African Forest Forum

AFF

ASSESSMENT OF FOREST PLANNING AND MANAGEMENT IN DIFERENT FOREST TYPES IN SELECTED AFRICAN COUNTRIES

Cover photos (L-R): Natural stand of Miombo woodland in Zambia (Forest Department Zambia); AFF Rapid Carbon Stock Appraisal training in Guinea Bissau; Rain forest in Victoria falls, Zambia (via Wikimedia Commons).

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Assessment of forest planning and management in different forest types in selected African countries

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ACRONYMS AND ABBREVIATIONS

AFF	African Forest Forum
CBD	Convention on Biological Diversity
DFID	Department for International Development
ESDA	Energy for Sustainable Development Africa
FAO	Food and Agriculture Organization of the United Nations
FCB	Forest Conservation Botswana
FRN	Federal Republic of Nigeria
FRS	Federal Republic of Somalia
FSC	Forest Stewardship Council
FSR	Forestry Sector Review
GEF	Global Environmental Facility
GFDRE	Government of the Federal Democratic Republic of Ethiopia
GOM	Government of Malawi.
GRZ	Government of Republic of Zambia
ITTO	International Tropical Timber Organization
KAFU	Kenya Association of Forest Users
KFR	Kitulangálo Forest Reserve
KFS	Kenya Forest Service
KS	Kingdom of Swaziland
LiDAR	Light Detection and Ranging
MEWNR	Ministry of Energy, Water and Natural Resources
MNFR	Mkingu Nature Forest Reserve
MP	Forestry Sector Master Plan
NAP	National Action Programme
NCS	National Conservation Strategy
NEAP	National Environmental Action Plan
NEMS	National Environmental Management Strategy
NFA	National Forestry Authority
NFAP	National Forestry Action Programme
NP	National Legal Policy or Planning Framework
NPCD	National Plan to Combat Desertification
NSO	National Statistical Office
PES	Payment for Ecosystem Services
PFM	Participatory Forest Management
RA	Republic Angola
RADAR	Radio Detection and Ranging
RB	Republic of Botswana
REDD+	Reducing Emissions from Deforestation and forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
RGB	Republic of Guinea-Bissau
RGH	Republic of Ghana
RGM	Republic of Gambia
RK	Republic of Kenya
RL	Republic of Liberia

RM	Republic of Mozambique
RN	Republic of Namibia
RS	Republic of Sudan
RSA	Republic of South Africa
RSS	Republic of South Sudan
RU	Republic of Uganda
RZ	Republic of Zimbabwe
SE	State of Eritrea.
SFM	Sustainable Forest Management
Sida	Swedish International Development and Cooperation Agency
TFAP	Tropical Forests Action Programme
ToR	Terms of Reference
TPF	Timber Producers Federation
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
URT	United Republic of Tanzania
WCS	WANLEYS Consultancy Services
ZFD	Zambia Forestry Department

EXECUTIVE SUMMARY

This study is part of a project on "*Strengthening management and use of forest ecosystems for sustainable development in Africa*", which is funded by the Swedish International Development Cooperation Agency (Sida) and implemented by the African Forest Forum (AFF). The overall goal of the project is "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 addresses poverty eradication and environmental protection in Africa". One of the key project objectives is to identify and promote opportunities for protecting and sustainably managing the forest resource base of the continent as well as the supply of its ecosystem' goods and services. The consultancy assignment of which this report is part of is titled: "Assessment of forest planning and management in different forest types in selected African countries". The purpose of the study is to evaluate ways for improving forest planning and forest management in selected countries in Anglophone and Lusophone Africa with the aim to enhance the supply of forest ecosystem goods and services. This particular report covers only some select countries from Anglophone and Lusophone Africa.

The specific objectives of the study are: ***On forest planning****:* a) Evaluate the planning processes found in forest types in the selected countries and; b) Evaluate the adequacy of the plans in terms of accuracy/reliability and adequacy of information used, tools /techniques/models used for planning and for moving the forest to a desired future structure, adequacy of knowledge and skills for their development, sensitivity to gender considerations, inclusiveness of related sectors, constraints in planning and ways to contain them. ***On forest management****:* c) Evaluate institutions implementing forest management; d) Assess human, financial and physical resources available for forest management; (e) Assess the extent of compliance to plans by implementing institutions, constraints experienced and how to overcome them and; f) Evaluate the state of management of the forest types in the selected African countries.

A total of 28 Anglophone and Lusophone countries were covered in this study. Field work was conducted in selected forests in Angola, Tanzania, Zambia and Zimbabwe. The methodology involved two aspects: (1) literature review to source secondary information and data; (2) field work. Both aspects were guided by a checklist of guiding questions that were derived to cover the details necessary to fulfil the objectives of the study. Data and information from literature review and field work was summarized into tables and charts.

Results show that ***forest planning*** in most countries has been guided by international conventions, agreements, and initiatives that shaped national forest programmes. National forest programmes contributed to forest reforms in terms of revision of forest policies, forest laws and forest acts in most cases to support Participatory Forest Management. Stakeholders involved in forest planning are central government, local government, other government institutions, local communities, NGOs, private sector and the international community. The roles of stakeholders may depend on forest type, and especially on ownership and management rights. Gender was taken into consideration in some country national forest plans, but not considered in others. Even where gender is considered, the consideration is not institutionalized. Most countries had a planning horizon of 5 years or less, made to correspond to the five-year terms held by governments between elections, and also international guidelines for some types of plans.

Most of the plans are not based on recent national forest inventories, instead, they are based on estimates whose sources are not clear or are based on projections from past national forest

inventories. Most of the forest plans studied applied popular statistics and not specific demand and supply analysis. On the basis of an index calculated from considerations of gender, source of data for forest resource dynamics and source of data for demand and supply of forest products, most plans reflect low knowledge and skills employed in their development . The level of knowledge and skills appear to have not improved over the years. In most countries, there are constraints to forest planning including inadequate financial, human, and technical capacity for forest planning by government; overdependence on donor support; institutional and administrative constraints; and inadequate and accurate information.

With respect to **forest management**, in most countries the chain of decision making is long because the most common level of subordination was three, which means the unit responsible for forest management has to go through two levels to meet the minister under which the unit works. The highest percentage of female staff is 45% while the lowest is 3%. The highest percent of degree holders among staff is 53.5% and the lowest is 0.7%.

In every country, local communities have a way of getting forest ownership and user rights. In most countries, men have more access to and ownership of land and other means for forest management, and they harvest products with higher value for shorter times and distances than women. This in turn limits women's access to financial resources and thus ability to purchase facilities for some of the forest operations. The differences in extent and circumstances of gender imbalances vary from country to country depending on the country's peace and political stability and, significance of customary and/or religious traditions versus formal institutions governing forest management. Forest degradation and deforestation often aggravates the burden on women in terms of increasing distances to sources of forest products. Women also play a significant role in conservation work to recover from forest degradation and deforestation. Most countries have rural access index values that suggest that access of rural areas for forest management is a challenge. In some countries, expenditure in forest management is a few dollars per hectare per year. Most of the planned activities for forest management have not been fully implemented and are in progress. All studied countries have institutional, human capacity and financial constraints. More than 70% of the studied countries had loss of forest area and growing stock between 1990 and 2015. Constraints to requisite state of forest management include agricultural expansion, infrastructure extension, wood extraction, demographic factors, economic factors, technological factors, policy, institutional, cultural factors, globalization drought, destructive animals, disease and insect outbreaks, fires and floods.

The study recommends that countries should own forest planning to maintain their sovereignty. Stakeholder awareness should be enhanced to ensure they know and play their roles. Forest plans should give gender proper considerations. Forest plans should include longer terms than 5 years as well as shorter term 5-year plans. Forest plans should be based on recent forest inventory and analysis of demand and supply of forest products. There should be training to improve the knowledge and skills for forest planning. Governments should commit more resources to forest planning. The study further recommends research to understand how the findings of this study could be applied to improve forest management. The research should focus on: 1. How level of subordination of forest management unit influences forest management; 2. Implications of staff numbers and levels of training by gender on forest management; 3. How local communities utilize the opportunities for forest ownership and user rights; 4. Ways to improve gender equality in forest management; 5. How rural access by road affects forest management; 6. Dynamics of expenditure in forest management; 7. How to improve implementation of planned forest management activities; 8. How to redress the institutional, human capacity, and financial constraints and; 9. How to reverse loss of forest area and growing stock.

1.0 INTRODUCTION

1.1 The African Forest Forum
The African Forest Forum (AFF) is a pan-African non-governmental organization with its headquarters in Nairobi, Kenya. It is an association of individuals who share the quest for and commitment to the sustainable management, use and conservation of the forest and tree resources of Africa for the socio-economic wellbeing of its people and for the stability and improvement of its environment. The purpose of AFF is to provide a platform and create an enabling environment for independent and objective analysis, advocacy and advice on relevant policy and technical issues pertaining to achieving sustainable management, use and conservation of Africa's forest and tree resources as part of efforts to reduce poverty, promote gender equality, and economic and social development.

1.2 Background to the study
AFF is implementing the project entitled "*Strengthening management and use of forest ecosystems for sustainable development in Africa*". The overall goal of the project is "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 addresses poverty eradication and environmental protection in Africa". One of the key project objectives is to identify and promote opportunities for protecting and sustainably managing the forest resource base of the continent as well as the supply of its ecosystems' goods and services.

Forest management requires the execution of silvicultural practices in a forest while at the same time taking into account economic, social, ecological, and cultural aspects. For this to happen, a plan is a prerequisite. The planning process has to be inclusive; for example, to allow various stakeholders to participate in development of the plans and also in forest management. In this regard, the plans should clarify the roles and responsibilities of the various stakeholders. In the context of inclusivity, gender consideration in planning and in forest management is critical because men, youth, and women play different but complimentary roles in forest management, harvesting, and use of forest resources. Excluding women, for example, will deny the planning process, as well as forest management, considerable skills and knowledge possessed by this target group.

Good forest plans can only be developed when reliable, timely, and adequate information is available to guide the planning process. However, scientific literature and other writings paint of a picture that the continent lacks this type of information for planning its forest activities, in addition to other constraints associated with managing forests sustainably (McConnell, 2008; Nzunda, 2012). Information on assessment of Africa's forests, stand dynamics, and capacity to meet increasing demands of growing populations on a sustainable basis is largely lacking. As forests continue to play increasingly critical roles to the welfare of people and survival of animals and plants, as well as to the protection of the environment, development of good plans to guide sustainable supply of ecosystem goods and services is inevitable.

However, some African forests lack good management plans to guide their development, exploitation, as well as their conservation. The implication is that different types of forests in African countries are not managed sustainably. It is within this context that AFF commissioned an assessment of the forest planning process and forest management in different forest types in Africa. These are key in facilitating ways to increase the supply of ecosystem goods and services originating from various forest types in the continent.

According to Akishin (2014), forest planning is the most important condition or requirement for ecologically sustainable and economically efficient forest use. The increasing role of forest planning is based on the obvious need to transition from extensive way of forest management and use of primary natural forests, to an intensive way of secondary reforested forests' management and use. Forest planning in these conditions should provide the required demand in timber and other non-timber products and services.

Planning must be carried out across a range of hierarchical levels (country, regional, site-specific) to ensure that the process is acceptable to all stakeholders (FAO, 1999). Broad scale planning will support the identification of requirements for balancing conservation and development needs of forests and communities. Site-specific planning will support identification of the most desirable management practices to ensure that areas are managed in a sustainable manner.

Forest management is a branch of forestry concerned with overall administrative, legal, economic, and social aspects, as well as scientific and technical aspects, such as silviculture, protection, and forest regulation (Wikipedia, 2020). This includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, forest genetic resources, and other forest resource values. Management can be based on conservation, economics, or a mixture of the two. Techniques include timber extraction, planting and replanting of different species, building roads and pathways through forests, and preventing fire.

