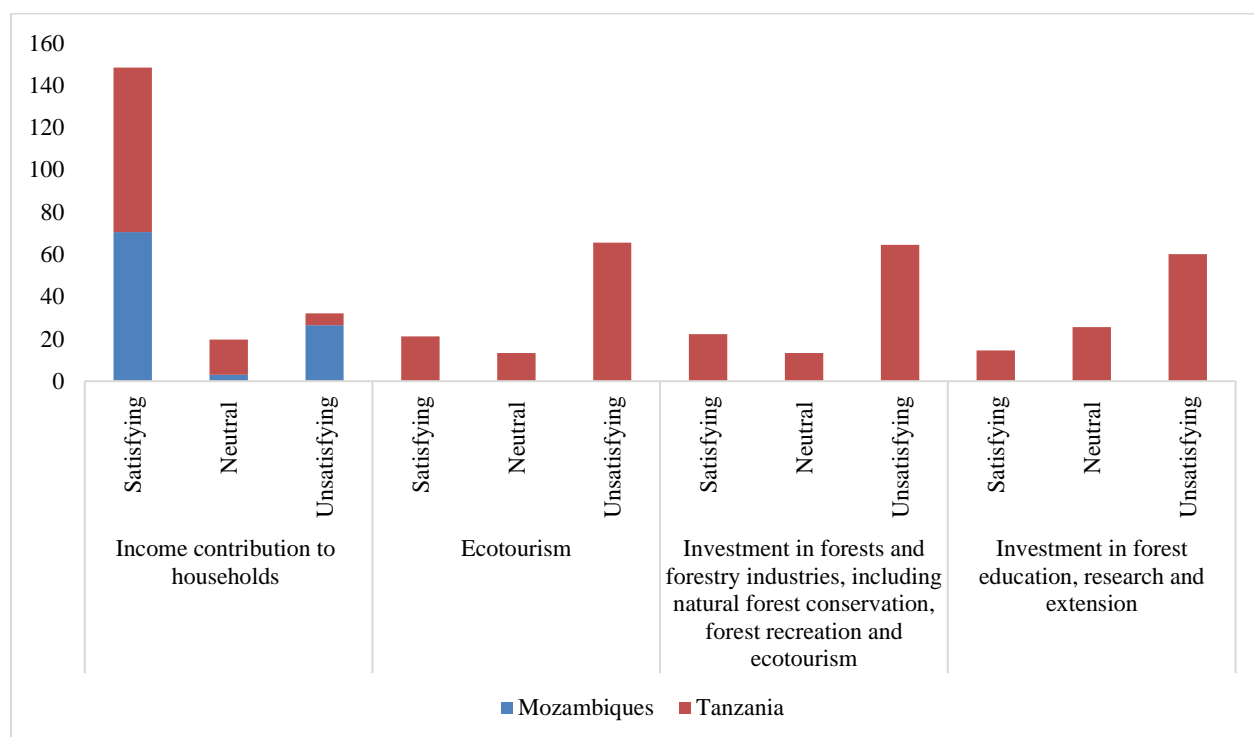


Figure 11: Economic criteria of assessing compatibility of the identified SLM practices with forests in Tanzania and Mozambique

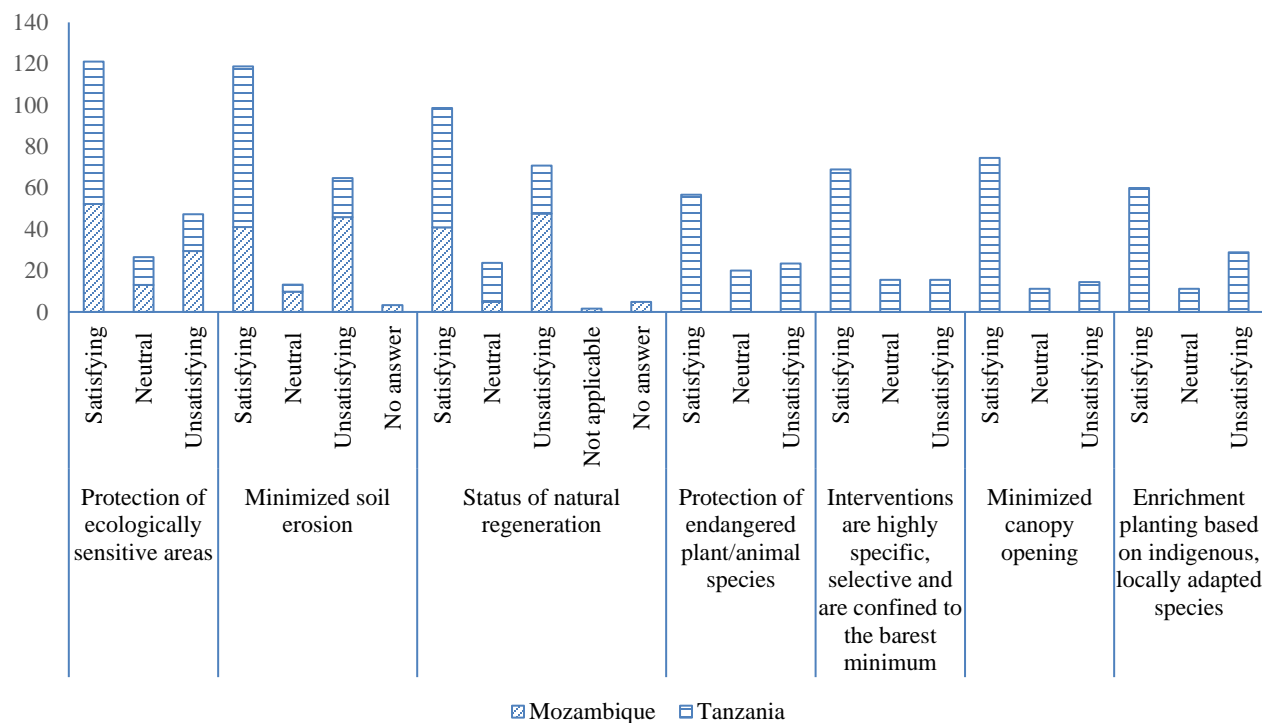


Figure 12: Ecological criteria of assessing compatibility of the identified SLM practices with forests in Tanzania and Mozambique

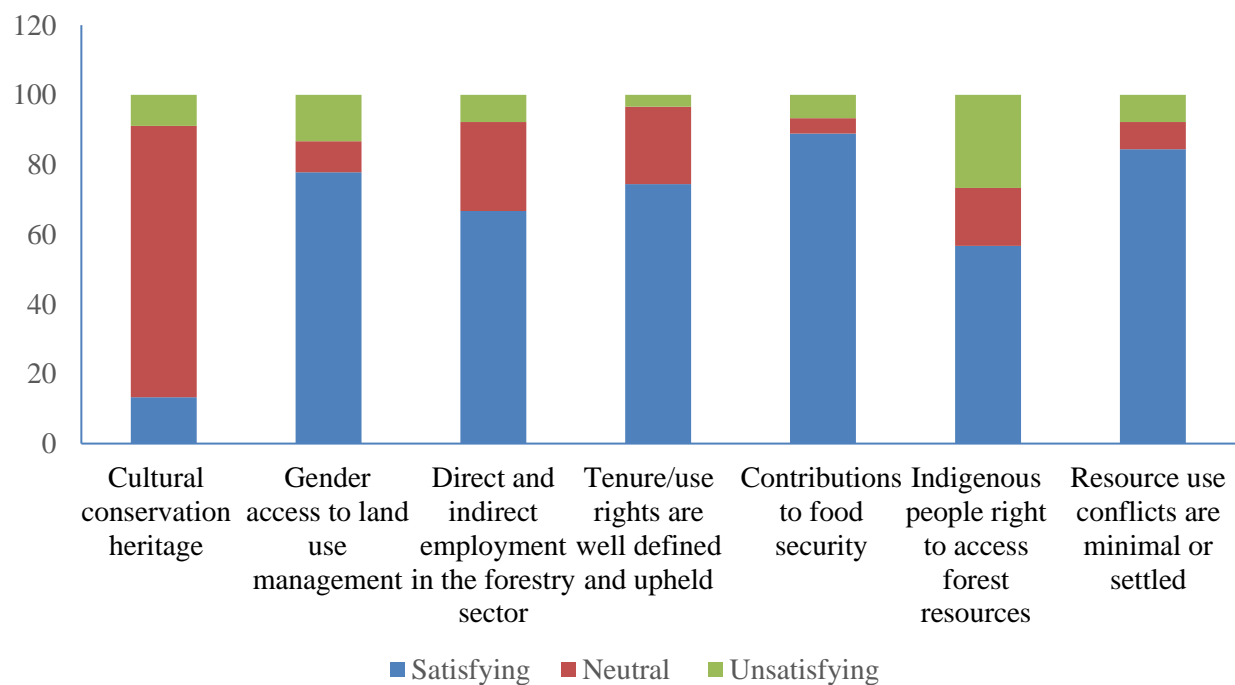


Figure 13: Social criteria of assessing compatibility of the identified SLM practices with forests in Tanzania

### **4.3 Compatibility of the identified land management approaches with development and protection of mangrove forests, and development and protection of trees outside forests**

#### **4.3.1 Ecological criteria**

About 67% of respondents in Tanzania were satisfied with the way PFM approach is contributing to the protection of ecologically sensitive areas of mangrove forest (Fig. 4.5). Although FFS approach was introduced to promote the best agricultural innovations, respondents perceived that the approach is satisfying in the development and protection of mangrove forests, and development and protection of trees outside the mangrove forests. Results from FGDs revealed that the implementation of FFS approach has stimulated many people, especially the youth, to be involved in farming high value crops such as vegetables and fruits for sale. This in turn has reduced the dependence on mangrove forests for household income. On the other hand, own innovations such as spiritual beliefs attached to sacred mangrove areas was satisfying in the context that these enhanced protection of ecologically sensitive areas. Focus group discussions revealed that it was a taboo to collect anything from the sacred mangrove area.

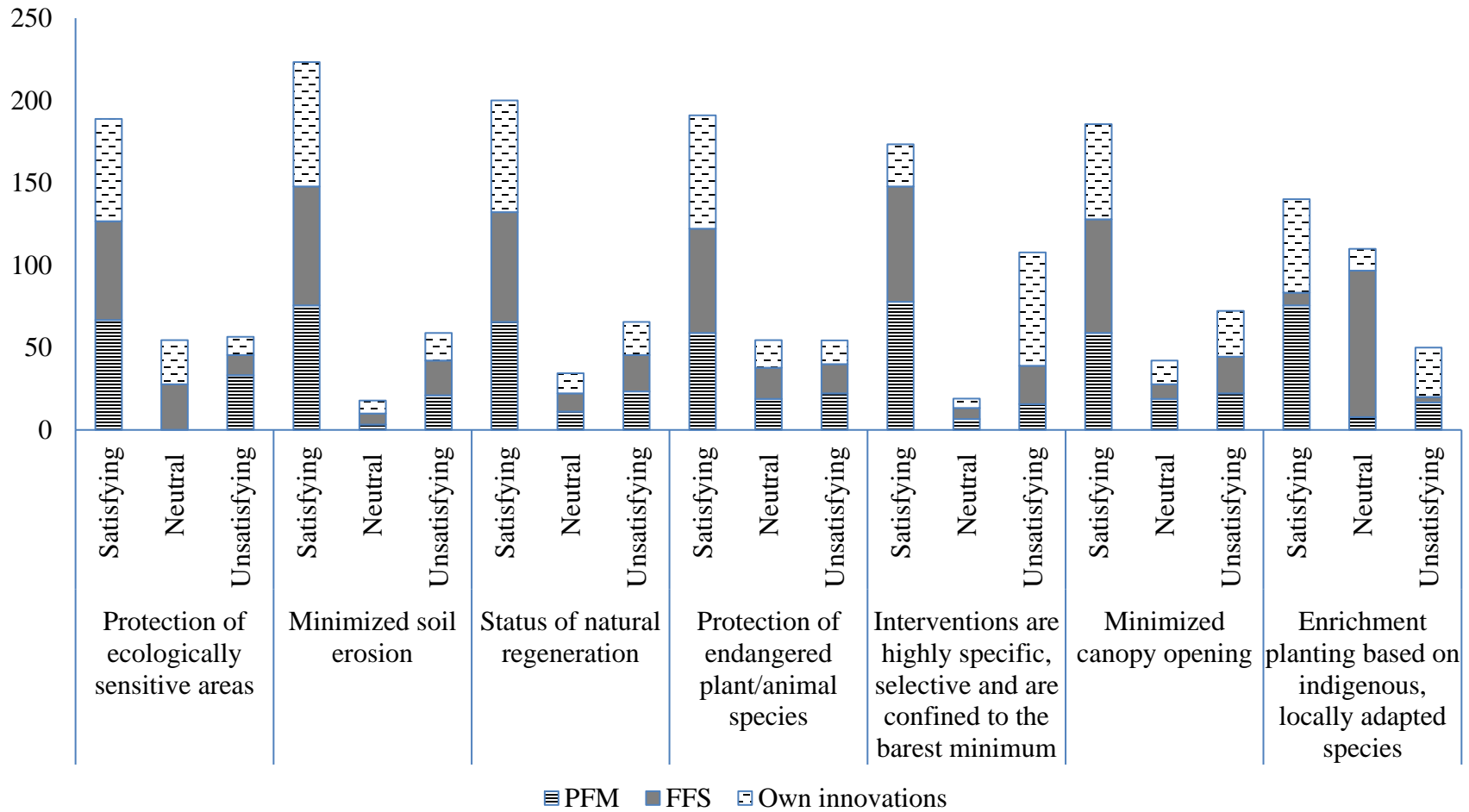


Figure 14: Ecological criteria of assessing compatibility of the identified SLM practices with mangrove forest in Tanzania



