

Enhancing the Role of the Forestry Sector in Building Climate Resilient Green Economy in Ethiopia:

Strategy for scaling up effective forest management practices in
Benishangul-Gumuz National Regional State with emphasis on
management of dry forests and woodlands



Center for International Forestry Research
Ethiopia Office
Addis Ababa



THE FEDERAL DEMOCRATIC
REPUBLIC OF ETHIOPIA
MINISTRY OF ENVIROMENT,
FOREST AND CLIMATE CHANGE

Enhancing the Role of Forestry in Building Climate Resilient Green Economy in Ethiopia

**Strategy for scaling up effective forest management practices in
Benishangul-Gumuz National Regional State with emphasis on
Management of Dry Forests and Woodlands**

Motuma Tolera
Abeje Eshete
Bekele Guta
Efrem Garedeu
Girmay Fitwi
Abrham Abiyu
Habtemariam Kassa

Center for International Forestry Research
Ethiopia Office
Addis Ababa
October 2015

FORWARD

This regional strategy document for scaling up effective forest management practices in Benishangul Gumuz National Regional State, with particular emphasis on managing dry forests and woodlands was produced as one of the outputs of a project entitled “Enhancing the Role of Forestry in Ethiopia’s Climate Resilient Green Economy”, and implemented between September 2013 and August 2015. CIFOR and our ministry actively collaborated in the planning and implementation of the project, which involved over 25 senior experts drawn from Federal ministries, regional bureaus, Federal and regional research institutes, and from Wondo Genet College of Forestry and Natural Resources and other universities. The senior experts were organised into five teams, which set out to identify effective forest management practices, and enabling conditions for scaling them up, with the aim of significantly enhancing the role of forests in building a climate resilient green economy in Ethiopia. The five forest management practices studied were: the establishment and management of area enclosures; the management of plantation forests; Participatory Forest Management (PFM); agroforestry (AF); and the management of dry forests and woodlands. Each team focused on only one of the five forest management practices, and concentrated its study in one regional state.

The team that studied practices in managing dry forests and woodlands focused on Benishangul Gumuz National Regional State. The other teams examined practices in enclosure; smallholder plantations, PFM; and agroforestry and worked respectively in Tigray; in Amhara, in Oromia; and in Southern Nations, Nationalities and Peoples Regional States. The findings of all teams were used in the write-up of this strategy, though this report focuses primarily on managing dry forests and woodlands. The engagement of senior experts and researchers from regional institutions made the document more relevant to the region, and created opportunities for building the capacity of all staff involved in the process. The draft document was presented and discussed at various workshops at national and regional levels, and was assessed and endorsed by the respective regional authorities.

The Ministry of Environment Forest and Climate Change (MEFCC) will continue to be actively involved in similar processes. I take this opportunity to encourage relevant offices in the region to make best use of the document, and plan to further improve its content and scope by building on experiences to be gained during the implementation of the strategy. It is important that we systematically document the process and outcomes of the scaling up process and draw lessons. Implementing this strategy will further build the capacity of the region to plan and implement the scaling up of good practices in forest management. The selection and scaling up of effective practices supports regional and national efforts to develop the forestry sector, and significantly enhances its contribution to building a climate resilient green economy in Ethiopia, as envisaged by the government.

On behalf of the MEFCC, I would like to thank all team members and their respective institutions for their contributions. I am particularly grateful to the Center for International Forestry Research (CIFOR) for initiating and implementing this joint project, which played an important role, not only in filling gaps in knowledge and skill, but also

in building capacity at various levels. I also thank the Strategic Climate Institutions Program (SCIP) for funding the project. As SCIP is financed by the Governments of the UK, Norway and Denmark, I would like to extend my appreciation to the peoples and governments of these three countries for their support.