1.4 Purpose of the study
To evaluate ways for improving forest planning and forest management in selected countries in Anglophone and Lusophone Africa with the aim to enhance the supply of forest ecosystem goods and services.

1.5 Specific objectives of the study
The study has six objectives as follows:
a) Evaluate the planning processes found in the forest types in the selected countries,
b) Evaluate the adequacy of the plans (annual, short, long term, tree and stand level, etc.), in terms of:
    o accuracy/reliability and adequacy of information used,
    o tools /techniques/models used for planning and for moving the forest to a desired future structure
    o adequacy of knowledge and skills for their development
    o sensitivity to gender considerations
    o inclusiveness of related sectors
    o constraints in planning and ways to contain them
c) Evaluate institutions implementing forest management;
d) Assess human, financial and physical resources available for forest management;
e) Assess the extent of compliance to plans by implementing institutions, constraints experienced, and how to overcome them and;
f) Evaluate the state of management of the forest types in the selected African countries.

2.0 METHODOLOGY

2.1 Forestry characteristics of study countries

A total of 28 countries were covered in this study (Table 1). Among the studied countries, Angola, Zambia and Tanzania had the largest forest area while Sao Tome and Principe, Lesotho and Saint Helena had the smallest forest area by 2015 (FAO, 2015). Only ten out of the 28 countries had primary forest. Other naturally regenerated forests constituted the largest forest area while plantation forest and mangrove forest covered only small areas. Field work was conducted in selected forests in Angola, Tanzania, Zambia and Zimbabwe (Table 2).

2.2 Methods

The methodology involved two aspects: (1) literature review to source secondary information and data; (2) field work. Both aspects were guided by a checklist of guiding questions that were structured to cover the details necessary to fulfil the objectives of the study. Data and information from literature review and field work was summarized into tables and charts.

Table 1. Selected Anglophone and Lusophone countries covered in the study

Country	Country	Country
Angola	Kenya	Sierra Leone
Botswana	Lesotho	Somalia
Cape Verde	Liberia	South Africa
Equatorial Guinea	Malawi	South Sudan
Eritrea	Mozambique	Sudan
Ethiopia	Namibia	eSwatini
Gambia	Nigeria	Tanzania
Ghana	Saint Helena	Uganda
Guinea-Bissau	Sao Tome and Principe	Zambia
		Zimbabwe

Table 2. Selected forests for field work in Angola, Tanzania, Zambia and Zimbabwe

Country	Name of forest	Management purpose	Country	Name of forest	Management purpose
Angola	Mayombe Forest	Production	Tanzania	Mkingu Nature Forest Reserve	Protection
Angola	Umpulo Forest Reserve	Protection	Zambia	Katanino Forest Reserve	Protection
Angola	Brito Teixeira Forest Reserve	Protection	Zambia	Ichimpe Forest Plantation	Production
Tanzania	Sao Hill Forest Plantation	Production	Zimbabwe	Gwaai Gazetted Indigenous Protection Forest	Protection
Tanzania	Kitulanghalo Forest Reserve	Production	Zimbabwe	Stapleford Plantation Forest	Production

3.0 RESULTS

3.1 Evaluation of the planning process

3.1.1 Conventions, policies and guidelines on which forest planning is based
In most countries, forest planning is guided by international conventions, agreements and initiatives that shaped national forest programmes, especially beginning in the late 1980s and in the 1990s (FAO, 2003, 2006; Mayers, 2003) (Figure 1). In most countries, technical guidance and financial support for forest planning was initially obtained from FAO and other development partners. Further, the national forest programmes contributed to revision of forest legislation in most cases to support Participatory Forest Management (PFM) ((Wily, 2002) Figure 1). More recently, especially between 2000s and 2010s, forest programmes based on the use of carbon trade to finance forest conservation came into play (UN-REDD, 2020).

Results from field work show that in Angola and Zambia, forest planning considered international conventions and national policies but not regional directives. The regional directives were considered in forest planning in Tanzania and Zimbabwe. Even for Tanzania and Zimbabwe, only SADC region directives were considered and not Africa-wide directives. In Tanzania and Zimbabwe forest planning considered specific guidelines but these were international for Zimbabwe and national for Tanzania. Only in Angola and Tanzania was forest planning linked to the directives of the ruling party and directives from political leaders. With the exception of Gwaai Forest Reserve in Zimbabwe, which mentioned environmental policy statement for Gwaai forest, no mention of guidelines specific to the forest site was made. The omissions of consideration of some type and level of directives reported herein could either be due to limited scope of consideration of the directives in forest planning or merely due to oversight of the respondents involved in the study.
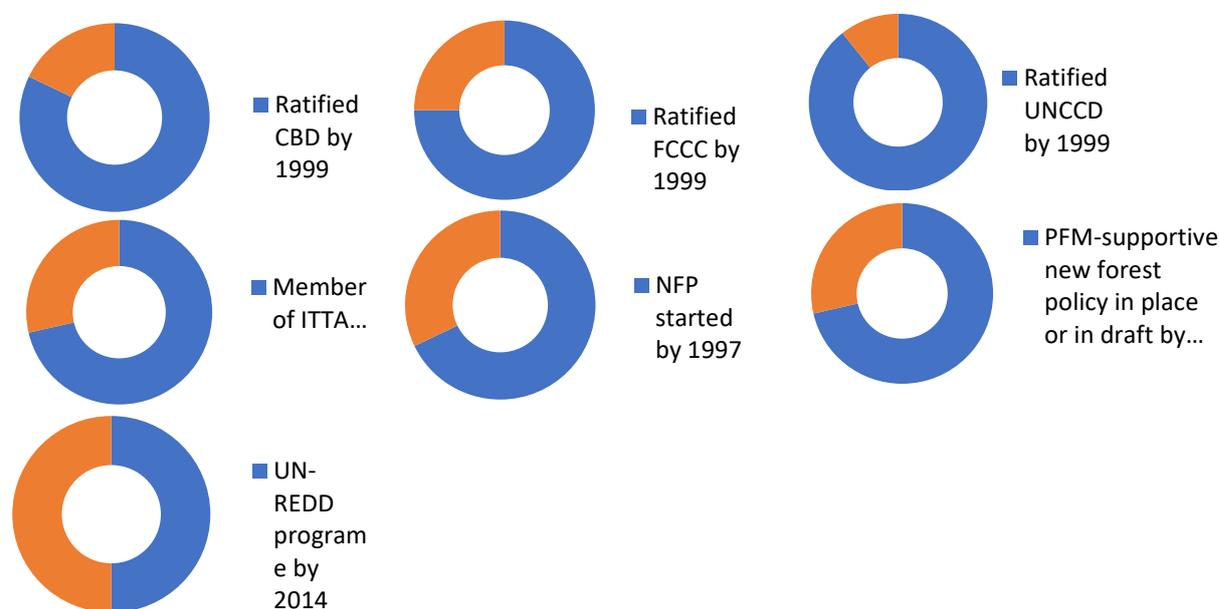
Figure 1. Some of the conventions, policies and guidelines on which forest planning is based in selected African countries. Source: prepared using data from (FAO, 1999b), (UN-REDD, 2020), (Wily, 2002). CBD= Convention on Biological Diversity. FCCC= Framework Convention on Climate Change. UNCCD= United Nations Convention to Combat Desertification. PFM=Participatory Forest Management. ITTA = International Tropical Timber Association. NFP = National Forest Programme. UN-REDD = United Nations Reducing Emissions from Deforestation and forest Degradation.

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3.1.2 Stakeholders and their roles

Stakeholders involved in forest planning are central government, local government, other government institutions, local communities, NGOs, private sector, and the international community. An example is given based on experience from Tanzania whereby these stakeholders have various roles within categories of normative activities, operative activities, and facilitation and monitoring (Figure 2). The roles of stakeholders may depend on forest type, and especially on ownership and management rights (Wily 2002, Figure 3). Public forests are more likely to involve local communities in forest management than private forests. The roles of the stakeholders may also depend on the state of peace and security of the country (FAO, 2004a).

In Angola, for Mayombe Forest, the stakeholders are the company that manages the forest under license, traditional authorities, the Ministry of Culture, Tourism and Environment (MCTA) and the Forestry Development Institute (FDI). The traditional authorities work as guides due to their local knowledge of the forest. MCTA carries out evaluation of environmental impact. FDI issues forest exploitation licenses. On the other hand, for Umpulo, Bié and Brito Teixeira Forest Reserves the stakeholders are Ministry of Agriculture and Forestry (MINAGRIF) through FDI, MCTA through DNAAC and INBAC, academia and forestry companies. MINAGRIF ensures the promotion, coordination and execution of policies outlined in the forestry, wildlife, rural and technological transfer development domains. MCTA implements management and conservation. Academia provides technical and scientific assistance in forest planning. Forestry companies may be contracted by the government to carry out specific tasks related for forest management and conservation.

In Tanzania for Sao Hill Forest Plantation (SHFP) main stakeholder is the government, through Tanzania Forest Services Agency (TFS), which owns and manages the forest. The stakeholders are considered to be either internal or external. Internal stakeholders are staff working for SHFP. External stakeholders include buyers of trees from SHFP, owners of timber milling facilities, smallholder tree out growers, neighbouring villages and other large plantation owning companies. Buyers of trees are the main consumers of products from the forest because SHFP sells standing trees.

The buyers fell the trees themselves. Smallholder tree growers get trained by SHFP in various aspects and are especially important in fire management. Neighbouring villages provide labour, permanent and casual, and are also important in fire management. SHFP collaborates with large plantation owners in some aspects of forest planning including conducting joint training programmes. Similar to situation for SHFP, for Kitulangálo Forest Reserve (KFR) and Mkingu Nature Forest Reserve (MNFR), the main stakeholder is the government through Tanzania Forest Services Agency (TFS). The other stakeholders are local communities and NGOs. These are involved in Joint Forest Management.

In Zambia, for Katanino Forest Reserve, the major stakeholders in the planning process are the government through the Forest Department, the local community, and the private sector. The forest is under Joint Forest Management. However, the involvement of local community in forest planning is limited partly because the community does not depend on the forest reserve as the main source of forest products (Umar and Vedeld 2012). On the other hand, the planning process for the Ichimpe Forest Plantation is exclusively done by ZAFFICO.

The company runs as a parastatal. There is very little involvement of the private sector or the local community in the planning process for the production processes. Other government agencies including the Forest Department, Zambia Forestry College, Ministry of Agriculture, and Ministry of Lands act as advisors to the production forest company.

In Zimbabwe, Gwaai Forest Reserve involves all stakeholders including local communities in the conservation of the gazetted forests through awareness that the resources belong to them, and with Forestry Commission of Zimbabwe being a custodian for ensuring survival of the forest resources. Forest management for Gwaai forest strives to enhance social and economic wellbeing of forest workers and local communities through employment opportunities, training, and provision of forest products.

Preference is given to local communities on employment and training. Where feasible, support is provided for local infrastructure and social programmes on condition that local communities have an active role in the identification of services offered by Forestry Commission or its agents. Communities are given controlled access to forest and non-timber forest products (NTFP) found in Gwaai forest. On the other hand, at Stapleford Plantation forest planning involves the company managing the forest, namely Allied Timbers Zimbabwe. For this forest, the role of the government is to oversee that the forest is managed according to the laws of the country. Local communities are considered in forest planning as source of labour, both permanent and casual.