Respondents in Tanzania were satisfied with the way promising land management approaches are being implemented to address problems associated with soil erosion. Respondents perceived that under PFM approach, the status of natural and artificial regenerations in the mangrove forests was satisfying (Fig. 4.5). This was justified by results from FGDs that nowadays the area covered by mangrove forests has increased through artificial and natural regeneration. Farmer Field School (FFS) approach was found satisfactory, in that it contributed to the protection of endangered plants and animal species. Focus group discussions revealed that FFS approach discourages the application of bad agricultural practices like shifting cultivation. Also, own innovations such as spiritual beliefs on caves, were satisfactory in that they enhanced the protection of trees outside mangrove forests. The study revealed that there are spiritual beliefs associated with caves (e.g. *Pange Juu* cave in Kitogani area) and these beliefs are important in helping to protect the forests that surround the caves. In addition, big trees such as baobab outside the forests that are believed to be important spiritually are not allowed to be cut. This in turn it helped to minimize the problem of soil erosion and also increased the protection of endangered plant/animal species.

More than 55% of respondents reported that the PFM approach was satisfactory in that it prevented loss of endangered mangrove tree species and resources in such areas (Fig. 4.5). This could be due to increased enforcement of rules and regulations regarding protection of the mangrove forests. Campaigns for mangrove planting was satisfactory because they targeted indigenous locally adapted mangrove species. The study revealed that own innovation was unsatisfying because it was highly specific. The own innovations were satisfactory in minimizing canopy opening because it was a taboo to collect anything from the sacred areas.

About 45% of the respondents in Mozambique were unsatisfied with the status of natural regeneration of forests and the effects of forests in minimizing soil erosion. Despite the effort by local institutions in promoting the preservation of mangrove forests through political and legislation Acts, the rate of depletion of mangrove resources remains high in Mozambique. The mangrove areas decreased by 113 hectares from 1991 to 2000 in the Incomati Estuary alone (Macamo *et al.*, 2020). Results from FGDs and key informant interviews indicated that quality/cover of mangroves had increased in Quelimane. The increase is related to restoration activities in the degraded areas.

#### **4.3.2 Economic criteria**

It was found that respondents were unsatisfied with PFM and traditional approaches regarding income contribution to households (Fig. 4.6). The main reason given was that harvesting of mangroves for household income is not allowed by the government. Respondents were satisfied with the way FFS approach is contributing to household income because the approach helped farmers to practice best agricultural technologies for increased income and food security.

There were no projects responsible for payment of ecosystems services in Tanzania, indicating that PFM, FFS and traditional approaches were neutral in this aspect. Respondents were unsatisfied with PFM approach as it restricted them to access benefits coming from mangrove timber products. Harvesting of mangrove poles for household use is allowed under special permission from village conservation committees, indicating that respondents were satisfied with the PFM approach regarding access to benefits from non-timber forest products in the mangrove forests. On the other hand, the FFS approach and own innovations were neutral with regard to controlling access to benefits coming from mangrove timber products and non-timber forest products from the same forests. (Fig. 4.6).

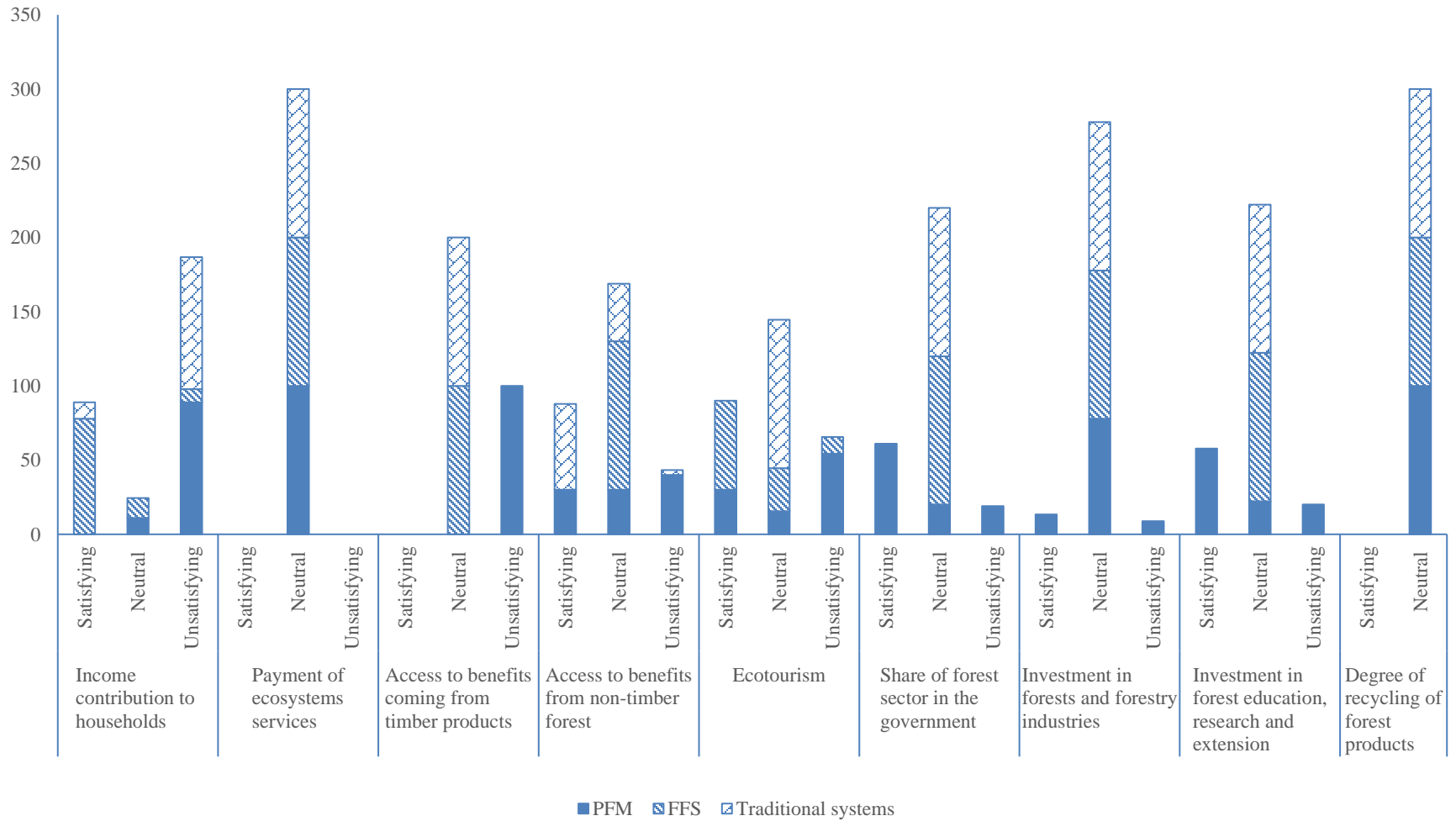


Figure 15: Economic criteria of assessing compatibility of the identified SLM practices with forests in Tanzania

Communities in Zanzibar were satisfied with the PFM approach since it introduced community-based ecotourism activities in the mangrove forests for income generation and recreation. The farmer field school (FFS) approach was satisfactory with regard to ecotourism and including hunting and recreation since it stimulated farming crops to feed the tourism sector. Revenues generated from illegal mangrove activities were shared between government and villagers and this made respondents to be satisfied with the PFM approach. There was no area set aside for investments in forests and forestry industries, forest education, research, and extension, meaning that PFM was neutral on this aspect. Degree of recycling of forest products was rather neutral in Tanzania (Fig. 4.6).

Payment for Ecosystem Services (PES) is an economic approach to conservation which can result in community development as well as the protection of the environment. Example of a mangrove PES scheme is Mikoko Pamoja project in Gazi Bay in Kenya which seeks to conserve mangroves and bring about community development through the sale of carbon credits. The project which has now been replicated in Vanga in Kenya earns the community an annual income of circa USD 25,000 which is used to implement community development projects and mangrove restoration activities. However, when asked about their level of satisfaction with PES, only 2% of the respondents were satisfied with its contribution in developing and protecting forests (Fig. 4.7). This might be because it is a new concept in both Vanga and Majaoni villages in Kenya. Nevertheless, majority of the respondents (30%) were satisfied with the amount of income contribution to households while 15% also felt satisfied with access to benefits from non-timber forest products from these forests.

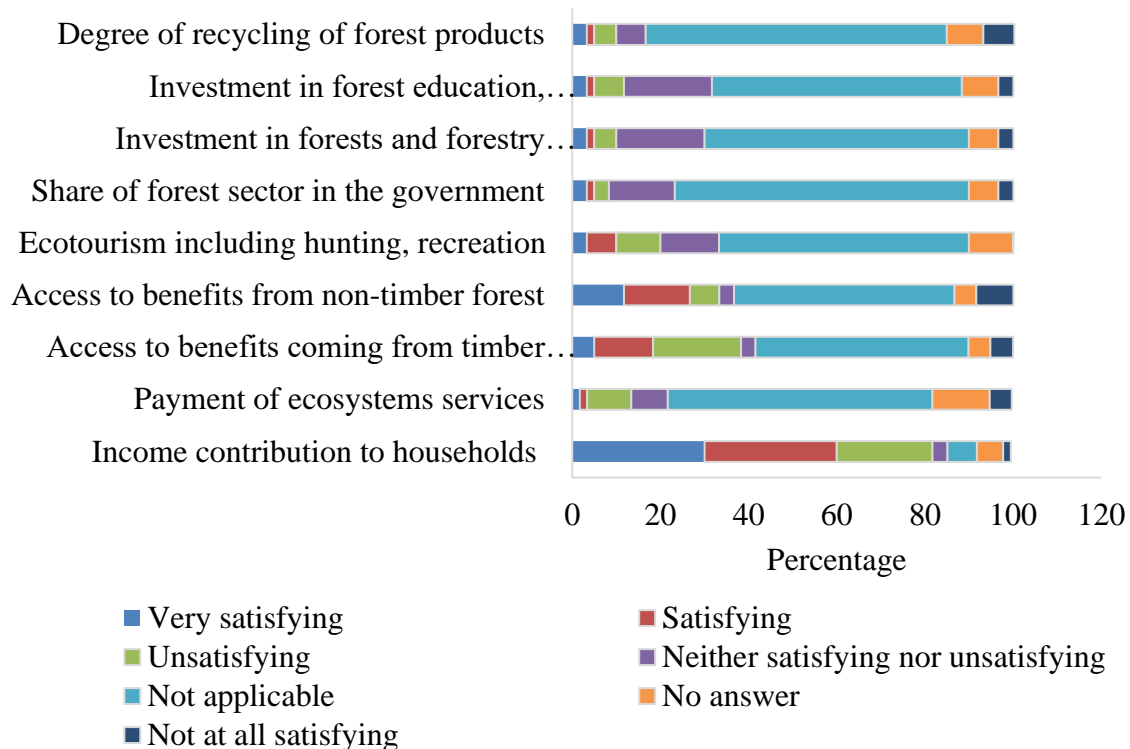


Figure 16: Economic criteria of assessing compatibility of the identified SLM practices with forests in Kenya

### 4.3.3 Social criteria

The promising land management approaches in Tanzania were satisfactory with regard to conserving cultural heritage (Fig. 4.8). These approaches promote conservation and respect of areas in and outside the mangrove forests that are used for performing traditional rituals. Gender access to land use management was satisfactory under the PFM approach. The approach promotes equal access to land use management by all social groups. The study revealed that under indigenous system, cultural conservation heritage was also satisfactory in all study sites. However, gender access to land use management was unsatisfactory under indigenous system. There were complaints from some Muslim women that cultural practices, such as divorce, reduce the chances of widows getting land from their spouses.