Ato Kebede Yimam
State Minister
Ministry of Environment, Forest and Climate Change
Federal Democratic Republic of Ethiopia
Addis Ababa
15 October 2015

FOREWORD

Benishangul Gumuz regional state is endowed with different natural resources among which dry forests and woody vegetation constitute the major proportion. Forests with their multiple values are becoming critical to the well-being of the environment, the national economy and society at large. They contribute significantly to household economy and food security and thereby to poverty reduction, economic growth and social transformation. Our regional government, in collaboration with communities and other relevant stakeholders including development partners, has been working hard to conserve existing forests and to the extent possible increase the tree and forest cover through different mechanisms such as afforestation, reforestation, area enclosure, watershed development and annual tree planting initiatives. These all are helping in reducing deforestation and degradation in the region and in enhancing the contributions of dry forests and woodlands to local communities and to the national economy.

However, the current situation of forest development, management and utilisation is not satisfactory and improvements are needed. Deforestation and degradation rates are still high in the dry forests and woodlands of the region. Still the regulatory wings of the forest administration and the respective law enforcement agencies need to do more to reduce deforestation and degradation and illegal movement of forest and tree products. The overall situation calls for additional and concerted effort to identify and address the causes of land and forest degradation and explore opportunities for forestry sector development. In doing so it is important that we identify effective forest management practices and scaling them up to enable the region and the country to achieve the targets of the forestry sector set in the CRGE strategy document. Thus there was a great need for formulating a regional strategy to select effective forest management practices and scale them up.

The Center for International Forestry Research (CIFOR) in collaboration with relevant federal and regional institutions initiated and implemented a project that aimed at identifying effective forest management practices and enabling conditions for scaling them up. The study in Benishangul Gumuz National Regional State focused on the management of dry forests and woodlands. The findings of the study were used as inputs in the write-up of this strategy. Our regional bureau has been actively engaged in the process of its write up and review. Thus, we will do our level best to implement the proposed strategy and to use it in developing plans, programmes and projects that will foster the development of the forestry sector in general and the wider use of selected forest management practices in particular. Finally, I would like to thank the authors of this strategy for producing such an important document and CIFOR and the Ministry of Environment, Forest and Climate Change for initiating and implementing the project by also involving experts from our Bureau and other institutions in the region.

Ato Muleta Womber
Head, Bureau of Agriculture and Rural Development,
Benishangul Gumuz National Regional State
Assosa
15 September 2015

PREFACE

Apart from their direct contributions to the national and household economy through wood and non-wood products (NWFPs), forests contribute significantly through their services to the environment and to various sectors of the economy – agriculture, energy, water, health, tourism, etc. Nationally, the forestry sector contributes to employment generation and income diversification, earning of foreign currency through exports and savings through import substitutions. Its ecosystem services for agriculture are also well known though difficult to put monetary values on. Forests are and will continue to be important in sequestering carbon and in regulating the hydrological cycle.

Unless the growing demands for wood products and other forests products and services are met, the rapidly growing population will lead to increased demand for food and wood, which in turn may increase the rate of deforestation and degradation. Unless backed by sustainable intensification options, horizontal expansion of agriculture will result in the conversion of forests, woodlands and bushlands to agricultural fields. This is particularly true for commercial farming that is expanding rapidly in the dry forested and woodland areas. Therefore, deforestation and degradation are major environmental challenges that Ethiopia is faced with. Thus, effective management of its forests is critical.

Identifying and scaling up effective forest management practices will significantly enhance the contribution of the forestry sector to local livelihoods, the national economy as well as to the environment. Wider adoption of good forest management practices enhances the contribution of the forestry sector in building a climate resilient green economy. CIFOR, in collaboration with federal ministries and regional and federal research and higher learning institutions implemented a project that focused on identifying effective forest management practices and enabling conditions for scaling them up.

The major areas where the identification of effective forest management practices was done included area enclosure (in Tigray region), smallholder plantations (in Amhara region), agroforestry (in SNNPRS), participatory forest management (in Oromia region) and management of dry forests and woodlands with emphasis on Benishangul Gumuz region. Our team worked in Benishangul Gumuz regional state and critically assessed the management of dry forests and woodlands in order to identify good practices. It also looked at limitations and weaknesses of the selected practices and proposed improvement measures. It examined other forest management practices based on the findings of other teams that had worked in the other four regional states. Thus, specific suggestions were made regarding those management practices. In selecting and proposing effective forest management practices for scaling up, our team benefited from a series of discussions with communities, senior experts from the region and national progress review and planning meetings. The findings of our field research and desk work, the results of graduate students' theses researches as well as the comments and suggestions gathered at different levels were used as inputs in writing this strategy document.