Normative activities   Operative activities   Facilitation and monitoring
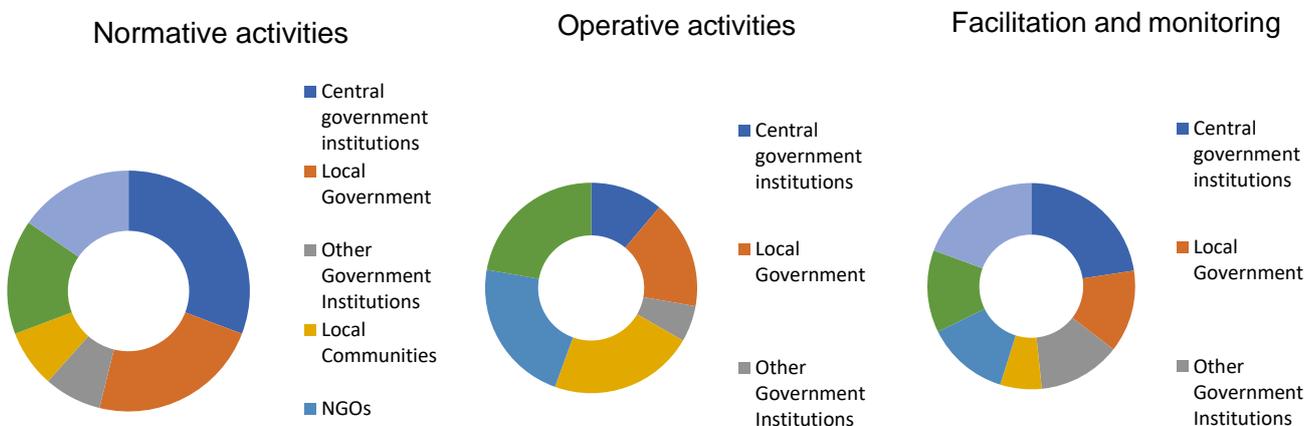
Figure 2. Stakeholders and their roles in forest planning and management in Tanzania guided by the country national forest programme. NGOs have no normative role. International Community have no operative role. Source: Chart prepared using data from (URT), (2001)
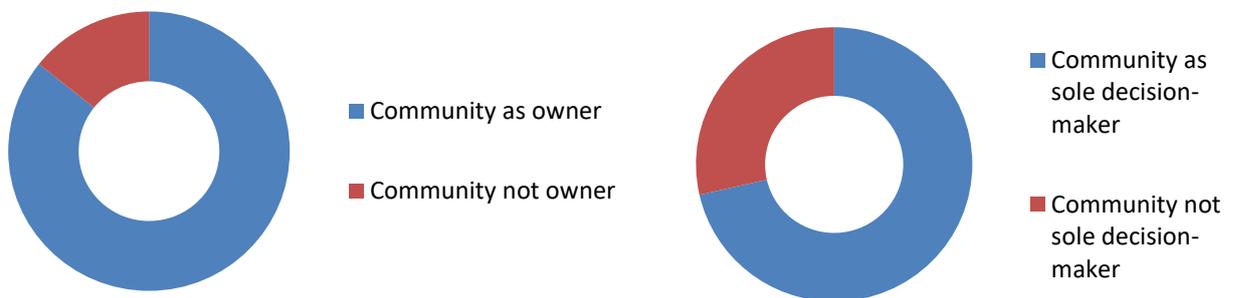
Figure 3. Local communities' involvement in forest planning for community forests in selected African countries. Even when communities are designated forest owners still they may not be sole decision makers. This is based on data for 14 African countries (Wily, 2002)

3.1.3 Gender considerations in forest planning

Based on the review conducted, gender was taken into consideration in some country national forest plans, but not considered in others (Figure 4). For example, from the review eleven plans did not mention gender while one mentioned it 80 times and another one 85 times. In general, there was a tendency to consider gender for more recent documents than older ones, because gender considerations have been receiving more attention in recent times. The wording for gender considerations varied by document, but the aim was the same, which is to ensure gender equality and empowerment of women. Other documents, and especially those produced later in the 2010s, include the broader aspects of equality by considering people with special needs in addition to gender.

In Angola, for the Mayombe forest the company does not include women in its planning for field operations. The reason given for this is that it t is very hard and rural work. Most field workers are male hunters. For the Umpulo, Bié and Brito Teixeira Forest Reserves although there are several women in charge of forest departments and it is women and children who frequently collect non-timber forest products, there is no explicit gender consideration in forest planning. In Tanzania, gender in forest planning is only considered at the village level whereby the bylaws state that half the number of members of the village natural resources committees should be females. At other levels, there is no discrimination by gender but there also is no directive enforcing the involvement of women in forest planning. Similarly for forests in Zambia and Zimbabwe, there is no discrimination by gender, and there also is no directive enforcing the involvement of women in forest planning.
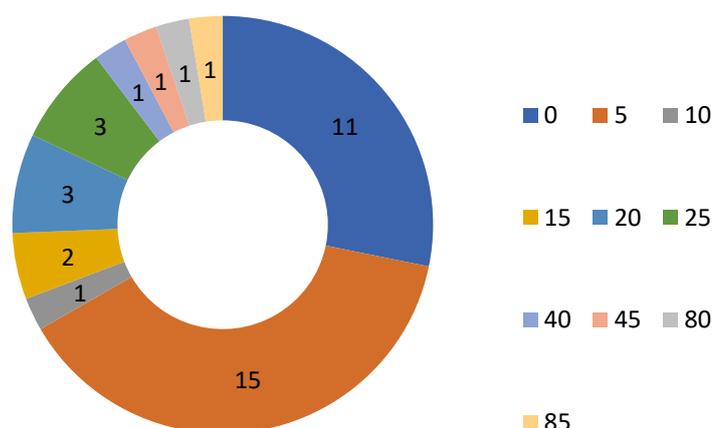
Figure 4. Distribution of number of national forest programme plans according to how many times gender is mentioned in the document for selected African countries.

3.1.4 Time span covered by forest planning

Most countries had a planning horizon of 5 years or less (Figure 5), corresponding to eleven of the assessed plans. Some exceptions include Liberia, South Africa, Kenya, Ghana and Tanzania which had more than 5 years for their plans. The five year planning horizon is made to correspond to the five year terms held by governments between elections, while longer term planning horizons are set to correspond to longer-term plans such as national poverty eradication strategies (RU, 2013). Also, it appears that plans written for submission to the Convention on Biological Diversity are guided to cover five years because most of them do so.

For production forest, forest planning in Angola is carried out annually. This is through the regulation of the opening periods of the forest exploitation season, the list of species to be conserved, and the referred process of designing exploitation licenses. For the studied forests in Tanzania, Zambia and Zimbabwe, the aim is to have forest management plans for every five years, although financial constraints may sometimes result in failure to fulfill the aim. For all the three countries, the five-year strategic plan is operationalized using one-year annual plan of operations (APO).
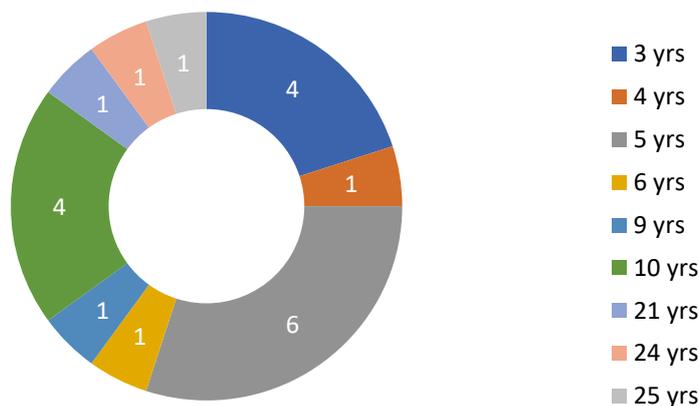
Figure 5. Distribution of number of national forest programme plan documents by planning horizon in years

3.2 Evaluation of the adequacy of the plans

3.2.1 Accuracy, reliability, and adequacy of information used

Most of the plans are not based on recent national forest inventories; instead, they are based on estimates whose sources are not clear or are based on projections from past national forest inventories (Figure 6). The same is true for information on consumption, supply, and demand of forest products (Figure 6). For the plans based on forest inventories, the accuracy and reliability of such inventories is questionable in some plans, though in others the accuracy and reliability of such plans is adequate (DFID, 2004; KFS, 2013).
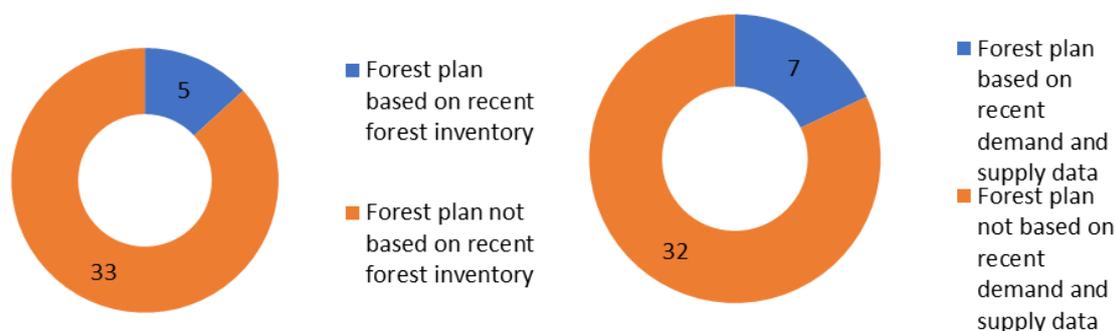
Figure 6: Distribution of number of national forest programme plan documents by use of data from recent forest inventory and demand and supply surveys in selected African countries

In Angola, for production forest the source of information for forest planning is ground forest inventory. In Tanzania, for all the three study forests, the data used for preparation of the forest management plans were from ground forest inventory supported by remote sensing data. In Zambia, for both the forest plantation and miombo woodland the source of data for forest planning is one-time ground forest inventory. There are no permanent sample plots. There is also limited use of remote sensing data. In Zimbabwe for Gwaai Forest Reserve, the source of information is from past inventories and surveys. However, the reliability of the methods of extrapolation of the past data is questionable. On the other hand, wildlife data is generated through annual game counts/surveys and is fairly accurate. This is done to allow annual quota setting. In Gwaai Forest Reserve, whether to use one-time data or recurrent data depends on nature of phenomenon. Soil types are assumed to have infrequent changes. Weather/climatic changes particularly rainfall patterns use data created over long time periods. Physical features such as rivers and mountains are stable over long time. Timber inventories are not frequently conducted. The current practice is that forest resources inventories are conducted prior to timber logging activities.

3.2.2 Tools / techniques/ models used for planning and for moving the forest to a desired future structure

Forest plans should be based on how the forest resources can supply products that meet expected demands in terms of quantities and quality for different forest products (WCS, 2013; RU, 2020). Forecasts of demand for such products are based on projections from the past to the present and future. These projections become "popular statistics" when they are used over and over in documents without reference to the source of the study that created them. This is different from analysis of demand and supply performed at a specified time. Most of the forest plans studied applied popular statistics and not specific demand and supply analysis (Figure 6). Some of the plans used only analysis of demand and supply based on one or a few forest products such as timber or charcoal.

In Angola, forest planning for Mayombe production forest focuses mainly on current availability of merchantable size of trees of preferred species. There is no interest in future projections of tree availability and forest structure. For protection forest, no future projections of availability of forest products and forest structure are done. In Tanzania, the projections are done for SHFP to estimate allowable cut and forest structure for each year of the five-year span covered by the plan using standard plantation forest growth and yield estimation methods (Malimbwi 2016). However, there is no projection to beyond the five-year plan period. For MNFR and KFR no projections of trees availability and forest structure are made because no tree harvesting is planned. In Zambia, growth models and a ZAFFICO forest calculator are used to analyse forest structure parameters for Ichimpe Forest Plantation (ZAFFICO, 2011). However, no projections are made beyond the five-year planning span. Likewise, for Katanino Forest Reserve no projections are done. In Zimbabwe, no projections are done for Gwaai Forest Reserve. On the other hand, projections of area due for clearfelling, available area, area to be felled, and area balance are done for 25 years since 2014 to 2038 for Stapleford Forest Plantation.

3.2.3 Adequacy of knowledge and skills for their development

Thorough assessment of the knowledge and skills of experts who developed the documents could not be made for most of the documents because the knowledge and skills of the experts were not listed (Figure 7). However, on the basis of an index calculated from considerations of gender, source of data for forest resource dynamics, and source of data for demand and supply of forest products, most plans reflect low knowledge and skills in developing the plans (Figure 8). Regression analysis of the index against year had no significant relationship; suggesting that the level of knowledge and skills did not improve over the years ($R^2 = 0.04$, p = 0.22, n = 38).