The participatory forest management approach was satisfactory in that it provides direct and indirect employment in the forestry sector. The approach promoted the establishment of woodlots to supply firewood, poles, and charcoal for household income generation. This in turn created employment opportunities in the forest sector in the study areas. The majority of respondents were satisfied with the PFM approach as it defines use rights well and ensures that they are upheld. There are village land use plans and bylaws that guide use rights of forest resources including mangroves. Under the PFM approach, Village or *Shehia* councils are the managers of the village land, including mangrove forests. Village or *Shehia* councils are also responsible for the supervision and registration of village land within their areas of jurisdiction.

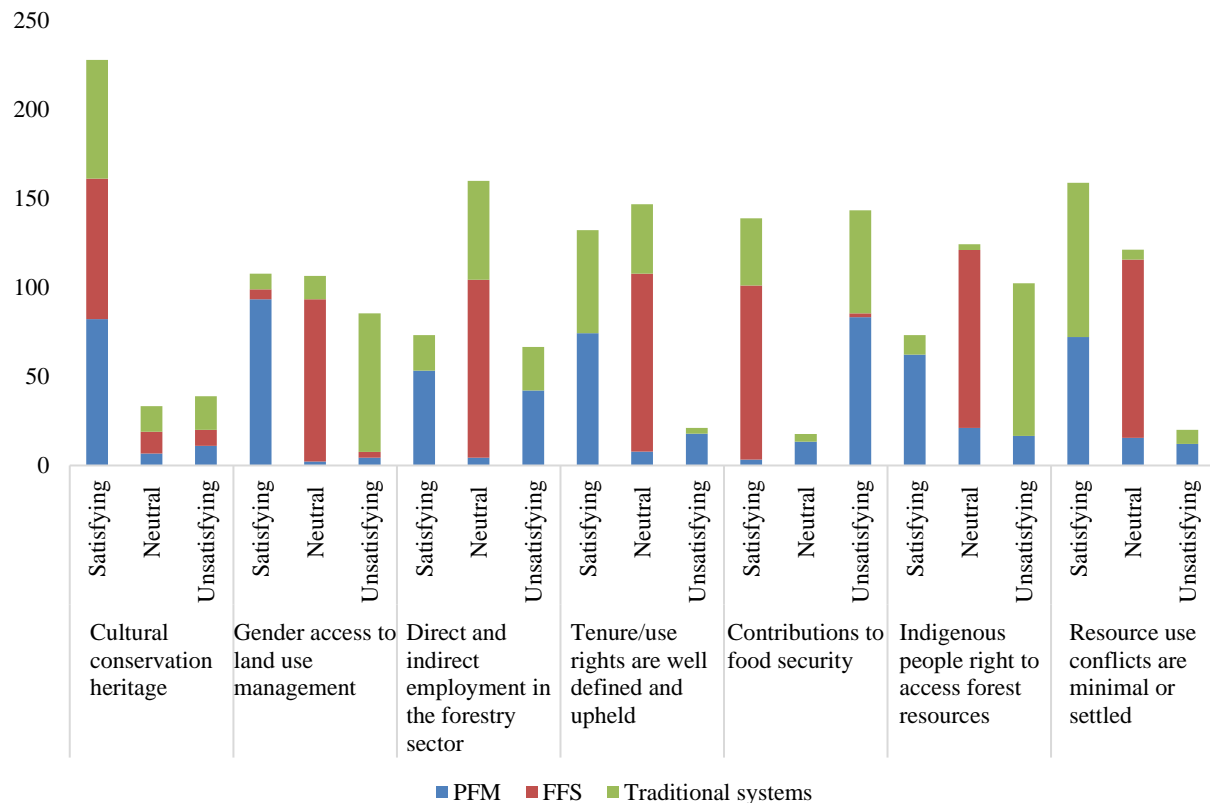


Figure 17: Social criteria of assessing compatibility of the identified SLM practices with forests in Tanzania

It was noted that contribution to food security was unsatisfactory under PFM and own innovation arrangements. These approaches do not allow harvesting of mangrove wood for sale. Indigenous people rights to access forest resources were satisfactory under the PFM approach. Indigenous people are allowed by the conservation committees to access mangrove forests to perform traditional rituals as well as harvest forest products for house construction in case of emergency. The approach was reported as satisfactory in minimizing or settling resource use conflicts. Verbal warning is first given to those who have violated the rules to access mangrove forest resources. Arrests and fines and/or confiscation of mangrove wood are actions taken for offenders who have repeatedly violated rules regarding harvest and transport of mangrove wood.

In Kenya, the majority of the respondents on the compatibility of SLM approaches with the forests felt satisfied with the level of gender accessibility to land (30%), cultural conservation heritage (35%) and that tenure rights were felt well defined and upheld (35%) (Fig. 4.9). However, 50% were unsatisfied with the approaches' contribution to food security, while 27% were unsatisfied with its contribution to employment in the forestry sector. Forest education, research, and extension plays a crucial role in development and protection of forests because it is through these that the communities get to know the benefits of forest conservation and also development projects are implemented. However, the satisfaction level with investment in this area is of serious concern and thus more needs to be done in this area.

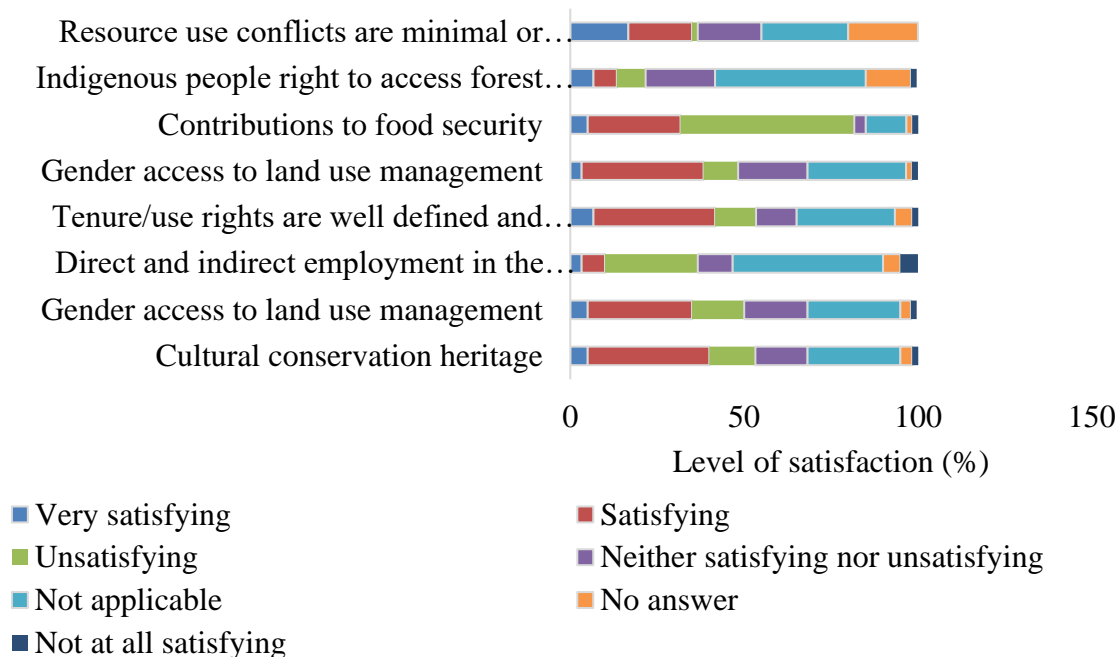


Figure 18: Social criteria of assessing compatibility of the identified SLM practices with forests in Kenya

## **5.0 THE EXTENT TO WHICH FOREST STAKEHOLDERS ARE INCORPORATING SUSTAINABLE LAND MANAGEMENT APPROACHES AND PRACTICES IN THEIR FOREST PLANS AND ACTIVITIES**

Stakeholders are defined as interest groups or dependent groups, that is, categories of people or institutions who share a common interest in a landscape. Not all stakeholders are farmers, but that off-site categories such as administrators, researchers, and international organizations are included as well. Stakeholders can play their own roles, either in groups or individually, and have significant influence on promotion of SLM practices and approaches in mangrove forests. The adoption of SLM technologies/practices in this study refers to the use of one or more SLM technologies by forest stakeholders in their forest plans and activities. The adoption and investment in SLM are crucial in reversing and controlling land degradation, rehabilitating degraded lands, and ensuring the optimal use of land resources for the benefit of present and future generations (Akhtar-Schuster *et al.*, 2011).

### **5.1 Adoption of good practices by communities adjacent to mangrove forests**

The majority of respondents in Mozambique and Tanzania felt that the level of participation of communities in sensitization sessions was satisfactory (Fig. 5.1). Communities in Tanzania were involved in sensitization sessions through meetings such as village assemblies, seminars, and in demarcation of village land use boundaries. Key informants indicated that more than 180 people participated in mangrove restoration in Quelimane, Mozambique. WOCAT (2011) pointed out that the extent of community involvement at different stages from problem identification to decision making and implementation will influence adoption and the potential of an approach to be up scaled. Land users or communities need to develop ownership or identify with the approach and the technology. Awareness of the best SLM technology options is a precondition for spreading SLM.

Respondents in Kenya and Tanzania perceived that level of establishment of community management and watch structure was satisfactory. For example, in Tanzania there existed village councils and community conservation committees whose duties are protection of coastal and marine resources including mangroves. Through these committees, communities were involved in forest patrol in collaboration with government staff to increase the protection of the forest resources. This shows that presence of enabling policy and regulatory environment are basics for the adoption of the most appropriate SLM measures (WOCAT, 2011). Establishment of community-based conservation committees for natural resource management is a strategy that empowered local committees to monitor and regulate wood cutting and soil erosion and has also helped to reduce deforestation from tree cutting for firewood in Kenya (Houten, 2002). The majority of respondents in Tanzania and Mozambique perceived that level of respect for good practices when cutting wood forest products was satisfactory. Harvesting of trees were done on selective manner, meaning that only mature trees were harvested. Furthermore, the level of respect for good practice during the processing of wood forest products was reported as

satisfactory in the study countries. Most farmers in Tanzania plant or leave some trees on their farms during farm preparation to provide, among other things, wood or fuel. Pruning was done to trees such as cashewnuts and *Grevillea robusta*. During pruning activities, the branches were collected for use as fuelwood. During wood processing, slabs were used for construction of pens for animals like goats. Sometimes they were used as firewood.

Respondents from Tanzania felt satisfied with the level of respect of good practice when harvesting non-timber forest products. Only specific part of medicinal plant is harvested for treatment of diseases. The respondents also reported that they were satisfied with the level of respect of good practice in agricultural and/or livestock. Respect of good practice when distributing and managing land was unsatisfactory in both Tanzania and Kenya. Some respondents in Tanzania were complaining that their land has been taken to expand the area covered by JCBNP and Biosphere Reserve. More area was needed by JCBNP and Biosphere Reserve in order to constitute a buffer zone and control human activities that impact the protected marine environment.

On the other hand, respondents in Mozambique felt that level of respect for good practice when distributing and managing land was satisfactory. To minimize conflicts, proof of the right to use and benefit from the land may be required, among others means, as the testimonial evidence presented by members (men and women) of the local communities. The right to use and benefit from land is granted by the Land Law No 19/97 of 1<sup>st</sup> October 1997. Respondents in Mozambique and Tanzania felt satisfied with the level of organisation of communities to protect forests and land. Members of the local community are organized to protect forests and land, in most case under the leadership of local authorities, and in close collaboration with government at municipal and district levels. Organisation of communities to protect trees outside forests was unsatisfactory in all study countries. Active participation of women at community level was satisfactory in all study countries.

## **5.2 Adoption of good practices by local authorities**

The results from key informant interviews indicated that the level of organization and participation of the local communities in awareness raising actions on good practices was satisfactory. Respondents felt that existence of a service/entity within the community responsible for monitoring the implementation of good practices was unsatisfactory. There was no service/entity within the community responsible for monitoring the implementation of good practices. Monitoring of the implementation of good practices was done by the government staff. The study revealed that consideration of good practices in the budget of the local collectivity was unsatisfactory. There was no budget allocated for the implementation of the good practices. Supervision and control of compliance with good practices during campaigns on harvesting wood products was satisfactory. On the other hand, supervision and control of compliance with good practice during campaigns on harvesting non-timber forest products was unsatisfactory. Good practices exercised in monitoring land distribution were satisfactory. Active participation of women at community level was satisfactory.