The authors would like to thank several persons and institutions that contributed to the preparation of this strategy document. In particular, our thanks go to CIFOR, Ethiopia

Office for initiating this project and engaging us in its implementation. We thank our respective institutions for allowing us to be involved in the project and work on the write-up of the document. We are grateful to the staff of the regional bureaus and the NGOs operating in Benishangul Gumuz for taking part in the series of discussion sessions held. Their contributions have improved the content and relevance of the strategy to the region. It is our hope that this strategy will be implemented and serves as a basis to plan and implement further work to develop the forestry sector in Benishangul Gumuz region.

The authors

ACKNOWLEDGEMENTS

This publication is an outcome of a project entitled Enhancing the Role of Forestry in Ethiopia's Climate Resilient Green Economy: A Knowledge, Action Research and Innovation Project, which was implemented between September 2013 and August 2015. The project was designed and implemented by CIFOR in collaboration with its national partners, including the Ministry of Environment, Forest and Climate Change, the Ministry of Agriculture and Natural Resources, the Ethiopian Environment and Forestry Research Institute, Wondo Genet College of Forestry and Natural Resources and other higher education institutions and federal and regional research institutes. Over 25 senior experts from 16 organizations were engaged in the project. The intended outcome of the project was to identify effective forest management practices for scaling up, focusing on: area enclosure in Tigray; PFM in Oromia; smallholder plantations in Amhara; agroforestry in SNNPR; and the management of dry forests and woodlands in Benishangul Gumuz National Regional States. The major project outputs are strategies for scaling up selected practices for each of the five regions as well as a national road map for the ME FCC to support national efforts to enhance the role of forestry sector in building a climate resilient green economy.

This document was prepared for Benishangul Gumuz National Regional State (BGNRS), and was produced with the support of senior experts from the Bureau of Agriculture of BGNRS, the Ethiopian Environment and Forest Research Institute, the Amhara Region Agricultural Research Institute, Wondo Genet College of Forestry and Natural Resources, and the Ethiopian Natural Gums and Resins Processing and Marketing Enterprise. We gratefully acknowledge the contributions of all individuals and institutions to the collection of data and writing-up of this strategy. The draft of this strategy document was improved by feedback from experts and senior officials from the region.

The CIFOR Ethiopia office is grateful to members of the National Project Advisory Committee, which oversaw the project, to ensure its relevance and timely completion. I am particularly thankful to His Excellency Ato Kebede Yimam, State Minister of Forest, Ministry of Environment, Forest and Climate Change, for chairing the Project Advisory Committee for over two years. He attended all planned meetings and provided guidance to the project. He also took note of project findings, and encouraged researchers to generate policy and practice relevant findings, and better inform the activities of the Ministry and relevant regional bureaus. Members of the Project Advisory Committee included: the Dean of Wondo Genet College of Forestry and Natural Resources, the Director General of Oromia Forest and Wildlife Enterprise, Head of Amhara Forest Enterprise, Natural Resources Management Process Owners in the regional Bureaus of Agriculture of the five regions, and heads of the Natural Resources Research wings of regional agricultural research institutes operating in the five regions. Our sincere thanks also go to the authors and their respective institutions for taking lead role in the write-up of the strategy, as well as to the respective regional bureaus for actively taking part in the tasks and for reviewing and approving the strategy document. I am very grateful to Ato Bekele Guta, senior forestry expert in the Regional Bureau of Agriculture and member of the study team and co-author of the strategy and Ato Chanyalew Gelan, senior forestry expert in the Bureau of Agriculture

for their role in getting the strategy reviewed and approved by the region and for their technical contribution in making the strategy more relevant to regional needs. Ato Aschalew Manuye, Process Owner of Environmental Protection in the Environmental Protection, Land Administration and Use Bureau of the region also played an important role.

Our thanks also go to the SCIP Fund for financing the project. The SCIP Fund is financed by the UK, Norway and Denmark. To meet the emerging needs of our national partners, we revised the project activities twice in two years. I would like to recognize the SCIP Fund Management Team for their support with this. With their help, the team managed to plan and implement additional activities without increasing the project budget.