In Angola, company and community technicians are involved in forest planning for production forest. For protection forest, government officials are involved in forest planning. The training levels of the staff involved in planning is up to masters' degree in forest engineering or in agriculture. In addition to company and government officials, consultants may also be used. In Tanzania, for both forest plantation and natural forests under TFS planning is coordinated centrally. The level and type of training and skills involved comprise members with qualifications ranging from certificate to PhD in forestry, financial management and human resource management. Experts who are not TFS staff may also be co-opted into the planning teams. For SHFP the staff based at the forest who are involved in planning along with others from TFS central are holders of masters' degree in forestry. These also have had short-term training in budgeting and planning. There is no stipulation of the level of training that those involved in forest planning should attain.

In Zambia, staff involved in forest planning have good knowledge needed for carrying out ground inventory. However, there is insufficient knowledge of current technologies including geospatial technologies. For effective involvement of communities in forest management, there is need for their basic training in forest planning and general implementation of forest inventories, including sampling design and forest measurements.

In Zimbabwe, at Gwaai Forest Reserve type and level of training of those involved in planning varied by section. The sawmill supervisor, harvesting supervisor and plantation supervisor were holders of diploma in forestry. Security officer and safari camp manager had 2-year secondary education. At Stapleford Plantation Forest those involved in forest planning have diverse knowledge background to cater for the various sections needed for forest planning. However forest science trained personnel give direction for the planning.
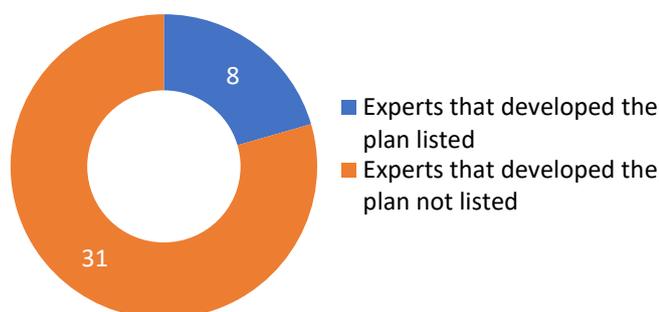

Figure 7. Distribution of number of national forest programme plan documents by listing of experts that developed the forest plan in selected African countries
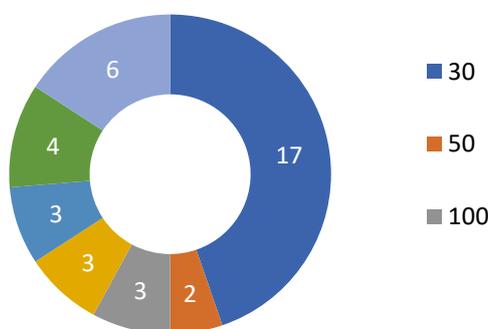

Figure 8. Distribution of number of national forest programme plan documents based on an index of adequacy of knowledge and skills for development of forest plans.

The distribution shows most plans reflect low knowledge and skills in developing the plans. Gender considerations index was taken as the frequency with which (number of times) gender is mentioned in the plan. Source of forest information index was coded as 1 for "yes" and 0 for "no" if forest plan use recent forest inventory. Source of forest products demand and supply information index was coded as 1 for a forest plan that used "demand and supply analysis" and 0 for a forest plan that used "popular statistics". Overall index was calculated as product of three indices. A small number (0.1) was added to the indices to prevent zeros from collapsing the multiplication. The product was multiplied by 1000 so that the lowest value of the overall index is 1. The overall index gives more weight to the gender considerations index because its measure is more quantitative, unlike the other indices whose measures are binary.

3.2.4 Strategies for implementation of the forest plan
Strategies for implementation of the forest plans should be based on principles of national forestry programmes (NFP) (Mayers, 2003; FAO, 2006). The main pillars of the principles are three, namely (1) national sovereignty and country leadership, (2) consistency within and integration beyond the forest sector and (3) participation and partnership (FAO, 2006).

In Angola, strategies for the forest plan are to facilitate a better growth of forest species that have quality wood, conserve those that are in danger of extinction, conserve the flora and fauna but make them increasingly profitable in order to contribute to the country's gross domestic product. Data from prospecting and forest inventory are presented to the IDF. The IDF analyzes the data and issues the license that authorizes exploration in this same area. In the exploration, the established commercial guidelines are respected.

In Tanzania, for SHFP the strategies and tools used for implementation of the plan are annual budgets, annual plan of operations, annual harvesting plan and annual cash flow plan. Monitoring and evaluation is done monthly to check work plan implementation for challenges and ways to overcome them. SHFP does monthly monitoring and evaluation due to its vast size, other forest plantations under TFS do monitoring and evaluation quarterly. For KFR, the strategies are: (1) Build capacity on preparation of forest and bee resource management plans and quality control; (2) Improve forest and bee resources information and management planning; (3) Enhance stakeholders' participation in forest and bee resources development and management in identified areas; (4) Strengthen forest protection and management; (5) Maintain adequate information on ecosystem; (6) Adopt mitigation measures on addressing climate change; (7) Rehabilitate degraded areas and poorly stocked forest reserves; (8) Strengthen human resources capacity; (9) Develop and improve working facilities and infrastructure; (10) Develop and implement effective Monitoring & Evaluation system; (11) Strengthen and enforce compliance to laws, rules, regulation on forest and bee resource management; and (12)   Improve customer care service delivery of the forest. For MNFR the strategies are: (1) zonation and limiting access to biodiversity and catchment zones, (2) Payment for Environmental Services (PES), (3) Conduct research and monitoring, (4) Enhance Joint Forest Management (JFM) and (5) Initiate Income Generating Activities (IGAs). In Zambia, for Katanino Forest Reserve, the strategies used in implementing forest plan are: (1) involve the local community from the time of planning until the end of the plan; (2) zonation of the forest into sections to be managed by neighbouring villages, and; (3) provision of alternative sources of livelihoods. The joint JFM strategy works well when the communities are mobilised through their tradition leaders. Zoning has worked well for Katanino Forest Reserve because the forest reserve is in five zones, which are managed by Village Resource Groups (VRG). Provision of alternative sources of livelihoods including beekeeping, conservation agriculture, and fish farming enhances forest management and encourages local communities to participate in forest planning processes. For Ichimpe forest plantation, the planning process is executed by ZAFFICO and is done based on the four plantation groups (ZAFFICO, 2011). Thus, the implementation of different management objectives is done

following what has been described for each plantation group. Thus, Ichimpe forest plantation, has its own planned operations which range from nursery operations to harvesting. Also, other resources including machinery, human resource and finances are managed under the Ichimpe office.

In Zimbabwe for Gwaai Forest Reserve, the plan ensures that the activities to be conducted promote sustainable management and utilisation of the forest resources therein, implying that the forest is used for logging operations and hunting safaris. The management plan is a five (5) year strategic document or frame work which is implemented through execution of tasks enunciated in the annual work plans, normally called annual plans of operations (APO). The management plan is applied to the whole of Gwaai forest management unit (FMU). Plan implementation is through various checklist tasks which are reviewed annually through monitoring programmes outlined in the forest plan. For Stapleford forest plantation, the implementations strategies are: (1) the Divisional Manager based at Stapleford Estate is responsible for the implementation of the plan; (2) for planting: Manage slash or harvesting in such a way that the compartment is available for planting as soon as harvesting is completed; (3) for weeding: Engage contract workers in order to weed out competing weeds; (4) for pruning: Involve plantation labour force to complete all pruning within plan period; (5) for Thinning to waste: Engaging contractors using their own equipment to do the operations; (6) for Harvesting, 2nd and 3rd Thinning: Engage contractors with their own resources to exploit timber from all areas except in rugged areas where Allied Timber's skidders can be used economically; (7) for Clear Felling: Carefully plan and harvest using the equipment most suitable taking cognizant of environmentally sensitive areas e.g. archaeological site or relics.

3.2.5 Constraints to forest planning and ways to overcome them and improve implementation of plans

In most countries, there is inadequate financial, human, and technical capacity for forest planning by government (RGH, 2016; RU, 2016). Financial constraints result in overreliance on donors for funding forest planning. Limited human and technical capacity result in failure to carry out forest planning and plans that lack consideration of important aspects as shown in section on adequacy of knowledge and skills in this report.

Vast areas of woodlands have been classified as National Parks and fall under the National Parks and Wildlife Service (FAO, 2004b). The f national forest departments have no jurisdiction in these areas, much as they are forested or wooded areas, and the forestry profession plays only a limited role in their management. This structural weakness is common to all countries in the Miombo phytoregion except in Mozambique where the two functions are the responsibility of one department. Population growth, widespread poaching, and human encroachment pose a threat to the long-term sustainability of the current management approach. The current approach to natural forest management places too much emphasis on forest protection at the expense of management. As a result, policy recommendations which do not appeal to this traditional protection mandate of the forestry departments receive little policy attention. This is generally due to lack of capacity in the forestry departments to adequately integrate economic and ecological analysis to inform policy making (FAO, 2004b).

Forest planning also suffers from poor intra- and inter-sectoral coordination (Nzunda, 2012). Since the forestry sector affects a number of other sectors in the economy, coordination in planning forestry activities is of vital importance. In spite of this, planning is characterized by weak intra- and inter-sectoral coordination. The planning capacity is limited by the existence of lines of parallel command systems which do not allow full use of the few existing human and material resources at the countries' regional/provincial and district levels. Since planning at the national level depends on availability of planning information from lower levels, lack of coordination at the lower levels results in poor forest planning at the national level.

In Angola, within the Chart of the Institute for Forestry Development there is a lack of relevant components to facilitate planning. Despite having a large department, aspects related to training and forestry extension are not among its main tasks. Among main institutional constraints affecting the sector, the following are underlined: (1) Lack of appropriate forest law regulating the administrative and sustainable management of the forestry sector and forest resources; (2) Funds limitation to enabling the sector to implement already identified development programmes; (3) Forestry sector poorly staffed and lack of professional cadres at all levels; (4) Lack of operational forest management plan; (5) Weak co-operation at internal level among institutions dealing with the administration and management of natural resources and the society as well; and (6) Permanent political instability affecting the development of vital economic sectors of the country.

Forestry planning suffers from inadequate reliable data on the dynamics of forest resources (Nzunda, 2012). Apart from negatively affecting the preparation of management plans, this pitfall hinders investments in forestry activities and retards participation by local populations. The implications of the inadequate availability of reliable forestry information are that the targets set in the plans are unrealistic. This affects evaluation of implementation of the forest plans (Nzunda, 2012).

All forest plans reviewed recommended capacity building as a strategy to ensure improved capacity in forest planning. The capacity building was in terms of formal training at various levels to create personnel for central government, local government and local communities.

The financing of the forest sector has largely depended on donor support. Increased domestic contribution can be achieved through a combination of strategies, including: (i) expansion of revenue base, (ii) improvement of revenue collection, (iii) improvement of forest produce pricing system, and (iv) promotion of stakeholder involvement, particularly domestic private sector. Increasing the efficiency and effectiveness of the foreign financing, including donor support, the strategies include (i) increasing foreign direct investment, (ii) optimizing the use of foreign assistance e.g. through basket funding approach, and (iii) making the use of international opportunities related to new international initiatives.

Many forest plans included strategies to carry out forest inventory and analysis of demand and supply of forest products among the planned activities. These activities provide up to date and reliable information (URT, 2015; ZFD, 2015). However, the problem is inability to implement the studies or failure to carry them in time due to limited financial, human and technical resources (FRN, 2018). Foreign experts contribute to provision of information that is used in forest planning (RA, 2014, 2019b).