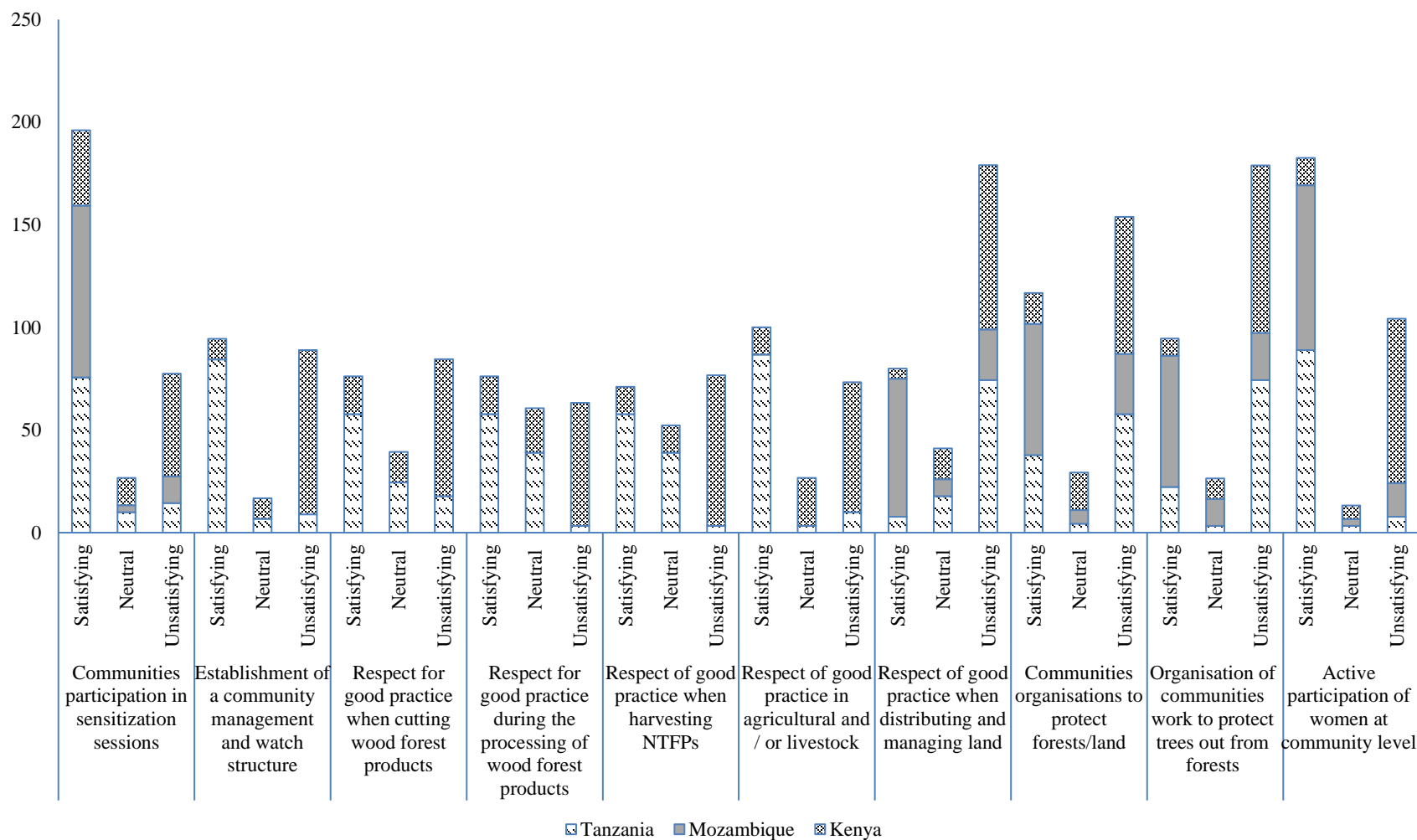


Figure 19: The extent of incorporating SLM approaches and practices in the forest plans and activities by communities adjacent to mangrove ecosystems in Eastern African countries

### **5.3 Adoption of good practices by the administrative and technical services of the State**

The study revealed that participation of state representatives at local level in awareness raising activities on good practice was unsatisfactory. Focus group discussions revealed that state representatives were not involved in the awareness raising at the local level. Key informant interviews revealed that awareness raising was the responsibility of extension staff at the local level. Participation of state representatives at regional level in awareness-raising actions on good practices was satisfactory. However, considering the financial needs for good practice activities in the state budget was unsatisfactory, as well as taking into account good practices in state sectoral policies and also consideration of good practice in national legislation. Consideration of good practice in the national action plan was satisfactory, and so was the supervision and control of compliance with good practice during campaigns on harvesting wood products. However, supervision and control of compliance with good practice during campaigns on harvesting NTFPs was unsatisfactory, and so was monitoring of compliance with good practice during the distribution of land. Also, organization and/or supervision of community forest and/or land protection works was unsatisfactory as well as organization and/or supervision of community work to protect trees outside forests. Active participation of women in technical and administrative services responsible for good practices was satisfactory.

awareness raising at the local level. Key informant interviews revealed that awareness raising was the responsibility of extension staff at the local level. Participation of state representatives at regional level in awareness-raising actions on good practices was satisfactory. However, considering the financial needs for good practice activities in the state budget was unsatisfactory, as well as taking into account good practices in state sectoral policies and also consideration of good practice in national legislation. Consideration of good practice in the national action plan was satisfactory, and so was the supervision and control of compliance with good practice during campaigns on harvesting wood products. However, supervision and control of compliance with good practice during campaigns on harvesting NTFPs was unsatisfactory, and so was monitoring of compliance with good practice during the distribution of land. Also, organization and/or supervision of community forest and/or land protection works was unsatisfactory as well as organization and/or supervision of community work to protect trees outside forests. Active participation of women in technical and administrative services responsible for good practices was satisfactory.

## **6.0 GENDER ROLES IN PROTECTING FOREST LANDS AND ADOPTION OF APPROPRIATE SLM APPROACHES AND PRACTICES IN MANGROVE FORESTS**

In the context of this study the term gender refers to socially constructed roles, rights, responsibilities, and relations existing between men and women (Magigi and Sathiel, 2014). In north western part of Ethiopia, economic variables such as plot ownership, livestock holding, family size, and land-to-labor ratios have an influence on adoption of land conservation practices (Adugna and Bekele, 2007). Furthermore, the major socio-economic factors that influence household's decision to adopt soil conservation measures in Ethiopian highlands include sex and education level of household head, availability of labor force, cattle holding, and off/ non-farm income (Amsalu and de Graaff, 2007; Adimassu and Kessler, 2012). On the other hand, biophysical characteristics of plots, topography, and agro-ecological variations also influence the adoption decision of SLM practices (de Graaff *et al.* 2008; Miheretu and Yimer. 2017). World Bank (2007) and Yirga (2007) also reported that institutional factors such as land insecurity, access to credit, proximity to all weather roads, and market access were likely to influence the adoption of and investments on sustainable land management practices in Ethiopia. The adoption of SLM practices by farm households has also been hurdled by wealth-related factors (Genanew and Alemu 2012; von-Braun *et al.* 2013). Furthermore, Amsalu and de Graaff (2007) report that the adoption level of SLM practices by self-motivated farmers remains very low, however, they bring the intended results in terms of improving the livelihoods of rural households.

The study revealed that there were equal opportunities for all social groups to participate in the implementation of SLM approaches and practices. The majority (80%) of respondents in Tanzania were involved in the actual implementation process of good practices. Others were involved in the implementation process of good practice through meetings such as village assemblies (60%), seminars (33.3%), while only 16.7% participated through village land use boundary demarcation. Women were identified as the main actors in agricultural activities in Kenya, with men described as the daily bread winners for their families. There was, however, equal responsibility in the farms whenever men and women work together, equity in decision making, and equal rights of access to land resources in both Kwale and Mombasa in Kenya (Fig. 6.1).

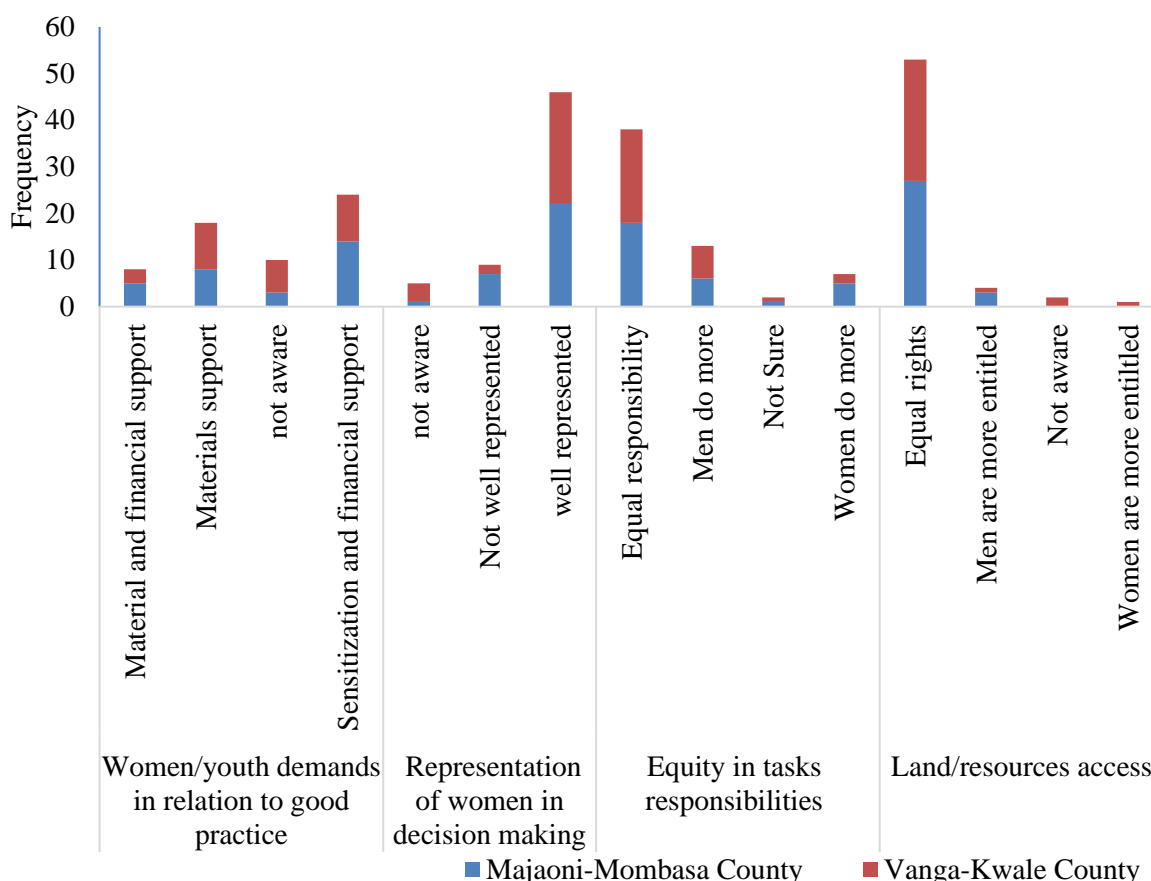


Figure 20: Distribution of equity in responsibility, decision making and access to land resource, and the needs of women and youth in SLM practice, Kenya

The majority of respondents cited the need for sensitization and financial support for youth and women undertaking SLM in Mombasa, while majority in Kwale indicated a need for sensitization, financial, and material support to enhance the capacity of the youth and women practicing SLM. Respondents in Tanzania cited the need for financial support, establishment of tree nurseries, establishment of financial institutions such Savings and Credit Cooperative Societies (SACCOS) and Village Community Banking (VICOBA) to enhance capacity of women and youth to undertake SLM practices. Others have indicated that support of agriculture inputs (seeds, fertilizer and pesticide), tractors, agriculture extension services, horticulture production through greenhouse, value addition of high value crops, and farmer exchange visits are needed to enhance capacity of youth and women to implement SLM practices (Fig. 6.2). The most common cited elements that prevent women and youth from adopting good practice were poor financial support (57%), poor marketing of agricultural produce (53%), poverty (52%), high cost of agricultural inputs ((50%) and poor working tools. Others were increased climate variability (36%), lack of technical skills (26%), land tenure (16%) and illiteracy (12%). The positive changes brought about by observing good practices were increased participation of women and youth in production activities, land ownership, conservation activities, and control over the use of income; as well as reduced dependence on harvesting mangroves, increased mangrove forest protection activities, agricultural crops productivity, household income and household food security.