We hope that this document will assist national efforts to develop the forestry sector, specifically related to the selection and wider adoption of effective forest management practices. It was also our intention that the process would help to build human and institutional capacity of national partners, which the project funders were particularly keen to achieve.

Habtemariam Kassa (PhD)
Center for International Forestry Research
Forests and Livelihoods Research Portfolio
Ethiopia Office
Addis Ababa
20 October 2015

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LIST OF ABBREVIATIONS

ADLI	agricultural development-led industrialization (strategy)
BGRS	Benishangul Gumuz Regional State
CDM	clean development mechanism
CIFOR	Center for International Forestry Research
CRGE	climate resilient green economy
D&D	deforestation and degradation
GHGs	greenhouse gases (GHGs)
GTP	Growth and Transformation Plan
MEF	Ministry of Environment and Forest
MEFCC	Ministry of Environment, Forest and Climate Change
NGOs	non-governmental organisations
NTFPs	non-timber forest products
PFM	participatory forest management
REDD+	Reducing Emissions from Deforestation and forest Degradation
SCIP	Strategic Climate Institutions Programme
SNNPRS	Southern Nations, Nationalities and Peoples Regional State

SUMMARY

The concept of sustainable forest management accommodates social, economic and ecological issues. Through sustainable management, forests can contribute to the resilience of ecosystems, societies and economies while also safeguarding biological diversity and providing a broad range of goods and services for present and future generations. Identifying and scaling up effective forest management practices is important. To track progress toward the goal of sustainability, there is a need to establish mutually agreed-upon criteria and indicators which would provide a framework for data collection and evaluation in selecting effective practices. This scaling-up strategy focuses on identifying and wider adoption of effective forest management practices that aim at sustainable management of the resource while also contributing to human well-being. The report was compiled by a team that studied the management of dry forests and woodlands in Benishangul-Gumuz Regional State (BGRS). It provides information on effective dry forest management practices observed in the region and on scaling up challenges, opportunities and enabling conditions. The strategy is also informed by the information generated by other teams that worked in other regions to identify effective forest management practices in exclosures, smallholder plantations, agroforestry and PFM. The information obtained from the other teams was first evaluated by the team and then by the regional experts for its relevance to the region and the country at large.

Practices that generate more ecological and socio-economic benefits are considered to be effective. Practices that lacked management plans on resource development, protection and use and clearly defined mechanisms for community participation as well as for defining responsibility and benefit-sharing failed to fulfil the team's criteria of selection of effective forest management practices. As a strategic direction, effective dry forests and woodland management practices identified in this study could easily be scaled up within the region. The positive impacts will be greater if the improvement measures suggested by the team are taken into consideration. Scaling up of other forest management practices need to be preceded by research. Successful scaling up requires enabling environments such as active involvement of key stakeholders, notably communities and the private sector, adequate involvement of supporting actors such as research, allocating sufficient budget, strengthening the policy and legal framework, improving the market links, strengthening institutional capacity and ensuring compatibility of measures in a cultural and socio-economic setting and considering the interests of various stakeholders. The modality of scaling up can take either individual (households and private investors) or community-based organisations (CBOs) such as cooperatives based on the type of forest management practice to be scaled up. The report also suggested key issues to be considered for the national road map in scaling up selected practices in managing dry forests and woodlands, regionally or nationally. These include addressing information gaps on dry forests, management of invasive species, understanding and managing the livestock–dry forest link, addressing prevailing challenges (e.g. fire incidence and intensity) that are exacerbated by climate change, addressing silvicultural problems, managing resource-use patterns and the competing land-use interests (for conservation and for development interventions) in line with the CRGE and international pledges the country made and relevant conventions that Ethiopia ratified.