In Angola, for Mayombe Forest, land conflicts with the community is the main constraint to implementation of the forest plan. To overcome these conflicts, social action programs have been implemented with the participation of the Municipal Administrations of Buco Zau and Belize. For the Umpulo, Bié and Brito Teixeira Forest Reserves, the main constraints to the implementation of the forest plans are excessive impunity, corruption, weak inspection/follow-up on achievements of national and international requirements. To address these, society must be moralized through continuing training on the requirements.

In Tanzania constraints to implementation of forest plans include contradictions among guidelines, shortage of human, financial and physical resources. The contradiction among guidelines mostly takes the form of those ideas/guides/instructions given by politicians versus the documented guidelines. For example, a politician may prevent encroachers from being evicted from a forest in which one is squatting illegally stating that eviction should wait until after an election so that the politician is favoured/ does not lose votes during the ballot. For

SHFP, shortage of staff is mainly because at the start of SHFP many were employed without specific training because they were employed in return to land offered to start SHFP. Most of these are now too old to work and are retiring. The shortage was in terms of having people without the needed skills, although some work could be accomplished as a result of experience gained from working. The other side of the shortage is due to their retirement without systematic replacement employment. This forces SHFP to use contract workers. For example, up to 103 contract workers were employed by December 2021. At SHFP there are also constraints in physical resources especially machines and trucks. Of the 33 trucks only 23 worked in 2021, the others were broken down due to obsolescence. Budgetary constraints are also experienced at SHFP although the forest produces revenues. The revenues are submitted to a central basket and needed expenditure has to be requested from the central bursary. The problem is that the amount of funds disbursed may be less than what is requested. For example, SHFP may plan to conduct pruning for 800 ha but funds secured could only be sufficient for 400 ha. This was particularly the case before the creation of TFS as a semiautonomous agency. After TFS creation, things are better. For example, the harvested area used to be more than that planted annually before TFS was established. After creation of TFS, that has been adjusted and now the area harvested is equal to the area planted annually.

For KFR the constraints are delayed availability of resources (funds, skilled and knowledgeable human and physical resources); uncertainty in willingness of the community to participate in the implementation of planned activities; incidences of human activities in the forest reserve including forest fires; ineffective communication and policy on cost and benefit sharing mechanisms; uncertainty of REDD+, especially with respect to carbon trading as a motivation to forest management.

For MNFR the constraints are limited human, financial and physical resources as for other forest reserves in Tanzania. Because MNFR is not a productive forest, it expects to a large extent to raise its revenues from nature-based tourism. Despite its endowment of unique assets, the southern tourism circuit of Tanzania is relatively underdeveloped and attracts few visitors due to poor access to it . The region's nature-based tourism receives a small portion of the more than one million visitors per year coming to Tanzania. Southern Tanzania, accounts for less than 10% of all visitors to Tanzania's national parks and less than 1.5% of park revenue. Occupancy rates in many southern lodges are below 50%. When compared to northern Tanzania and Zanzibar, southern Tanzania's products, including accommodation options and activities, are fewer in number, limited in variety and have poor market penetration. Today's opportunity for Southern circuit is that the major attraction Northern Tanzania's protected area circuit is becoming overcrowded, particularly the Ngorongoro Conservation Area. As a result people are looking for alternative destinations in Tanzania. Southern Tanzania should position itself through distinct investments strategies, improvements in infrastructures and service delivery, and coordinated marketing. Furthermore, inadequate cost-benefit sharing mechanisms may change people's attitude towards conservation and thus negatively impact the set objectives. Furthermore, there is possibility of availability of precious minerals that may influence decision makers to change management objectives of the reserve. Main assumption is that funding is not limiting, and stakeholders are willing to participate in implementing forest plan.

In Zambia, for Katanino Forest Reserve the major constraints in forest planning are shortage of resources, limited knowledge and mistrust by the community. The shortage of resources resulted in failure to conduct a detailed forest inventory. Like many other protected forests in Zambia, Katanino Forest Reserve has an outdated management plan because the Zambian Forest Department could not secure the needed financial resources to develop a forest plan. With the coming of WeForest, a new management plan is being developed as the forest

inventory is under way. Limited knowledge is particularly in terms of geospatial techniques including mapping, which is important in forest planning. Furthermore, community engagement is a challenge sometimes because of mistrust between the community and the private sector. For the Ichimpe forest plantation, the major challenge for the implementation of the plan is political interference because the company is partly owned by the government (it is a parastatal company). Thus, some decisions are influenced by the central government because the government participates in decision making. Since ZAFFICO is the major player in forest production in Zambia, there is a lot of demand on its products hence sometimes it is challenging to stick to the plan when demand is high. Other minor challenges include outbreak of pests and shortage of finances for the expansion programs.

In Zimbabwe, for Gwaai Forest Reserve the employees cannot handle the challenges the reseve is facing. There is need for training in planning. Also, accurate up to date information is required for planning. There is also need for supervision, and improved methods of data and information storage and update. In addition, the process needs to be equipped with up-to-date software for planning. For Stapleford forest plantation, the constraints include: (1) Long order turnarounds for tools, equipment, consumables solved by on time funding; (2) lack of an integrated business model solved deploying artificial intelligence tools like computers, GIS and remote sensing techniques; (3) Fires, which have to be addressed using integrated fire management incorporating GIS and remote sensing (fire hazard and risk assessment), drone technology (fire detection), fuel reduction, awareness campaigns, patrols and law enforcement; (4) climate change, which calls for implementation of disaster management plan to reduce impacts, use of hydrogel, better site-species matching, meteorological focus; (5) Illegal settlers and mining, which is redressed through law enforcement; (6) COVID 19, which is addressed by following the regulations for safety against COVID 19; (7) Pests and diseases – which are addressed through site-species matching, resistant species and hybrids, control and weed management; and, (8) senior managers are faced with a big challenge to attract sufficient junior employees to carry out not only general work in the forest, but also in production activities such as saw milling. Added to this is the ever-dwindling skilled manpower pool, as many skilled workers have either gone into the diaspora or have gone into private business.

3.4 Evaluation of forest management in different forest types in selected African countries

3.4.1 Evaluation of institutions implementing forest management

The naming of institutions implementing forest management varies from country to country. FAO (2010a) defines the ministry responsible for forest policy-making, level of subordination of head of forestry within the ministry, other public forest agencies at national level and institution(s) responsible for forest law enforcement as the basis of global assessment of the institutional framework for forest management. The level of subordination of head of forestry within the ministry is the number of administrative levels between the head of forestry and the minister. The level of subordination of head of forestry within the ministry measures the level of autonomy of the unit implementing forest management. It also gives a picture of the amount of bureaucracy that relates to implementation of forest management. For the studied countries, the most common level of subordination was level 3 and the least common was level 4 (Figure 9). In the reviewed FAO reports some countries did not mention the other institutions involved in forest management. For example, in most countries the jury and the police must be involved in settling some of the illegal cases pertaining to forest management. This inconsistency reflects weaknesses in the instructions, communication, and supervision of the data collection process used by FAO to get the data for the reports. The reports should not have been published without making sure that the needed data are provided consistently.
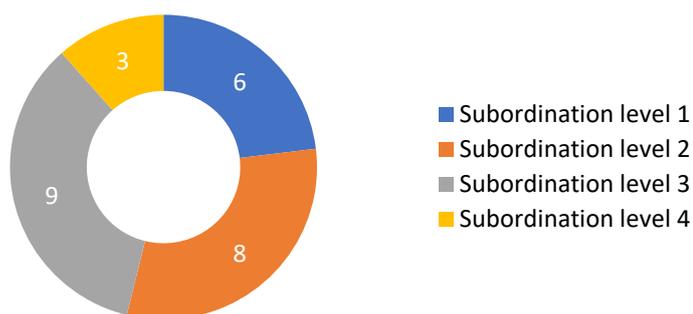
Figure 9. Distribution of number of countries by level of subordination of head of forestry within the ministry for selected African countries

In all the four countries covered by the fieldwork for the study, protection forests are managed by public institutions. In Angola, production natural forest is managed by a private company, under lease agreement and supervision of the central government. In Tanzania, the studied plantation is managed by a semi-autonomous agency, the Tanzania Forest Services (TFS) Agency, under the Ministry of Natural Resources and Tourism. In Zambia the plantation forest is managed by a parastatal, the Zambia Forestry and Forest Industries Company (ZAFFICO). Each of these categories of forest management institutions has its advantages and disadvantages. The assessment of these advantages and disadvantages of the categories of the institutions is beyond the scope of the study. However, each country has mechanisms to ensure the government oversees forest management with the aim of attaining forest sustainability.

3.4.2 Evaluation of resources available for forest management

3.4.2.1 Human resources

3.4.2.1.1 Staff numbers and training by gender

Most of the studied countries had less than one staff per hectare, less than 10% degree holders and less than 20% female staff (Figure 10). There is no literature to show which staffing level is optimal. These numbers show the burden that a single staff member has and thus may serve to show the expected effectiveness in forest management of the forestry unit of a country. The percent of degree holders shows the proportion of staff that may do professional and technical forest management work in addition to operational forest management. More inclusion of female staff in forest management adds perspectives to forest management that may not be contributed by male staff due to gender differences (Lee and Jin, 2019).

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Figure 10. Distribution of number of countries by number of staff per hectare (A) , per cent of degree holders (B) and female staff (C). Number of staff per forest area calculated using total number of staff in 2008 and forest area in 2015.

For the miombo woodland, there are 24 staff at Huambo and 15 staff at Bié. Their training is reasonable including degree holders and technicians with medium and basic training. For the most part, the staff are not trained in forest science. There is no integrative plan for the surrounding communities. However, traditional authorities have been responsible for sensitizing these populations on the need to conserve forests, not using fire, periodically collecting firewood, wild fruits and mushrooms. Community organizations are not exactly for forestry but linked to agricultural production. These are peasant associations that are organized in field schools where they receive training in techniques to improve agricultural production and therefore improve forest management.

For the Mayombe forest, the company has 430 employees, of which 220 are forest technicians (machine operators and tree felling technicians) and 140 industrial operators (carpentry and furniture factory), 30 drivers and 40 administrative employees. With the exception of 50% of the administrative staff, the others are medium technicians in their areas of expertise. In prospecting and felling trees, community members are guides and helpers in the forest. Community organizations are in the form of villages or neighborhoods, made up of different families and a traditional representative or authority.

In Tanzania, at Sao Hill Forest Plantation (SHFP) the categories of staff include permanent, 1 year contract, and casual labourers. A total of 245 staff work for SHFP. Of the total, 80 have specialized training of the level of certificate to masters' degree, 7 are secondary school leavers while 158 are primary school leavers. At Kitulang'lo Forest Reserve (KFR) the human resources are one forest assistant assigned as in-charge of KFR being assisted by two forest guards under contract. The plan calls for improved status of the current staff for the reserve in terms of number and qualification. The staff will be responsible for the facilitation of local communities to perform their roles and responsibilities in the management of the forest reserve. In terms of physical resources, there are no working facilities at the forest site.

In terms of human resources at MNFR, there are 7 staff with different capabilities in terms of education and experience. These include 1 with BSc in forestry, 2 with diploma in forestry, one with certificate in forestry, 2 forestry attendants and one forester in-charge (the Conservator) who has MSc in forestry. The BSc holder is the Assistant Conservator and the rest are stationed at four blocks/ranges which are Hembeti, Maskati, Pemba and Mhonda block/Range. Limited staff results in poor management of MNFR. Casual labour for activities carried out in Mkingu Nature Reserve, such as forest boundary clearing and patrolling has been provided by people from adjacent villages through Village Natural Resources

Committees (VNRCs). Members of the VNRCs who work for reserve are motivated by being excused from other village development activities, although during boundary clearing, they get cash payment from Conservator`s office.

In Zambia, at Ichimpe forest plantation all the human, financial and physical resources are managed from the Ichimpe office as a station of ZAFFICO. At Katanino Forest Reserve, most of the aspects of human, financial and physical resources are supported by private organizations, such as WeForest.