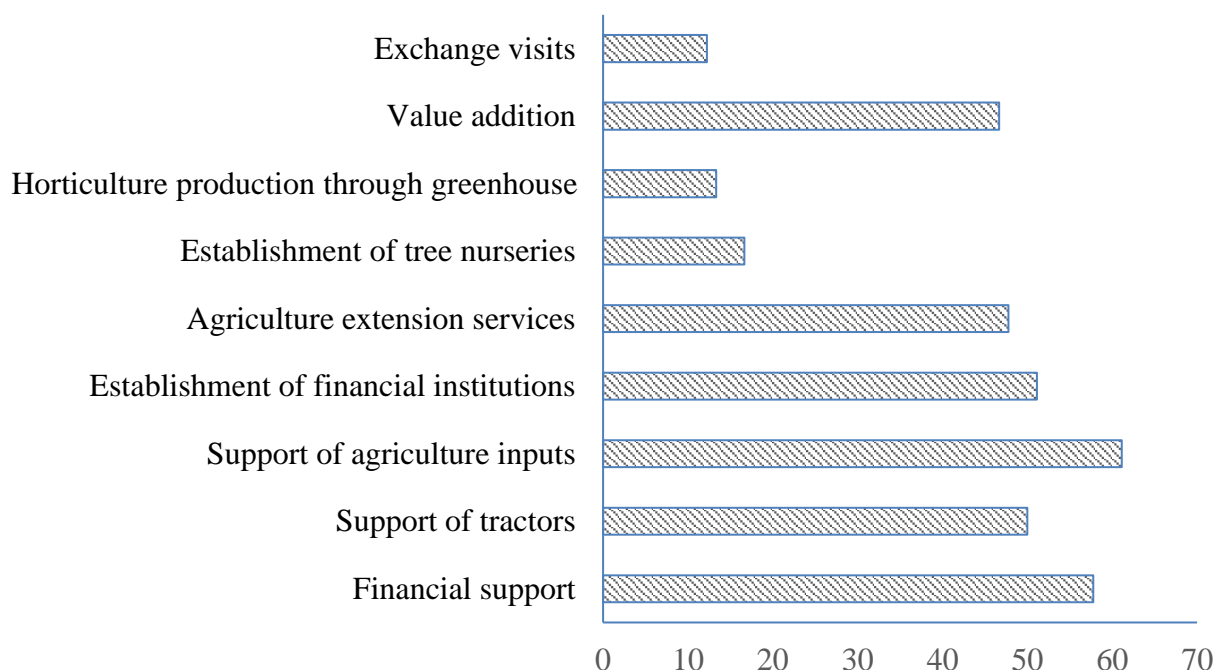


Figure 21: Women and youth need in relation to good practice in Tanzania

## 7.0 INSTITUTIONAL, POLICY, LEGAL MECHANISMS AND OTHER ASPECTS THAT CAN BE EMPLOYED TO ENHANCE PROTECTION OF FOREST LANDS IN THE STUDY AREAS

Piecemeal past efforts in land management through different agencies have failed to enhance protection of forest lands in the Eastern African countries. In response to this concern, some Eastern African countries have recently adopted the Strategic Investment Framework (SIF) for SLM. This framework is a legal instrument that aims to guide addressing land management issues through effective multi-sectoral, multi-stakeholder partnerships and collaboration. It seeks to provide a set of iterative processes which require that countries should first identify the contextual challenges facing their specific national land and associated sectors and economies before policies and programmes of reform can be developed and implemented. Central to those processes is the need for a fully gendered, informed and participatory mobilization and continuous engagement of all stakeholders in the land and related sectors at all stages of policy development, implementation and review.

The Strategic Investment Framework (SIF) for SLM is a tool to foster a programmatic approach to scaling up SLM practices across all relevant sectors and its implementation is envisaged to lead to a systematic change to upscale policy, institutional, governance, and financial responses to the scaling up of SLM, by adopting a cross-sectoral integrated development approach to SLM. This framework (SIF for SLM) is an important tool because it identifies gaps, opportunities, and priorities for scaling up SLM. The Framework outlines clear roles for key sectors and stakeholders to guide and focus interventions which support securing ecosystems and actions for moving towards land degradation neutrality as part of contributing towards the attainment of Sustainable Development Goals (SDGs).

The Strategic Investment Framework for SLM has been advocated and adopted in the Eastern African countries to serve as an umbrella framework for all land management. All actors and partners in land management align and harmonize efforts, approaches, and technologies. The Framework is formulated with the goal of serving as a national level strategic planning framework to guide the prioritisation, planning, and implementation, by both the public and private sectors, of current and future investments in SLM with the aim of addressing the interlinked problems of poverty, vulnerability, land degradation, and deforestation at the rural community level.

Various sectoral policies promulgated by the governments of Eastern African countries (see section 2.5 in this document) are in coherence with the objectives of SLM. The environmental objectives and strategies of different policies at national and sector levels give an indication of the level and magnitude of support they render to SLM interventions. Therefore, the presence of a legally constituted multi-sectoral coordinating and management body to oversee the development and implementation of SLM interventions at national and local levels is important. Such a body is most effective since it consists of key officials of the local government and the relevant stakeholders. However, there is a need for assessing the potential of this framework for generation information to generate recommendations for its improvement and adoption in all Eastern African countries as a way to enhance forest protection in the region. The implementation and sustainability of SIF for SLM depends on the availability of local resources. Lack of budget should not be used as an excuse for not implementing SIF for SLM. This framework can be implemented by building on and optimizing the existing human and financial resources of the local governments, agencies, and relevant stakeholders in the area. Financial resources from the private sector can also be mobilized through public-private partnership arrangements.

### **Potential barriers to SIF for SLM development and implementation**

- **Political interference**

Political rivalry between ruling and opposition parties, changes in local leadership, shifts in political power, and personal interests of political leaders affect the choice of program areas, legislation, institutional reforms, financial obligations or even the continuation of existing SLM initiatives. Sustainable Land Management (SLM) practitioners should be aware of the political climate they are working under, take full advantage of political opportunities, and effectively mobilize all positive elements to create a favorable political environment to move the SIF for SLM forward.

- **Resistance from line agencies**

Line agencies' fear of losing their traditional legal authority, mandates, and human and financial resources can create resistance to the concept and practice of SIF for SLM. Line agencies may be suspicious of outside intrusion into their jurisdictional boundaries. SLM practitioners should promote the value that coordination and integration add to the efforts of

sectoral agencies. A coordinating mechanism with a strong and authoritative power base, such as the office of the mayor or governor, could facilitate cooperation among the line agencies. This is because this office can implement its normal functions and at the same time undertake cross-agency activities such as the implementation of zonation schemes, legislative proceedings, public hearings, and community mobilization. A relatively neutral agency such as an economic planning and development department or at least an environmental department may also be selected to lead the implementation process.

Literature shows that there are promising lessons that can be learnt from implementation of SIF for SLM in some African countries. They include high sustainability of development activities namely platform functionality (stakeholders and partners); conflict of approaches and duplication of effort avoided; community mobilization and awareness; aligned financial and technical support; government led partnership; sufficient policy and strategy support; donors and development partners interest to align; best practices identified to be scaled up.

## 8.0 CONCLUSIONS

Most of the identified SLM practices were directly linked to farming crops. The study established that the most common farming practices were mixed cropping, fertilizers and manure applications, irrigation, green manure cropland, rotation/fallows, legume-intercropping, mulching, furrows, breaking compacted top soil and deep tillage. Although application of fertilizers and pesticides on farms to enhance crops yield have become popular nowadays, pesticides application are toxic to other organisms especially honey bees. In the long run, fertilizers use will lead to the problem of soil pollution. Currently, organic farming is highly encouraged to address the problem of soil pollution. Farmers applied more than one practice on their farms for security purposes.

Land management practices that have direct link to mangrove forest protection and conservation included zoning land as forest reserves, planting trees, agroforestry, afforestation, selective clearing, traditional practices, and ecotourism. The study indicated that own innovations, contact farmers, and field visits were the most common approaches used to implement SLM practices in the study countries.

Approaches namely FFS, PFM, demonstration plots, and meetings were mentioned in Tanzania only. The focus of FFS methodology was employed to promote new good agricultural innovations for improving food security and household income of communities living in the rural areas. Communities have confirmed that since the introduction of FFS they have been able to apply new innovations on their farms and have recognized improvements in crops productivity. This situation has made communities to depend less on mangrove forests for household income. On the other hand, the PFM approach has focused on promoting good forestry practices in order to achieve sustainable management of resources in the mangrove forests. Under the PFM approach, participation of communities in mangrove forest protection is highly encouraged. This situation helped to raise awareness of communities on the importance of mangrove conservation for livelihoods. Own innovations system was a crosscutting SLM approach as it was applied to promote both agricultural technologies and forest conservation measures. In addition, approaches namely FFS, field visits, meetings, demonstration plots, contact farmers and PFM were official programmes initiated by the governments in order to promote more SLM practices. There exist well

developed policies, plans and strategies on SLM in the Eastern African countries. Gaps however exist in implementation, where most farmers, especially in Kenya, indicated to have not received any extension services on SLM and that the SLM approaches they practice are indigenous. Majority of the farmers in Kenya also lack knowledge on SLM with most unable to link their practices to economic and social wellbeing.

Indicators used to measure sustainability of promising land management approaches have proved that land management practices such as zoning land into forest reserve, ecotourism activities, tree planting, and agricultural practices are sustainable. Land management approaches such as FFS, contact farmers, and PFM were also found to be sustainable. Based on ecological dimensions of SFM, it was found that PFM and FFS approaches were implemented satisfactorily in mangrove forest development, protection of mangrove forests, and development and protection of trees outside mangrove forests. However, some economic dimensions of SFM namely income contribution to households, access to benefits coming from timber products, access to benefits from NTFPs-especially harvesting poles, and ecotourism have indicated that PFM approach was unsatisfactory with respect to mangrove forest development, protection of mangrove forests and development and protection of trees outside mangrove forests. The study established that the adoption of good SLM approaches and practices are crucial in addressing problems associated with soil and land degradation. They are also important in the contributing to increase in mangrove vegetation cover through planting trees and enforcement of laws. However, the implementation of promising land management approaches was constrained with low number of extension agents and annual budget allocation by the governments.

Regardless of gender, all community members have equal opportunities to participate in the implementation of the good practices. Beyond sensitization, the participants also identified a need for financial and material support for the youth and women practicing SLM. Women are particularly important in this discourse, as despite being identified as the major actors in the agricultural sectors, they are not considered to bear the biggest agricultural burden. From the preceding conclusions, the following recommendations are proposed:

- Approaches such as PFM and FFS should be supported and maintained in the study areas as models for technology transfer
- The governments should continue supporting FFS by setting aside enough funds for follow up to improve knowledge and skills of farmers gained through FFS programmes
- Establishment of more woodlots using fast growing tree species should be promoted
- Community based ecotourism in the mangrove forests should be scaled up in other parts of region with similar environment in order to promote mangrove conservation and act as alternative source of income to the villagers.
- There is need for sensitization and involvement of farmers in forest management activities to enhance their knowledge on the link between their agricultural activities and ecological, social, and economic wellbeing.
- Financial support targeting women would, therefore be of essence. This support can be in the form of training and capacity building, improved marketing of agricultural products, and increased financing.