In Zimbabwe, at Gwaai Forest Reserve, a forester is the officer in charge of all operations and administration of Gwaai forest and reports to the District Conservator based at Forest Hill, the forest reserve's headquarters. A staff compliment of 8 permanent workers (1 supervisor, 1 accounts clerk, 1 office orderly, 3 nursery attendants and 2 grounds persons), 15 seasonal fire fighters, and 2 fire tower attendants are engaged. A resident anti-poaching team of 18 persons would be ideal for the station. In 2021 Stappleford forest plantation had 201 staff, of which 140 were forest plantation operational staff while 61 were administrative staff.

3.4.2.1.2 Forest adjacent communities, community organizations and institutions to facilitate community participation

Community participation in forest management depends on type of ownership of land (Wily, 2002; FAO, 2010). In some countries community land ownership category is explicitly designated while in others that category is only implied under other naming (Figure 11). Almost in every country, communities have a way of getting ownership and user rights. For example, in Botswana, wildlife management areas, communal land, and freehold land allow for communities to own and use land, and hence engage in forest management. Community organizations may be individuals, families, villages, tribes or private companies (Wily, 2002). Community participation mainly takes one of the two forms depending on ownership and user rights of the community: community based forest management (CBFM) or Joint Forest Management (JFM) (Wily, 2002). When the community has both owner and user rights, it is CBFM while it is JFM if the community only has user rights (Wily, 2002). The management agreements may be short-term licenses (e.g. maximum of one year for "Simple licensing" in Mozambique) or long-term leases of up to 99 years.
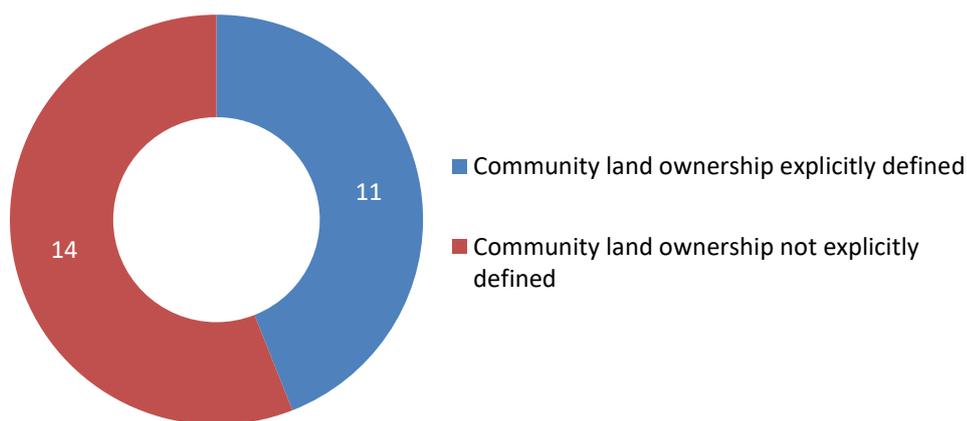

Figure 11. Distribution of number of selected African countries by definition of community land ownership category

3.4.2.1.3 Gender considerations in forest management

Gender considerations in forest management are presented in terms of ownership, access to and user rights for land, distribution of labour, and types of forest products harvested among men and women. In most countries, men have more access to and ownership of land and other means of forest management; and harvest products with higher value for shorter times and distances than women. This in turn limits women's access to financial resources and thus ability to purchase facilities for some of the forest operations. The differences in extent and circumstances of gender imbalances vary from country to country depending on the country's peace and political stability and significance of customary and/or religious traditions versus formal institutions governing forest management. Forest degradation and deforestation often aggravate the burden on women in terms of increasing distances to sources of forest products. Women also play a significant role in conservation work to recover from forest degradation and deforestation.

For all countries studied, information on gender policy and legal environment is provided (Figure 12). For some countries, data are given on division of forest management labour among men and women but for other countries, no such data are given (Figure 12). For some countries, forest management is covered under agriculture while for others it is explicitly covered as a stand-alone sector (Figure 12). It would be desirable to have a standard format for reporting considerations of gender in forest management given the huge investment in studies on gender profile sponsored by, among others, the African Development Bank and by FAO. These studies produced data that are difficult to compare across countries due to lack of standard format especially with regards to gender and forest management. Generally, studies sponsored by FAO covered gender and forestry as a separate topic while most of those sponsored by ADB covered gender and agriculture and hence forestry was implicitly captured under agriculture.
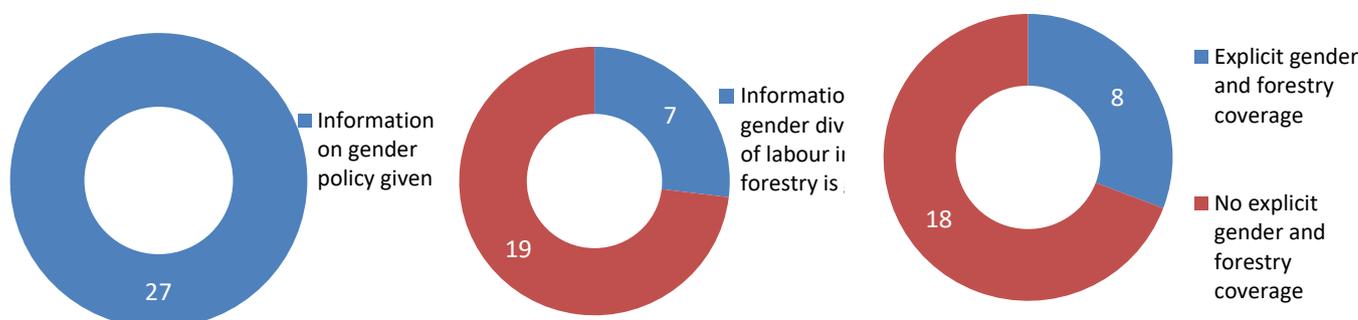
Figure 12. Number of countries for which information on gender policy, gender division of labour and specific forestry and gender information is given by FAO and ADB reports for selected African countries.

3.4.2.2 Physical resources

Country-level data on physical resources set for forest management specifically roads, buildings and equipment are not available. However, data that approximately measure accessibility by road are available (Figure13). The Rural Access Index (RAI) measures the proportion of the rural population who live within 2 km of an all-season road (World Bank, 2020). RAI is the most widely accepted metric for tracking access to transport in rural areas (World Bank, 2020). This measure should have correlation with ease with which stakeholders in forest management access forests, people and institutions involved in forest management, and markets for forest products. Most countries studied had RAI score 61-70% (Figure 13). Just for comparison, RAI score is 92% for Sri Lanka and 86% for USA (World Bank, 2020).
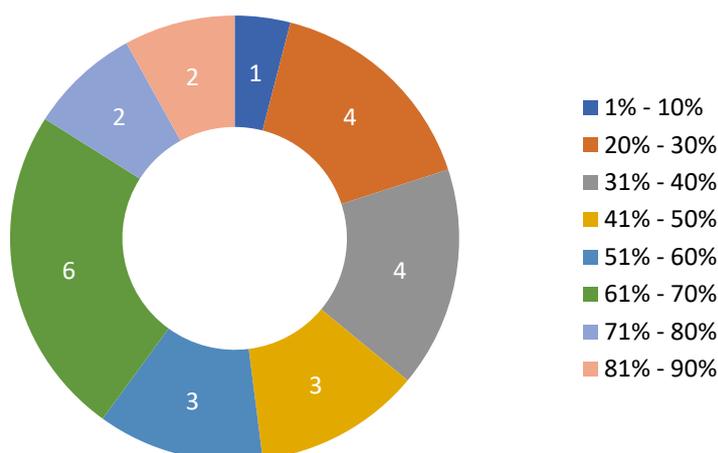
Figure 13. Number of selected African countries with varying Rural Access Index.

In Tanzania, at Sao Hill Forest Reserve there are some roads, buildings, and vehicles for forest management. However these are insufficient and obsolete. For Kitulang'lo Forest Reserve (KFR), there are no working facilities at the forest site. There is need of one motorcycle, one GPS, one laptop computer, two medium size tents and one binocular. The presence of all mentioned working facilities will help to carry out management activities smoothly. Important infrastructure in KFR include access roads, one ranger post to be used by forest in-charge, establishment of camping sites and facilities. Access roads to KFR are the Morogoro – Dar es Salaam highway. At Mkingu Nature Forest Reserve (MNFR), there are no staff houses, offices or communication facilities for staff working in that forest. Lack of road/trail network inside the forest reserve makes it difficult to reach important sites for management. Moreover, no transport facility is available at the reserve.

In Zimbabwe, for Gwaai Forest Reserve the physical resources are: (1) A two way radio communication system already in place and maintained in good working order throughout the year; (2) strategic fire lines and access routes; (3) the Bulawayo-Victoria Falls highway, which is 5 km from forest Hills headquarters and complement the communication network for Gwaai forest; (6) A Wi-Fi internet service is in place and maintained in good working order and data paid up throughout the year (7) Workshop and equipment for all services rendered at Forest Hill the headquarters for the forest reserve with Bulawayo being the referral centre for specialised jobs. The financial resources are described in a district-level action plan, which lumps resources needed for management of three forest reserves in the district. For the Stapleford forest plantation there is a tarred road from the forest to Allied Timbers Zimbabwe headquarters in Mutare. This is approximately 57 kilometers long. All sawn timber is delivered either to ATZ outlets within the country or to both internal and external customer using this tarred road. For fire management, the forest has vehicles, other fire fighting equipment, water points, and fire lookout tower.

3.4.2.3 Financial resources

Financial resources allocated to forest management differ by tens of millions of US$ (Figure 14). The highest expenditure per hectare is in Cape Verde, The Gambia, Lesotho and South Africa whereas the lowest are in Nigeria, Mozambique and Angola. The highest per hectare expenditure values are for countries that have relatively small forest area. The values reported here are total public expenditure on forest management for reference years ranging from 2005 to 2011 for various countries. Forest area year of reference used was 2015. The information that was needed by the FAO (2010) report format required breakdown of the total public expenditure into various components of expenditure, and sources of funds. These FAO reporting guidelines were in some countries not adhered to.
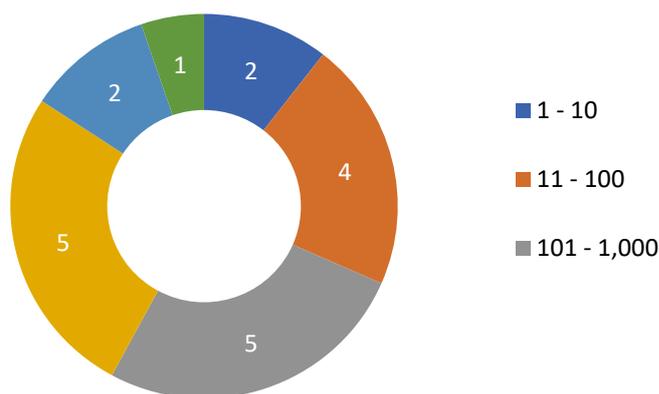
Figure 14. Number of countries by per hectare total annual public expenditure in forest management (US$/ha).