## 9.0 REFERENCES

- ACLUMP (Australian Collaborative Land Use and Management Program). 2010. *Status of Land Management practices Activities of the Australian Collaborative Land Use and Management Program*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. 23 pp.
- Adimassu, Z., Langan, S. and Johnston, R. 2016. Understanding determinants of farmers' investments in sustainable land management practices in Ethiopia: review and synthesis. *Environ Dev Sustain* 18:1005 -1023
- Adugna, G. and Bekele, W. 2007. Determinants of land degradation in the Lake Tana Basin and its implications for sustainable land management. The Case of Angereb And Gish-Abbey Watersheds
- Akhtar-Schuster, M., Thomas, R. J., Stringer, L. C., Chasek, P. and Sealy, M. 2011. Improving the enabling environment to combat land degradation: Institutional, financial, legal and science-policy challenges and solutions. *Land Degradation and Development* 22(2): 299-312.
- Amsalu, A. and de Graaff, J. 2007. Determinants of adoption and continued use of stone terraces for soil and water conservation in an Ethiopian highland watershed. *Ecol Econ* 6: 294 - 302
- Banadda, N. 2011. Gaps, barriers and bottlenecks to sustainable land management (SLM) adoption in Uganda. *African Journal of Agricultural Research* 5(25): 3571-3580
- Berhe, S. M. 2018. Final Country Report of the LDN Target Setting Programme in Eritrea. The State of Eritrea, Ministry of Agriculture, Asmara, Eritrea.
- Berkes F, Colding, J. and Folke, C. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* 10(5):1251-1262
- Branca, G., Lipper, L., McCarthy, N. and Jolejole, M.C. 2013. Food security, climate change, and sustainable land management. A review. *Agron. Sustain. Dev.* DOI 10.1007/s13593-013-0133-1
- Colding, J. and Folke, C. 2001. Social Taboos: "Invisible" systems of local resource management and biological conservation. *Ecological Applications*, 11:584-600
- Collins, C., Magnani, R., and Ngomirakiza, E. 2013. USAID Office of Food For Peace Food Security Country Framework for Burundi (FY 2014–FY 2019). Washington, D.C.: FHI 360/FANTA.
- Curtis, M. 2014. Putting small-scale farming first: Improving the national agriculture investment plans for Burkina Faso, Burundi, Ethiopia, Rwanda and Tanzania. Agency for Cooperation and Research in Development.
- Dale, D.D. (ed). 2010. *Sustainable Land Management Technologies and Approaches in Ethiopia*. Sustainable Land Management project, Natural Resources Management Sector, Ministry of Agriculture and Rural Development. Federal Democratic Republic of Ethiopia. [https://issuu.com/wocat/docs/ethiocat\\_book\\_final/91](https://issuu.com/wocat/docs/ethiocat_book_final/91) site visited 29 May 2020
- Dallimer, M., Stringer, L. C., Orchard, S. E., Osano, P., Njoroge, G., Wen, C. and Gicheru, P. 2018. Who uses sustainable land management practices and what are the costs and benefits? Insights from Kenya. *Land Degradation & Development*, 29(9). 2822–35.
- de Graaff, J., Amsalu, A., Bodnar, F., Kessler, A., Posthumus, H. and Tenge, A. 2008. Factors influencing adoption and continued use of long-term soil and water conservation measures in five developing countries. *Appl Geogr* 28: 271 - 280
- Dudley, N. and Sue S. 2002. To Dig or Not to Dig? Criteria for determining the suitability or acceptability of mineral exploration, extraction and transport from ecological and social

- perspectives: a discussion paper for WWF. WWF International and WWF UK. [http://www.wwf.org.uk/filelibrary/pdf/to\\_dig\\_or\\_not\\_to\\_dig1.pdf](http://www.wwf.org.uk/filelibrary/pdf/to_dig_or_not_to_dig1.pdf) Site visited 25 August, 2020
- FAO. 1999. Tropical Forest Management Techniques. A Review of Sustainability of Forest Management Practices in Tropical Countries. Working paper FAO/FPIRS/04. Prepared for the World Bank Forest Policy Implementation Review Strategy. 44 p.
- FAO. 2007. Gender Mainstreaming in Forestry in Africa. Forest Policy Working Paper No. 18. Rome. 61 pp.
- FAO. 2010. *Guidelines on sustainable forest management in drylands of sub-Saharan Africa*. Arid Zone Forests and Forestry Working Paper No. 1. Rome.
- Feldstein, H. and Jiggins, J. 1994. Tools for the Field: Methodologies Handbook for Gender Analysis in Agriculture. Kumarian Press, West Hartford
- Foley, J. A., Defries, R., Asner, G. P., Barford, C., Bonan, G., Carpenter, S. R., Chapin, F. S., Coe, M. T., Daily, G. C., Gibbs, H. K., Helkowski, J. H., Holloway, T., Howard, E. A., Kucharik, C. J., Monfreda, C., Patz, J. A., Prentice, I. C., Ramankutty, N., Snyder, P. K. 2005. Global consequences of land use. *Science* 309 (5734): 570-574.
- Fraser, G.D.E., Dougill, J.A., Mabee, E.W., Reed, M., McAlpine, P. 2006. Bottom up and top down: analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management. *Environ Manage.* 78: 114-127.
- Genanew, B. W. and Alemu, M. 2012. Investments in land conservation in the Ethiopian highlands: a household plot-level analysis of the roles of poverty, tenure security, and market incentives. Discussion Paper Series. Environment for Development
- Houten, H. V. 2002. Natural Resource Management best practices from FARM- Africa's Pastoralist Development Project in Kenya. FARM-Africa. <ftp://ftp.fao.org/docrep/nonfao/LEAD/X6176e/X6176e00.pdf> Site visited 22 August 2020.
- Houten, H. V. 2002. Natural Resource Management best practices from FARM- Africa's Pastoralist Development Project in Kenya. FARM-Africa. <ftp://ftp.fao.org/docrep/nonfao/LEAD/X6176e/X6176e00.pdf> Site visited 25 August, 2020
- Kairo, J. G., Dahdouh-Guebas, F., Bosire, J. and Koedam, N. 2001. Restoration and management of mangrove systems - a lesson for and from the East African region. *South African Journal of Botany*, 67: 383-389.
- Kajembe, G.C., Luoga, E.J., Kijazi, M.S. and Mwaipopo, C.S. 2003. The role of traditional institutions in the conservation of forest resources in East Usambara, Tanzania. *International Journal of Sustainable Development and World Ecology* 10: 101-107
- Kangalawe, R.Y.M., Noe, C., Tungaraza, F.S.K., Naimani, G. and Mlele, M. 2014 Understanding of Traditional Knowledge and Indigenous Institutions on Sustainable Land Management in Kilimanjaro Region, Tanzania. *Open Journal of Soil Science*, 4, 469-493.
- Koyo, J. P. 2004. Watershed management case study: Burundi. Washington DC: FAO
- Lamb, D. and Don, G. 2003. Issues in Forest Conservation, Rehabilitation and Restoration of Degraded Forests. IUCN, Gland, Switzerland and Cambridge, UK and WWF, Gland, Switzerland.
- Lange, A., Siebert, R. and Barkmann, T. 2015. Sustainability in Land Management: An Analysis of Stakeholder Perceptions in Rural Northern Germany. *Sustainability* 7: 683 – 704
- Lefroy, B.D.R., Bechstedt, D.H. and Rais, M. 2000. Indicators for sustainable land management based on farmer surveys in Vietnam, Indonesia, and Thailand. *Agric Ecosyst Environ.* 81: 137-146.

- Liao, C., Li, L., Yan, Z. *et al.* 2002. Sustainable use of land resource and its evaluation in county area. *Chin. Geograph. Sc.* 12: 61–67
- Liniger, H. P., Mekdaschi, S. R., Hauert, C. and Gurtner, M. 2011. *Sustainable Land Management in Practice – Guidelines and Best Practices for Sub-Sahara Africa*. TerrAfrica, World Overview of Conservation Approaches and Technologies (WOCAT) and Food Agriculture Organization of the United Nations.
- Liverman, D. M., Hanson, M. E., Brown, B. J. and Merideth' R. W. 1988. Global sustainability: toward measurement. *Environ. Manage.* 12(2): 133-143.
- Ludgate, N. and Tata, S. J. 2015. Integrating Gender and Nutrition within Agricultural Extension Services. Burundi Landscape Analysis Working document. INGENAES
- Magigi, W. and Sathiel, A. 2014. Gender Consideration in Sustainable Land Management Project Activities on the Highlands of Kilimanjaro Region: Lessons and Future Outlook. *Open Journal of Soil Science*, 4:185-205
- Mgumia, F.H. and Oba, G. 2003. Potential role of sacred groves in Biodiversity Conservation in Tanzania. *Environmental Conservation*, 30 (3): 259-265.
- Miheretu, B. A. and Yimer, A. A. 2017. Determinants of farmers' adoption of land management practices in Gelana sub watershed of northern highlands of Ethiopia. *Ecol Process* 6:19
- Moller, H., Berkes, F., Lyver, P.O. and Kislalioglu, M. 2004. Combining science and traditional ecological knowledge: Monitoring populations for Co-management. *Ecology and Society* 9(3)
- Msuya, T. S. and Kideghesho, J. R. 2009. The Role of Traditional Management Practices in Enhancing Sustainable Use and Conservation of Medicinal Plants in West Usambara Mountains, Tanzania. *Tropical Conservation Science* 2(1): 88-105.
- Mugasha, W.A. and Katani, J. Z. 2016. Identification of unsustainable land-use practices that threaten water sources and other ecosystem services in Kilosa District. TFCG Technical Report 49.
- Noble, I.R., Hu, S., Anokhin, Y.A., Carmin, J., Goudou, D., Lansigan, F.P., Osman-Elasha, B., and Villamizar, A. 2014. Adaptation needs and options. In: C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L. L. White (Eds.). *Climate change (2014): Impacts, adaptation, and vulnerability. Part A: global and sectoral aspects*. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, USA.
- Overholt, C., Anderson, M.B., Cloud, K. and Austin, J.E. 1985. Gender Roles in Development Projects: A Case Book. Connecticut, Kumarian Press.
- Pedro, P. S. 2011. Investing in agriculture in Burundi: Improving food security and conditions for women farmers. Oxfam Research Reports. Summary.
- Pender, J., Nkonya, E., Jagger, P., Sserunkuuma, D. and Ssali, H. 2004. Strategies to increase agricultural productivity and reduce land degradation: evidence from Uganda. *Agricultural Economics* 31(2/3): 181-195.
- Republic of Burundi. 2015. Intended Nationally Determined Contribution (INDC) / Burundi. 14 pp
- Republic of Uganda. 2013. The National Forest Plan 2011/12 – 2021/22. Ministry of Water and Environment, Directorate of Environmental Affairs, Kampala Uganda. 118 pp
- Saj, T.L., Mather, C. and Sicotte. P. 2006. Traditional taboos in biological conservation: the case of *Colobus vellerosus* at the Boabeng-Fiema Monkey Sanctuary, Central Ghana. *Social Science Information* 45(2):285-310
- Sanz, M. J., Vente, J. de., Chotte, J. L., Bernoux, M., Kust, G., Ruiz, I., Almagro, M., Alloza, J.-A., Vallejo, R., Castillo, V., Hebel, A. and Akhtar-Schuster, M. 2017. Sustainable

- Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. 178 pp
- Senner, K. 2001. Mukuru Recycling Centre-A Gender Evaluation. Best Practices and Local Leadership Programme of the UN-Habitat. <http://www.blpnet.org/learning/learning03b.htm> Site visited 22 August 2020.
- Smith, P., Bustamante, M. and Ahammad, H. et al. 2014. Agriculture, forestry and other land-use (AFOLU). In: *Climate Change 2014: Mitigation of Climate Change*. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, pp. 811–922. Cambridge University Press, Cambridge.
- Smyth A.J. and Dumanski, J. 1993. FESLM: An international framework for evaluating sustainable land management. A discussion paper. Food and Agriculture Organization of the United Nations, Rome, Italy. World Soil Resources Report.
- Soutter R, Ntiamoa-Baidu Y, Smith J and Rana D. 2003. Recognising the contribution of Sacred Natural Sites for biodiversity conservation. *A paper presented at the World Parks Congress in Durban, South Africa*
- URT (United Republic of Tanzania). 2014. Compendium of best practices for sustainable land management in Tanzania. Vice President's Office, Division of Environment, Dar es Salaam, Tanzania. 92 pp.
- Verheye, W. 2006. Land use management. Land use, land cover and soil sciences. Vol IV. Encyclopedia of Life Support Systems (EOLSS). *National Science Foundation Flanders/Belgium and Geography Department, University Gent, Belgium*
- von Braun, J., Gerber, N., Mirzabaev, A. and Nkonya, E.M. 2013. The economics of land degradation (No. 147910). University of Bonn, Center for Development Research (ZEF), Bonn
- Webb, T. 2004. Understanding behaviour: Social and economic influences on land practice change, Australia. *A Paper Presented at the Workshop on Land Management Practices Information Priorities, Classification and Mapping – Towards an Agreed National Approach*, Kamberra Winery, Canberra 11-12 May 2004, Bureau of Rural Sciences, Australia. 7pp.
- Weith, T., Repp, A. and Besendörfer, C. 2013. The concept of Sustainable Land Management: A comparative discussion (at a global scale). 49<sup>th</sup> ISOCARP Congress. Leibniz-Centre for Agricultural Landscape Research (ZALF), Germany.
- Wily, A. 2000. Making woodland management more democratic: Cases from Eastern and Southern Africa. Issue Paper No. 99. IIED Drylands Programme. 17 p.
- WOCAT (World Overview of Conservation Approaches and Technologies). 2016. Questionnaire on Sustainable Land Management (SLM) Approaches: A tool to help document, assess, and disseminate SLM practices. 21 pp
- WOCAT (World Overview of Conservation Approaches and Technologies). 2011. *Sustainable Land Management in Practice. Guidelines and Best Practices for Sub-Saharan Africa: Field application*. A TerrAfrica Partnership Publication. 240 pp
- WOCAT (World Overview of Conservation Approaches and Technologies). 2002. *Questionnaire on SWC Technologies. A Framework for the Evaluation of Soil and Water Conservation (revised)*. Centre for Development and Environment. Institute of Geography, University of Berne, Berne. 63 pages.
- World Bank. 2006a. Sustainable land management: challenges, opportunities, and trade-offs. The International Bank for Reconstruction and Development. Washington, DC.
- World Bank. 2006b. Land Management Sourcebook. The International Bank for Reconstruction and Development. Washington, DC. 196 pp.
- World Bank. 2007. Review on the determinants of the adoption of sustainable land management practices and their impacts in the Ethiopian highlands, New York

- Yirga, C. 2007. The dynamics of soil degradation and incentives for optimal management in central highlands of Ethiopia. Unpublished Ph.D. thesis. Department of Agricultural Economics, Extension, and Rural Development. University of Pretoria, South Africa
- Zeleeke, G., Kassie, M., Pender, J. and Yesuf, M. 2006. Stakeholder Analysis for Sustainable Land Management (SLM) in Ethiopia: Assessment of Opportunities, Strategic Constraints, Information Needs, and Knowledge Gaps. SECOND DRAFT, A report prepared by the Environmental Economics Policy Forum for Ethiopia (EEPFE) and International Food Policy Research Institute (IFPRI), 97 pp.

# Annexes

## Annex 1: Questionnaire on Sustainable Land Management (SLM) Practices and Approaches

Name Interviewer and affiliation: -----

Overall aim of the study: To assess land management approaches and practices in mangrove forests to inform the adoption of land use systems that, through appropriate management practices, enable land users to maximise the economic, social and ecological benefits from the land while protecting forests.

### General information

Date of interview ----- Country name -----

District/county name ----- Village name -----

Name of interviewee -----

1. Sex of the respondent (1) Male (2) Female
2. Age of respondent (in years) -----
3. Marital status -----
4. Education level -----
5. Family size -----

### Specific information

#### Task 1: Identify and document land management approaches and practices, including policies guiding them, applied in different forest type areas

1. Which of the listed SLM practices and approaches are applied into your farms for protection of mangroves in this area? Please tick all that are applicable from the list provided below.

#### A: Agronomic/soil management

<b>Vegetation/ soil cover</b>	<b>Organic matter/soil fertility</b>	<b>Soil surface treatment</b>
Better crop cover by vegetation	Green manure cropland	Breaking compacted topsoil
Early planting	Legume inter-planting	Conservation tillage
Relay cropping	Applying manure	Contour tillage
Mixed cropping	Applying mineral fertilizers	Contour ridging
Contour planting/ strip cropping	Applying soil conditioners (lime, gypsum)	Furrows (drainage, irrigation)
Retaining more vegetation cover	Rotations / fallows	Deep tillage / double digging
Cover cropping	Others (specify)	Others (specify)
Mulching		
Temporary trash lines		
Others (specify)		

<b>B. Vegetative measures</b>					
Agroforestry		Windbreaks		Afforestation	
Vegetation strips along riverbanks		Grass strips along the contour		Upper catchment reforestation	
Hedges		Fire breaks		Live fences	
Protection of natural tree vegetation/ farmer-managed natural regeneration		Tree nurseries		Others (specify)	

**C. Structural measures**

Terraces		Earth bunds		Stone bunds	
Retention/ infiltration ditches		Planting holes		Micro-catchments	
water-spreading weirs		Dams		Pans to store water	
Stone and earth walls with planted vegetation		Barriers		Palisades	
Gabions		Others (specify)			

**D. Management measures**

Change of land use type		<b>Change of land use practices</b>		<b>Layout according to natural and human environment</b>	
Area closure/resting		From grazing to cutting (for stall feeding)		Exclusion of natural waterways and hazardous areas	
Protection		Change from mono-cropping to rotational cropping		Separation of grazing types	
Change from grazing land to cropland		Farm enterprise selection (degree of mechanization, inputs, commercialization)		Distribution of water points, salt-licks, livestock pens, dips (grazing land)	
Change from crop to grazing land		Change from open access to controlled access (grazing land, forests)		Reduction of invasive species	
Change from continuous cropping to managed fallow		Staged use to minimize exposure (e.g. staged excavation)		Selective clearing	
Change from forest to agro-forestry		Rotational grazing		Encouragement of desired species	
<b>Major change in timing of activities</b>		Control of invasive species		Controlled burning / residue burning	
Planting		Improving pastures			
Cutting of vegetation		Integrating livestock for organic fertilization			
Others (specify)		Afforestation			
		Irrigation			

--	--	--	--	--	--

2. How have the practices and approaches been developed (their origin)?
- Through land user's initiative (innovation, traditional)
  - Through experiments / research
  - Externally / introduced through project
  - Others (specify): -----
3. Proportion of the area of land covered by the good practice: -----
4. Have you received financial/ material support for implementing the selected SLM practices and approaches? Please explain -----  
-----
5. Indicate the estimated annual budget received per year -----

6. Please state the type of land degradation that you were aiming to address?

	Type of land degradation addressed	SLM practices and approaches selected from above list
1.	Water-induced soil erosion	
2.	Wind-induced soil erosion	
3.	Loss of biodiversity	
4.	Compaction/ soil sealing and crusting	
5.	Water degradation	
6.	Salinity	
7.	Soil fertility mining	
8.	Soil pollution	
9.	Rangeland degradation	
10.	Climate change	
11.		

7. For each of the selected SLM practices and approaches, who are the major actors (local populations, NGO, private sector, government department, etc) helping you in that process?

S n	SLM approaches and practices selected from above list	Actors involved (local populations, government department, NGO, private sector, civil societies etc)	Precise date of starting
1.			
2.			
3.			
4.			



--	--	--	--

**Task 2: Assess the sustainability of promising land management approaches and practices identified under No. 1 above**

8. From the above selected SLM practices and approaches, rate their sustainability based on the criteria shown in the Table below

S n	Land management practices and approaches selected from above list	Criteria (for each criterion write 1=high; 2=medium; 3=low; 4=not applicable against SLM practice and approach)								
		Effectiveness	Efficiency	Relevance	Ethical soundness	Community involvement	Partnership and collaboration	Political commitment	Sustainability	Replication and adoption
1.										
2.										
3.										
4.										
5.										
6.										

**Task 3: Evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with (a) the development of forests and (b) protection of forests and (c) development and protection of trees outside forests**

9. Evaluate the potential of the identified land management approaches and practices under task no. 2 above, in terms of their compatibility with the development of forests based on the following criteria

Ecological criteria	Very satisfying	Satisfying	Unsatisfying	Neither satisfying nor unsatisfying	Not applicable	No answer	Not at all satisfying
Protection of ecologically sensitive areas							
Minimized soil erosion							
Status of natural regeneration							
Protection of endangered plant/animal species							
Interventions are highly specific, selective and are confined to the							

barest minimum							
Minimized canopy opening							
Enrichment planting based on indigenous, locally adapted species							

<b>Economic Criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Income contribution to households							
Payment of ecosystems services							
Access to benefits coming from timber products							
Access to benefits from non-timber forest							
Ecotourism including hunting, recreation							
Share of forest sector in the government							
Investment in forests and forestry industries, including natural forest conservation, forest recreation and ecotourism							
Investment in forest education, research and extension							
Degree of recycling of forest products							

<b>Social Criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Cultural conservation heritage							
Gender access to land use management							
Direct and indirect employment in the forestry sector							
Tenure/use rights are well defined and upheld							
Gender access to land use management							

Contributions to food security							
Indigenous people right to access forest resources							
Resource use conflicts are minimal or settled							

10. Evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with the protection of forests based on the following criteria

<b>Ecological criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Protection of ecologically sensitive areas							
Minimized soil erosion							
Status of natural regeneration							
Protection of endangered plant/animal species							
Interventions are highly specific, selective and are confined to the barest minimum							
Minimized canopy opening							
Enrichment planting based on indigenous, locally adapted species							

<b>Economic Criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Income contribution to households							
Payment of ecosystems services							
Access to benefits coming from timber products							
Access to benefits from non-timber forest							
Ecotourism including hunting, recreation							
Share of forest sector in the government							
Investment in forests and forestry							

industries, including natural forest conservation, forest recreation and ecotourism							
Investment in forest education, research and extension							
Degree of recycling of forest products							

<b>Social Criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Cultural conservation heritage							
Gender access to land use management							
Direct and indirect employment in the forestry sector							
Tenure/use rights are well defined and upheld							
Gender access to land use management							
Contributions to food security							
Indigenous people right to access forest resources							
Resource use conflicts are minimal or settled							

11. Evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with the development and protection of trees outside of forests based on the following criteria

<b>Ecological criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Protection of ecologically sensitive areas							
Minimized soil erosion							
Status of natural regeneration							
Protection of endangered plant/animal species							
Interventions are highly specific, selective and are confined to the barest minimum							

Minimized canopy opening							
Enrichment planting based on indigenous, locally adapted species							

<b>Economic Criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Income contribution to households							
Payment of ecosystems services							
Access to benefits coming from timber products							
Access to benefits from non-timber forest							
Ecotourism including hunting, recreation							
Share of forest sector in the government							
Investment in forests and forestry industries, including natural forest conservation, forest recreation and ecotourism							
Investment in forest education, research and extension							
Degree of recycling of forest products							

<b>Social Criteria</b>	<b>Very satisfying</b>	<b>Satisfying</b>	<b>Unsatisfying</b>	<b>Neither satisfying nor unsatisfying</b>	<b>Not applicable</b>	<b>No answer</b>	<b>Not at all satisfying</b>
Cultural conservation heritage							
Gender access to land use management							
Direct and indirect employment in the forestry sector							
Tenure/use rights are well defined and upheld							
Gender access to land use management							
Contributions to food security							

Indigenous people right to access forest resources							
Resource use conflicts are minimal or settled							

12. What are the positive ecological, economic and social outcomes of the selected SLM practices and approaches?

- a. Has the quality/cover of the mangroves increased compared before the implementation of the approach? Please explain -----  
-----
- b. Are the goods and services offered by the mangroves changed compared before the implementation of the approach? Please explain -----  
-----  
-----
- c. Is there evidence that some tree species have been introduced after the implementation of the approach? Please explain -----  
-----  
-----
- d. Are there local institutions established or strengthened through the identified SLM approach? ☐no ☐yes, a little ☐yes, moderately ☐yes, greatly? Please explain-----  
-----  
-----
- e. Are there mechanisms for benefit sharing accrued from implementing the identified SLM practices and approaches in this village? Please explain -----  
-----  
-----

**Task 4: Assess the extent to which forest stakeholders are incorporating the identified SLM approaches and practices in their forest plans and activities**

**Practice appropriation by communities**

Assessment criteria	Very satisfying	Satisfying	Unsatisfactory	Neither satisfactory nor unsatisfactory	Not at all satisfactory	No answer	Not applicable
Communities participation in sensitization sessions							
Establishment of a community management and watch structure							
Respect for good practice when cutting wood forest products							

Assessment criteria	Very satisfying	Satisfying	Unsatisfactory	Neither satisfactory nor unsatisfactory	Not at all satisfactory	No answer	Not applicable
Respect for good practice during the processing / industrialization of wood forest products							
Respect of good practice when harvesting non timber forest products							
Respect of good practice in agricultural and / or livestock							
Respect of good practice when distributing and managing land							
Communities organisations to protect forests/land							
Organisation of communities work to protect trees out from forests							
Active participation of women at community level							

**Task 5: Assess gender roles in protecting forest lands and adoption of appropriate SLM approaches and practices in selected different forest types**

13. For each land management practice/approach identified in Qn. 1, explain:

- a. whether there are social group(s) that practice it more than others? -----  
-----  
-----
- b. List the elements that motivate women/youth to adopt good practice-----  
-----  
-----
- c. List the elements that prevent women/youth from adopting the good practice--  
-----  
-----
- d. Cite the positive changes for women/youth brought about by good practice-----  
-----  
-----
- e. Cite the negative changes for women/youth brought about by good practice---  
-----  
-----
- f. List women/youth demands / needs in relation to good practice-----  
-----

- -----
- g. Representation of women in decision making -----  
-----  
-----
  - h. Equity in tasks responsibilities and means of executing -----  
-----  
-----
  - i. Land/resources access -----  
-----  
-----  
-----



## Annex 2: Checklist for Focus Group Discussions

### **Sustainable Land Management (SLM) Practices and Approaches**

Name of interviewer and affiliation: -----

Overall aim of the study: To assess land management approaches and practices, in mangrove forest to inform the adoption of land use systems that, through appropriate management practices, enable land users to maximise the economic, social and ecological benefits from the land while protecting mangrove forests.