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3.4.3   Evaluation of the extent of compliance to plans by implementing institutions, constraints experienced and how to overcome them

3.4.3.1 Evaluation of the extent of compliance to plans

Most of the actions being implemented are in progress, some are fully implemented while others are not implemented (Figure 15). In most cases, actions that are fully implemented are those that may be achieved within limited time such as review of policies while those that take long to achieve are in progress such as implementation of policies (RGB, 2014; KL, 2019; RK, 2019; RL, 2019). Actions that require addressing drivers of change may not be achieved. For example, in Botswana two actions were not achieved (RB, 2019b). These were: (i) to ensure production and consumption by government, industry, and society are kept within sustainable levels and safe ecological limits; and (ii) at least 25 percent of all Botswana's ecoregions are effectively conserved through an ecosystem approach that integrates their management with that of the surrounding landscapes and involves resident communities.
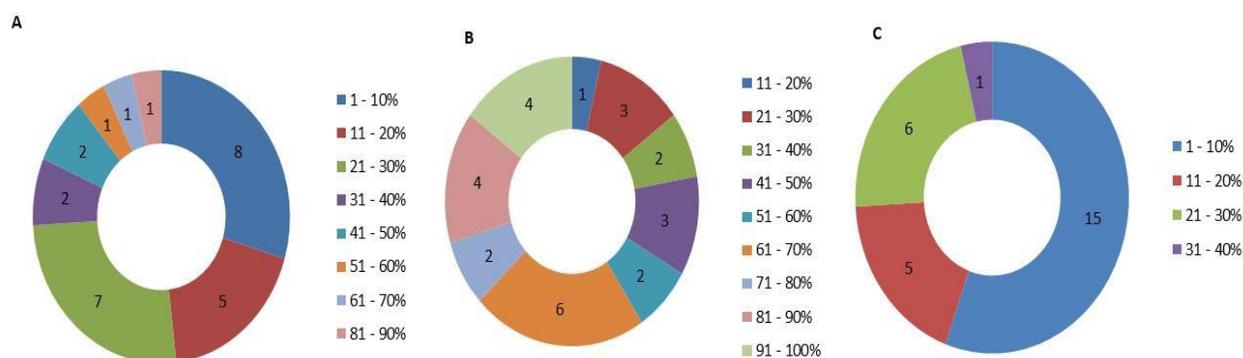
Figure 15. Number of selected African countries by percent of forest management activities at different levels of implementation. Activities fully implemented (A), in progress (B) and not implemented (C).

3.4.3.2 Evaluation of constraints to implementation of plans

In all countries, it was reported that institutional, human capacity, and financial resources hindered effective implementation of the plans. Institutional constraints may take many forms, including poor link between research and practice, lack of commitment, poor organizational set-up, weak co-ordination, low staff remuneration, and lack of incentives (GFDRE, 2014;

RGH, 2015; RGM, 2019). Human capacity constraints may include low numbers of staff and staff lacking skills needed for forest management (KS, 2014; RSL, 2014; RSS, 2015). Financial constraints are due to low budget allocation to forest management and resultant over-dependence on donor support for forest management (RU, 2014; RZ, 2015; GRZ, 2019; URT, 2019).

3.4.3.3 Ways to address constraints to forest management

To address institutional constraints, there have been reviews of policies and reforms of organizations involved in forest management (RA, 2019; RB, 2019b). For example, to improve management of forest reserves, in 2009 Tanzania established Tanzania Forest Services Agency to take over some of the tasks of the Forest and Beekeeping Division (URT, 2019) that was responsible for overall management of the country's public forests. To improve human capacity there has been vocational/technical training, apprenticeship, opening new training institutions or re-opening existing ones previously closed for some reasons (e.g. war, in Liberia) and incorporation of forest management into existing training institutions (RL, 2014; RM, 2014; RA, 2019). Financial constraints are dealt with through expansion of forest revenue base, improvement of revenue collection, improvement of forest produce pricing system, promotion of stakeholder involvement and domestic private sector, optimizing the use of foreign assistance, increasing foreign investment and, establishment of a forest fund (URT, 2001; RB, 2019a). For example, in Botswana, a National Environmental Fund (NEF) was established by the Government of Botswana to support projects that will help Botswana achieve the national environmental agenda and meet her international obligations; while simultaneously achieving her objective of improvement of community livelihoods; especially those dependent on natural resources or the environment in general (RB, 2019a). The Tanzania Forest Fund and Eastern Arc Mountains Conservation Endowment Fund were established in Tanzania to fund forest management (URT, 2001, 2019).

3.5 Evaluation of the state of management of the forest types in the selected African countries

3.5.1 Change in total forest area

One way to evaluate the state of management of forests is to measure change in forest area. Only five of the selected countries had an increase in total forest area while three of the countries had no change in forest area and the rest of the countries had decrease in forest area between 1990 and 2015 (Figure 16, Table 3). Three top countries by annual loss of forest area were Nigeria, Uganda and Zimbabwe; whereas countries with three lowest rates of annual forest loss were Sierra Leone, Angola and Sao Tome-and-Principe. Saint Helena, South Africa and South Sudan had no change in forest area. Ghana, Gambia, Lesotho, Swaziland and Cape Verde had increase in forest area.

3.5.2 Change in growing stock of forests

Change in growing stock is another way to evaluate state of management of forests. Unlike forest area, which is two-dimensional, growing stock is three-dimensional. Thus, growing stock shows the actual volume of wood. Of the 25 countries with data on growing stock, 21 had decreasing growing stock between 1990 and 2015 (Figure 16, Table 3). Top three countries by loss in growing stock were Malawi, Tanzania and Nigeria. Eritrea, Liberia and Zimbabwe had the lowest rates of loss of growing stock. Lesotho had no change in growing stock. Only South Africa, Ethiopia and Sierra Leone had increase in growing stock.
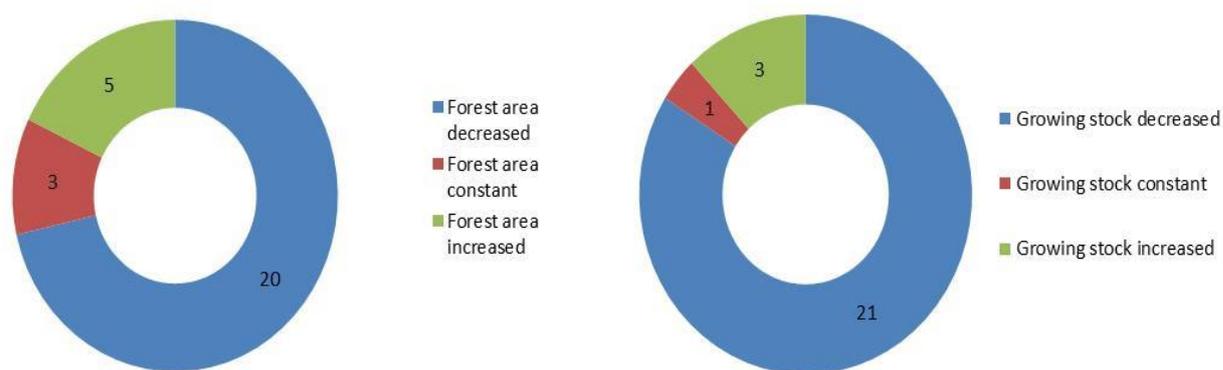
Figure 15. Number of selected African countries by change in total forest area and growing stock

Table 3 Change in total forest area and growing stock in selected African countries

Change in total forest area				Change in growing stock			
Country	Forest area (1000 ha)		Annual rate of forest area change (1000 ha)	Annual rate of forest area change (%)	Growing stock (million m³)		Annual rate of change of growing stock (million m³)	Annual rate of change of growing stock (%)
	1990	2015	1990-2015	1990-2015	1990	2015	1990-2015	1990-2015
Angola	60976	57856	-124.80	-0.21%	2364	2241	-4.92	-0.21%
Botswana	13718	10840	-115.12	-0.94%	799	725	-2.96	-0.39%
Cape Verde	57.75	89.903	1.29	1.79%	No data	No data	No data	No data
Equatorial Guinea	1860	1568	-11.68	-0.68%	347.9	251	-3.88	-1.30%
Eritrea	1621	1510	-4.44	-0.28%	849	836	-0.52	-0.06%
Ethiopia	15114	12499	-104.60	-0.76%	2.6	3.19	0.02	0.82%
Gambia	442	488	1.84	0.40%	427	345	-3.28	-0.85%
Ghana	8627	9337	28.40	0.32%	1575	1377	-7.92	-0.54%
Guinea-Bissau	2216	1972	-9.76	-0.47%	211	166	-1.80	-0.95%
Kenya	4724	4413	-12.44	-0.27%	207	159	-1.92	-1.05%
Lesotho	40	49	0.36	0.82%	670	670	0.00	0.00%
Liberia	4929	4179	-30.00	-0.66%	19.7	19	-0.03	-0.14%
Malawi	3896	3147	-29.96	-0.85%	206.2	92	-4.57	-3.18%
Mozambique	43378	37940	-217.52	-0.53%	4046.13	3332.7	-28.54	-0.77%
Namibia	8762	6919	-73.72	-0.94%	2940.96	2708.98	-9.28	-0.33%
Nigeria	17234	6993	-409.64	-3.54%	846	540	-12.24	-1.78%
Saint Helena	2	2	0.00	0.00%	No data	No data	No data	No data
Sao Tome and Principe	56	53.6	-0.10	-0.18%	1638	1378	-10.40	-0.69%
Sierra Leone	3118	3044	-2.96	-0.10%	8.3	12.95	0.19	1.80%
Somalia	8282	6363	-76.76	-1.05%	306	258	-1.92	-0.68%
South Africa	9241	9241	0.00	0.00%	16.5	18.2	0.07	0.39%
South Sudan	7157	7157	0.00	0.00%	434.1	378.1	-2.24	-0.55%
Sudan	23570.313	19209.938	-174.42	-0.81%	67	59	-0.32	-0.51%

Change in total forest area					Change in growing stock			
Country	Forest area (1000 ha)		Annual rate of forest area change (1000 ha)	Annual rate of forest area change (%)	Growing stock (million m^3)		Annual rate of change of growing stock (million m^3)	Annual rate of change of growing stock (%)
	1990	2015	1990-2015	1990-2015	1990	2015	1990-2015	1990-2015
Swaziland	472	586	4.56	0.87%	778.78	660.28	-4.74	-0.66%
Tanzania (United Republic of)	55920	46060	-394.40	-0.77%	2061	936	-45.00	-3.11%
Uganda	4751	2077	-106.96	-3.26%	No data	No data	No data	No data
Zambia	52800	48635	-166.60	-0.33%	7.1	6.7	-0.02	-0.23%
Zimbabwe	22164	14062	-324.08	-1.80%	124.72	120.54	-0.17	-0.14%

Source: Extracted from FAO (2015)

3.5.3 Constraints to requisite state of management of the forest types in the selected African countries

Constraints to requisite state of forest management are factors that cause decrease in forest area and forest growing stock. These factors are also referred to as drivers of change. The drivers are classified into direct anthropogenic drivers, indirect anthropogenic drivers, and biophysical drivers (Mertens and Lambin, 2000; Geist et al., 2006; Jaimes et al., 2010; Nzunda and Midtgaard, 2019). Direct drivers are also called proximate causes whereas indirect drivers are called underlying causes of change (Lambin, Geist and Lepers, 2003). Direct anthropogenic drivers are further classified into agricultural expansion, infrastructure extension and wood extraction (Geist and Lambin, 2001; Jaimes et al., 2010; Nzunda and Midtgaard, 2019). Indirect drivers are factors which influence direct drivers and can be divided into five major categories: (1) demographic factors, (2) economic factors, (3) technological factors, (4) policy, institutional, and cultural factors, and (5) globalization (Geist and Lambin, 2001; Jaimes et al., 2010; Nzunda and Midtgaard, 2019). Biophysical drivers include drought, destructive animals, disease and insect outbreaks, fires and floods (Geist and Lambin, 2001; Jaimes et al., 2010; Nzunda and Midtgaard, 2019).

Increase in human population may result in decrease in forest area (i.e. deforestation) mainly due to expansion of cultivation to cater for the increased population, especially if technology does not support increased agricultural productivity through intensification (Nzunda and Midtgaard, 2019). In Africa, most of the permanent deforestation in the last three decades was due to small-scale permanent agriculture unlike in South America where it has been mainly due to commercial agriculture (FAO, 2009; Freitas, Hawbaker and Metzger, 2010; Jaimes et al., 2010; Kilawe et al., 2018; Nzunda and Midtgaard, 2019). Another aspect of population is immigration. People immigrate into areas of active deforestation and forest degradation to make a living from wood-based livelihoods (CHAPOSA, 2002; Nzunda and Midtgaard, 2019). Refugees may also be an important component of human population contributing to deforestation and forest degradation (UN, 1999; Jones, Caro and Davenport, 2009; Nzunda and Midtgaard, 2019).

Expansion of infrastructure, particularly roads and railways, may be an insignificant direct anthropogenic driver of deforestation due to the relatively small areas used by roads and railways (Nzunda and Midtgaard, 2019). However, roads and railways facilitate access to forest for deforestation (Nzunda and Midtgaard, 2017). On the other hand, expansion of urban

settlements may result in extensive deforestation and degradation of remaining neighbouring forest (Krutilla, Hyde and Barnes, 1995; Defries et al., 2010). People in areas surrounding urban centres may be involved in agriculture leading to deforestation rather than being employed in off-farm occupations (Muzzini and Lindeboom, 2008; Kashaigili et al., 2013; Lupala, Mdemu and Butungo, 2014; Nzunda and Midtgaard, 2017).

Wood extraction may be for fuel or construction and industrial needs and may especially be a strong driver of deforestation and forest degradation (i.e. decrease in growing stock) when it is for a lucrative wood business, export, or meeting the needs of a rapidly expanding local population (Krutilla, Hyde and Barnes, 1995; Milledge, Gelvas and Ahrends, 2007; Schulz et al., 2010). Wood extraction for charcoal mainly for domestic fuel needs is an important driver of deforestation and forest degradation in Africa (CHAPOSA, 2002; World Bank, 2009; Nzunda and Midtgaard, 2019). Wood extraction may lead to conversion of forest to bushland and even to grassland (CHAPOSA, 2002; Nzunda and Midtgaard, 2019). Wood may also be obtained as a secondary benefit when forests are cleared for expansion of cultivation (Nzunda and Midtgaard, 2019).

Economic drivers of deforestation and forest degradation include increase in export of agricultural crops and forest products, high poverty levels, and dependence on wood for energy and other uses, high unemployment rates, and socio-economic crises (Nzunda and Midtgaard, 2019). Policy, institutional and cultural factors include explicit policies and strategies to increase land area under cultivation, low government investment in forest management, unsustainable forest harvesting, deficiencies in financial management capacity, and inadequate enforcement of forest conservation laws and regulations (Milledge, Gelvas and Ahrends, 2007; Nzunda and Midtgaard, 2019). Further, institutional bottlenecks include selfishness of leaders, conflicts in regulations, corruption, low transparency, high levels of illegality, low participation of some stakeholders, insufficient capacity, inadequate integrity, ineffective protected areas, and poor accountability mechanisms (Milledge, Gelvas and Ahrends, 2007; Nzunda and Midtgaard, 2019). In Africa, most globalization takes the form of land grabbing for biofuels and other land uses which result into aggravated deforestation and forest degradation (Achard et al., 2005; Sulle, 2013; Nzunda and Midtgaard, 2019; Alhassan et al., 2020).

Drought contributes to deforestation and forest degradation directly by killing trees and indirectly by making fires more destructive (Abeli and Nsolomo, 1998; Nzunda and Midtgaard, 2019). In East Africa in late 1990s and early 2000s large areas of forest plantations were lost due to outbreak of *Cinara cuppressi* (Abeli and Nsolomo, 1998; Nzunda and Midtgaard, 2019). Floods may only have temporary effects on deforestation and forest degradation. In miombo woodlands, which cover a significant part of southern Africa, fire does not cause deforestation because the burnt trees recover unless they are below the threshold escape size (Wilson and Witkowski, 2003; Strömquist and Backéus, 2009; Nzunda and Midtgaard, 2019). However, fire cause forest degradation and slow down the rate of forest regeneration and succession from grassland and bushland to forest, thus leading to persistent grassland and bushland (Eva and Lambin, 2000; Blomley et al., 2016; Nzunda and Midtgaard, 2019). This may be observed for instance in protected areas where fire is used consistently for maintenance of grassland (Hassan, 2007; Nzunda and Midtgaard, 2019). Fire is also an important destroyer of plantation forests (Abeli and Nsolomo, 1998; Nzunda and Midtgaard, 2019). Elephants are among important destructive animals that cause deforestation and forest degradation (WILDAID, 2015; Nzunda and Midtgaard, 2019). Livestock may also contribute to forest degradation (Blomley et al., 2016).

3.5.4 Ways to address constraints to requisite state of management of the forest types in the selected African countries

The most commonly identified ways to address constraints to requisite state of management of forests are sustainable forest management, fuelwood efficient cook stoves, promoting alternatives to wood for fuel and other uses, agroforestry, forest fire management, protected areas strategies, afforestation or reforestation, agricultural intensification, permanent agriculture, plantations establishment and management, and livestock rangeland management (Salvini *et al.*, 2014; Blomley *et al.*, 2016)). To deal with institutional constraints, the most common interventions are stakeholder involvement using participatory forest management approaches, tenure and rights regularisation and policy and governance reforms (Salvini et al., 2014; Blomley et al., 2016). Many of these interventions are likely to have a relatively low impact per unit area, but can have significant cumulative effects over large areas (Salvini et al., 2014; Blomley et al., 2016). Usually a combination of interventions is used to address the drivers: for instance, agricultural intensification is often combined with zoning protected areas, or rehabilitation of degraded lands to prevent further forest clearing (GRZ, 2019; RB, 2019b; URT, 2019). Many countries in Africa address the root cause of deforestation and forest degradation, which is high rate of population growth, using the whole spectrum of approaches from population control policies to other techniques, although this has not so far been successful due to various reasons (Robinson, 2016). There are also interventions to address economic and market drivers of deforestation and forest degradation such as forest certification and use of appropriate incentives (Salvini *et al.*, 2014).

4.0 CONCLUSIONS AND RECOMMENDATIONS

Forest planning in most countries has been guided by international conventions, agreements, and initiatives that shaped national forest programmes. In most countries, technical guidance and financial support for forest planning was initially obtained from FAO and other development partners. Forest planning was initiated by international institutions and initiatives, and was not endogenous. However, countries accepted and implemented the plans because they were in line with the requirements of the countries. Further, the national forest programmes contributed to revision of forest policies, forest laws, and forest acts in most cases to support Participatory Forest Management.

Stakeholders involved in forest planning are central government, local government, other government institutions, local communities, NGOs, private sector and the international community. The roles of stakeholders may depend on forest type, and especially on ownership and management rights. Public forests are more likely to involve local communities in forest management than private forests. The roles of the stakeholders may also depend on the state of peace and security enjoyed by the country. In some cases, the countries have laws that put all the authority on forest planning and management on the president for strategic reasons, especially if a country is in armed conflict.

Gender was taken into consideration in some countries' national forest plans, but not considered in others in general, there was a tendency to consider gender in more recent documents than older ones, because gender considerations have been receiving more attention in recent times. The wording for gender considerations varied by countries, but the aim was the same, which is to ensure gender equality and empowerment of women. Most countries had a planning horizon of 5 years or less. The five-year planning horizon appears to correspond to the five-year terms held by governments between elections, while longer term planning horizons are set to correspond to longer-term plans such as national poverty eradication strategies. The five-year horizon is also fixed to be in line with international guidelines for some plans.

Most of the plans are not based on recent national forest inventories, instead, they are based on estimates whose sources and accuracy are not clear or are based on projections from past national forest inventories.

Most of the forest plans studied applied popular statistics and not specific demand and supply analysis. Some of the plans used only analysis of demand and supply based on one or a few forest products such as timber or charcoal.

Thorough assessment of the knowledge and skills of experts who developed the plans could not be made for most of the documents available because these aspects were not provided for in the documents. On the basis of an index calculated based on considerations of gender, source of data on forest resource dynamics, and source of data for demand and supply of forest products, most plans reflect low levels of available knowledge and skills employed in developing the plans. The level of knowledge and skills did not improve over the years.

In most countries, there constraints to forest planning, including inadequate financial, human and technical capacity for forest planning by government; overdependence on donor support; institutional and administrative constraints, and availability of adequate and reliable information.

The study has demonstrated how, in different countries, institutions implementing forest management are related to the rest of the government organs. In most countries the chain of decision making is long because the most common level of subordination was three, which means the unit responsible for forest management has to go through two levels to meet the minister under which the unit works.

Of the studied countries, 20 have staffing levels of less than one staff per hectare, 2 have one or two and 3 have more than 2 staff per hectare. The highest percentage of female staff is 45% while the lowest is 3%. The highest percent of university degree holders among staff is 53.5% and the lowest is 0.7%.

In every country, local communities have a way of getting forest ownership and user rights. In most countries, men have more access to and ownership of land and other means for forest management; and harvest products with higher value for shorter times and distances than women. This in turn limits women's access to financial resources and thus ability to purchase facilities for some of the forest operations.

The differences in extent and circumstances of gender imbalances vary from country to country depending on the country's peace and political stability and, significance of customary and/or religious traditions versus formal institutions governing forest management. Forest degradation and deforestation often aggravates the burden on women in terms of increasing distances to sources of forest products. Women also play a significant role in conservation work aimed to contain forest degradation and deforestation.

Most countries have rural access index values that suggest that access to rural areas for forest management is a challenge. In some countries, expenditure in forest management is a few dollars per hectare per year. Most of the planned activities for forest management have not been fully implemented and are in progress. All studied countries have institutional, human capacity and financial constraints.

More than 70% of the studied countries had loss of forest area and growing stock between 1990 and 2015. Constraints to requisite state of forest management include agricultural expansion, infrastructure extension, wood extraction, and factors that are demographic ,

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economic , technological , policy, institutional, and cultural; in addition to effects of ,
globalization, drought, destructive animals, disease and insects outbreaks, fires and floods.

The study recommends that:
- ➢ countries shouldown forest planning to maintain their sovereignty;
- ➢ stakeholder awareness should be enhanced to ensure they know and play their roles;
- ➢ forest plans should give gender proper considerations;
- ➢ forest plans should combine longer terms than 5 years as well as shorter terms less than 5 year plans; forest plans should be based on recent forest inventory and analysis of demand and supply of forest products;
- ➢ there should be training to improve the knowledge and skills for forest planning, and
- ➢ national governments should commit more resources to forest planning.

The study further recommends research to understand how the findings of this study may be applied to improve forest management. The research should focus on:
- ➢ How level of subordination of forest management unit influences forest management;
- ➢ Implications of staff numbers and level of training by gender on forest management;
- ➢ How local communities utilize the opportunities for forest ownership and user rights;
- ➢ Ways to improve gender equality in forest management;
- ➢ How rural access by road affects forest management;
- ➢ Dynamics of expenditure in forest management;
- ➢ How to improve implementation of planned forest management activities;
- ➢ How to redress the institutional, human capacity and financial constraints and;
- ➢ How to reverse loss of forest area and growing stock.

5.0 ACKNOWLEDGEMENTS

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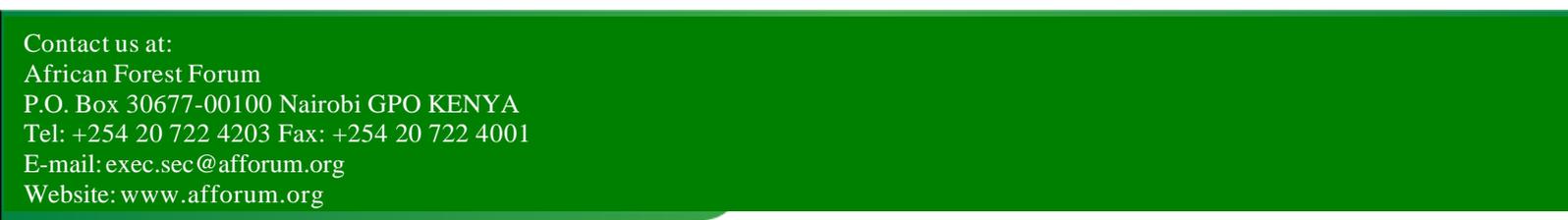
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