#### **General information**

Date of interview -----

Country name -----

District name -----

Village name -----

Name of participants, specializations and their corresponding sexes

- 1 -----
- 2 -----
- 3 -----
- 4 -----
- 5 -----
- 6 -----
- 7 -----

#### **Specific information**

##### **Task 1: Identify and document land management approaches and practices, including policies guiding them, applied in different forest type areas**

1. What are the existing SLM practices and approaches applied in this area which are relevant in the protection of mangrove forests?
2. Please state the aims of implementing the above listed SLM practices and approaches?
3. For each of the listed SLM practices and approaches, please describe the methods that were used to implement it?
4. For each of the listed SLM practices and approaches, who are the stakeholders (NGO, private sector, government department, etc) involved in their implementation?
5. Are there by-laws governing implementation of the above mentioned SLM practices for the protection of mangrove forest in this area? (1) Yes (2) No
6. If yes, please name them all -----
7. What do the by-laws state regarding protection of mangrove forest in this area?

##### **Task 2: Assess the sustainability of promising land management approaches and practices identified under No. 1 above**

8. From the above selected list of SLM practices and approaches, describe their sustainability based on the following criteria in the protection of mangrove forests
  - i. effectiveness,

- ii. efficiency,
- iii. relevance,
- iv. ethical soundness,
- v. community involvement,
- vi. partnership and collaboration,
- vii. political commitment,
- viii. sustainability, and
- ix. replication and adoption

**Task 3: Evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with (a) the development of forests and (b) protection of forests and (c) development and protection of trees outside forests**

9. What are the positive ecological, economic and social outcomes of the selected SLM practices and approaches?
- a. Has the quality/cover of the mangrove forest increased compared before the implementation of the approach?
  - b. Are the goods and services offered by the mangrove forest changed compared before the implementation of the approach?
  - c. Is there evidence that some tree species have been introduced after the implementation of the approach?
  - d. Are there local institutions established or strengthened through the identified SLM approach? ☐☐☐☐no ☐☐yes, a little ☐☐yes, moderately ☐☐yes, greatly? Please explain-----
  - e. Do you have access to the mangrove forest for timber and or non-timber forest products? Please explain -----
  - f. Are there mechanisms for benefit sharing accrued from implementing the identified SLM practices and approaches in this village? Please explain -----  
-----

**Task 4: Assess the extent to which forest stakeholders are incorporating the identified sustainable land management (SLM) approaches and practices in their forest plans and activities**

10. To what extent does the village government incorporate the identified SLM approaches and practices in its plans and activities?
- a. to implement measures to maintain or improve the quality of mangrove forests
  - b. to promote the accessibility of forest resources
  - c. to improve knowledge of mangrove forests formations, to help conserve biological diversity
  - d. to create synergies between climate change and biodiversity
  - e. to secure community participation in the monitoring and prevention of threats to mangrove forests health
  - f. to minimize the risk of extreme climatic conditions
  - g. to identify and prevent threats or limitations to forest growth and reproduction
11. Adoption of the practice(s) by local authorities (local government) and their perception vis-a-vis of other actors

Assessment criteria	Very satisfying	Satisfying	Unsatisfactory	Neither satisfactory nor unsatisfactory	Not at all satisfactory	No answer	Not applicable
Organization and participation of the local community in awareness actions on good practices							
Existence of a service within the community responsible for monitoring the implementation of good practice							
Consideration of good practice in the budget of the local collectivity							
Supervision / control of compliance with good practice during cutting campaigns for wood forest products							
Supervision / control of compliance with good practice during harvest campaigns for Non-Timber Forest Products							
Good practice monitoring during land distribution							
Active participation of women at community level							

**Task 5: Assess gender roles in protecting forest lands and adoption of appropriate SLM approaches and practices in selected different forest types**

12. Number of women/youth who participated in the initiation of the good practice (if it is an endogenous practice)
13. Number of women/youth who participated in the promotion (popularization) of good practice: in 2019....., 2018....., 2017....., before previous dates
14. Number of women/youth who attended awareness sessions of good practice in 2019....., 2018....., 2017....., before previous dates .....
15. Number of women/youth groups that adopted good practice in 2019....., 2018....., 2017.....
16. Proportion of women/youth who have adopted good practice in relation to the number of target women 2019....., 2018....., 2017.....
17. Budget invested by women/youth for access to good practice 2019....., 2018....., 2017.....
18. Rate of increase in annual income of women who adopt the good practice 2019 ....., 2018....., 2017
19. Proportion of posts occupied by women/youth in decision-making bodies within organizations set up for good practice:
  - i. at national level.....
  - ii. at regional / district level
  - iii. at the municipal level
  - iv. at the village level
20. Number of women/youth owners of land covered by good practice: in 2019....., 2018....., 2017.....
21. Proportion of the area of forests belonging to women/youth on the total area: 2019....., 2018....., 2017.....

22. List the infrastructure and equipment made for women/youth thanks to good practice and the number of beneficiaries

- .....  
.....
- .....  
.....
- .....  
.....

23. List women/youth demands / needs in relation to good practice

- .....  
.....
- .....  
.....

Annex 3: Checklist for key informant interviews

**Sustainable Land Management (SLM) Practices and Approaches in Eastern Africa**

**Land, Forest, Agriculture, Livestock, Fisheries, Wildlife Officers (at ministerial and district/county levels), NGO and private sectors including all the development agency (civil society)**

Name of interviewer and affiliation: -----

Overall aim of the study: To assess land management approaches and practices in mangrove forests in Eastern Africa to inform the adoption of land use systems that, through appropriate management practices, enable land users to maximise the economic, social and ecological benefits from the land while protecting forests.

**General information**

1. Date of interview -----
2. Country name -----
3. Name of the Organization/Institution -----
4. Name of interviewee -----
5. Position-----
6. Qualification -----
7. Years of service in that post ----- Email-----
8. Education level

**Task 1: Identify and document land management approaches and practices, including policies guiding them, applied in different forest type areas**

9. What are the existing land management practices and approaches implemented by your organization which are relevant in mangrove forests protection in this country?
10. If the practice concerns a tree species, specify the name -----
11. For each of the identified land management practices, indicate the age of that good practice -----
12. For each of the land management practices and approaches identified in Qn. 9, which areas in this country (Districts, villages) use them dominantly?
13. For each of the land management practices and approaches identified in Qn. 9, which stakeholders (local communities, NGO, private sector, government department, etc) are/were involved in implementing them?
14. Describe how the land management practices and approaches identified in Qn. 9 are carried out?
15. What are the main reasons toward practicing the identified SLM practices and approaches?
16. Proportion of inhabitants (estimate if necessary) who have adhered to the good practice: -----
17. Proportion of farmers who have adopted the good practice: -----
18. Proportion of the mangrove forest area covered by the good practice: -----
19. Proportion of the area of land covered by the good practice: -----
20. Budget mobilized by the community in 2019, .....2018,..... 2017 .....
21. Recipes made by the community in 2019, .....2018,..... 2017 .....
22. List the infrastructure and equipment produced thanks to good practice and the number of beneficiaries

23. Are there policies, plans, strategies in your sector governing SLM practices in this country?

(1) Yes (2) No

24. If yes, please name them all -----

25. What do the policies, plans and strategies state regarding mangrove forests protection in this country?

**Task 2: Assess the sustainability of promising land management approaches and practices identified under No. 9 above**

26. From the list of land management practices and approaches identified in Qn. 9, please, describe their sustainability in mangrove forests protection based on the following criteria:

- i. effectiveness,
- ii. efficiency,
- iii. relevance,
- iv. ethical soundness,
- v. community involvement,
- vi. partnership and collaboration,
- vii. political commitment,
- viii. sustainability, and
- ix. replication and adoption

**Task 3: Evaluate the potential of the identified land management approaches and practices under no. 2 above, in terms of their compatibility with (a) the development of forests and (b) protection of forests and (c) development and protection of trees outside forests**

27. What are the positive ecological, economic and social outcomes of the selected SLM practices and approaches?

a. Has the quality/cover of the mangroves increased compared before the implementation of the approach? Please explain -----

-----

b. Are the goods and services offered by the mangroves changed compared before the implementation of the approach? Please explain -----

-----

c. Is there evidence that some tree species have been introduced after the implementation of the approach? Please explain -----

-----

d. Are there local institutions established or strengthened through the identified SLM approach? ☐no ☐yes, a little ☐yes, moderately ☐yes, greatly? Please explain-----

-----

e. Do communities have access to the mangroves for timber and or non-timber forest products? Please explain -----

- 
- 
- f. Are there mechanisms for benefit sharing accrued from implementing the identified SLM practices and approaches? Please explain -----
- 
- 

**Task 4: Assess the extent to which forest stakeholders are incorporating the identified sustainable land management (SLM) approaches and practices in their forest plans and activities**

28. To what extent does the organization (stakeholders) incorporate the identified SLM approaches and practices in its plans and activities?

- a. to implement measures to maintain or improve the quality of mangrove forests
- b. to promote the accessibility of forest resources
- c. to improve knowledge of mangrove forests formations, to help conserve biological diversity
- d. to create synergies between climate change and biodiversity
- e. to secure community participation in the monitoring and prevention of threats to mangrove forests health
- f. to minimize the risk of extreme climatic conditions
- g. to identify and prevent threats or limitations to forest growth and reproduction

29. Adoption of the practice (s) by the administrative and technical services of the State and their perception vis-à-vis of other actors

Assessment criteria	Very satisfying	Satisfying	Unsatisfactory	Neither satisfactory nor unsatisfactory	Not at all satisfactory	No answer	Not applicable
Participation of state representatives at local level in awareness-raising actions on good practice							
Participation of state representatives at regional level in awareness-raising actions on good practice							
Taking into account the financial needs for good practice in the state budget							
Taking good practice into account in state sectoral policy							
Consideration of good practice in national legislation							
Consideration of good practice in the national action plan							
Supervision / control of compliance with good practice during cutting campaigns for wood forest products							
Supervision / control of compliance with good practice during cutting campaigns for Non Timber Forest Products							

Assessment criteria	Very satisfying	Satisfying	Unsatisfactory	Neither satisfactory nor unsatisfactory	Not at all satisfactory	No answer	Not applicable
Monitoring of compliance with good practice during the distribution of land							
Organization and / or supervision of community forest and / or land protection works							
Organization and / or supervision of community work to protect trees outside forests							
Active participation of women in technical and administrative services responsible for good practice							

Appropriation of the practice (s) by local authorities (local government) and their perception vis-a-vis of other actors

Assessment criteria	Very satisfying	Satisfying	Unsatisfactory	Neither satisfactory nor unsatisfactory	Not at all satisfactory	No answer	Not applicable
Organization and / or participation of the local community in vulgarization / awareness actions on good practices							
Existence of a service within the community responsible for monitoring the implementation of good practice							
Consideration of good practice in the budget of the local collectivity							
Supervision / control of compliance with good practice during cutting campaigns for wood forest products							
Supervision / control of compliance with good practice during harvest campaigns for Non Timber Forest Products							
Good practice monitoring during land distribution							
Active participation of women at community level							

**Task 5: Assess gender roles in protecting forest lands and adoption of appropriate SLM approaches and practices in selected different forest types**

30. Number of women/youth who participated in the initiation of the good practice (if it is an endogenous practice)
31. Number of women/youth who participated in the promotion (popularization) of good practice: in....., 2018....., 2017....., before previous dates
32. Number of women/youth who attended awareness sessions of good practice in 2019....., 2018....., 2017....., before previous dates .....



33. Number of women/youth groups that adopted good practice in 2019....., 2018....., 2017.....
34. Proportion of women/youth who have adopted good practice in relation to the number of target women 2019....., 2018....., 2017.....
35. Budget invested by women/youth for access to good practice 2019....., 2018....., 2017.....
36. Rate of increase in annual income of women who adopt the good practice 2019 ....., 2018....., 2017
37. Proportion of posts occupied by women/youth in decision-making bodies within organizations set up for good practice:
  - v. at national level.....
  - vi. at regional / district level
  - vii. at the municipal level
  - viii. at the village level
38. Number of women/youth owners of land covered by good practice: in 2019....., 2018....., 2017.....
39. Proportion of the area of forests belonging to women/youth on the total area: 2019....., 2018....., 2017.....
40. List the infrastructure and equipment made for women/youth thanks to good practice and the number of beneficiaries
  - .....  
.....
  - .....  
.....
  - .....  
.....
41. List women/youth demands / needs in relation to good practice
  - .....  
.....
  - .....  
.....



Contact us at:  
African Forest Forum  
P.O. Box 30677-00100 Nairobi GPO KENYA  
Tel: +254 20 722 4203 Fax: +254 20 722 4001  
E-mail: [exec.sec@afforum.org](mailto:exec.sec@afforum.org)  
Website: [www.afforum.org](http://www.afforum.org)