1 BACKGROUND

1.1 Introduction

Deforestation and forests and woodland degradation are the major problems of natural resources management (NRM) in Ethiopia that have undermined landscape productivity. Hence, protecting and properly utilising existing natural forests and woodlands is the priority in the current natural resource management (NRM) agenda of the country. Participatory forest management (PFM) has been recognised as an important mechanism to engage communities in responsibly managing and using natural forests. The government is also engaged in the rehabilitation of large areas of degraded lands through area exclosures. Smallholder farmers are also expanding their woodlot plantations. In southern Ethiopia, traditional agroforestry practices are enabling communities to intensify and diversify production while also maintaining high vegetation cover on the landscape. But so far, systematic national studies have not been conducted to identify best practices from these initiatives and document enabling conditions for scaling them up. A joint project by CIFOR and MEF was implemented between September 2013 and August 2015 to help fill in knowledge gaps in this regard. In 2014, five national technical teams studied the impacts of selected forest management practices (PFM, agroforestry, smallholder plantations and management of dry forests) with the aim of identifying best practices for scaling up.

This document was produced by one of five teams that worked on identifying effective practices in managing dry forests and woodlands in BGRS. The information generated by the team was used to develop this scaling-up strategy and contributed to the write-up of a section on managing dry forests in the national road map for scaling up effective practices in Ethiopia. Research reports of the other four research teams were also consulted in proposing other effective forest management practices (PFM, agroforestry, area exclosures and smallholder plantations) to be tested and scaled up in BGRS. This scaling-up strategy is aimed at guiding forest development initiatives and scaling up of effective forest management practices in general and in managing dry forests and woodlands in particular in BGRS, thereby enhancing the role of the forestry sector in building a climate resilient green economy by 2030.

1.2. Country profile

Given its long history of farming on hillsides and with a mainly rural population dependent on agriculture, Ethiopia is faced with high rates of deforestation and land degradation. Commonly cited causes are extensive forest clearing for agricultural use, overgrazing and exploitation of existing forest for fuel, fodder and construction materials (Bishaw, 2001). The condition is particularly pronounced in northern Ethiopia, where land degradation has been accelerated by long-standing human impact through changing land use and deforestation (Hurni, 1988; Nyssen et al., 2009) and strong biomass demand for the increasing human and livestock populations (Tekle, 1999). The most important measures taken to halt this process have been planting trees and assisting natural regeneration by excluding human and animal interference in the form of exclosures (Pohjonen and Pukkala 1990; Tekle 2001). Dry forests and woodlands constitute the larger proportion of the vegetation cover of Ethiopia and the same resource also contains

the highest aboveground carbon stock of the country. Hence, proper management of the dry forests and woodlands of the country will play a pivotal role in enhancing the role of forestry in achieving the targets set for the forestry sector in the CRGE strategy of Ethiopia.

1.3 Overview of the forestry sector in Ethiopia

1.3.1 The forest resource base and management

Ethiopia is endowed with various ecosystems that are formed by diverse fauna and flora. The vegetation of Ethiopia comprises over 7,000 species out of which 1,150 are endemic to the country (Teketay et al., 2010). It also harbours diverse fauna including 240 species of mammals and 845 species of birds, of which 22 species of mammals and 24 species of birds are endemic (Teketay et al., 2010). The landscape that ranges from the lowest altitudes in the north-eastern lowlands to the chain of mountains in the northern highlands is the basis for the diverse ecosystems of Ethiopia. The southern part of Ethiopia supports the high forest ecosystem of the country. The central highlands also support the dry montane forests, which harbour economically important tree species of Ethiopia. Both the south-western and central highlands of Ethiopian forest ecosystems are useful not only for the supply of wood, feed, energy and environmental goods and services but also as a habitat of biodiversity including endemic birds and wild animals.

Ethiopians have always been dependent on goods and services obtained from forests. Forests provide fuelwood which serves as the major source of energy for rural and urban households. The national fuelwood demand was once estimated as 20% higher than the combined demand of all other forest products that was estimated at 109 million m³yr⁻¹ (EFAP 1994; Teketay et al., 2010). The majority of the demand for construction wood is collected from the natural forests. Several edible and medicinal plant parts are collected from forests. Major farm implements are made of wood extracted from the surrounding natural vegetation. Most household furniture is locally processed from indigenous tree species growing in the natural forest. Considerable numbers of rural people are earning an income from the sale of fuelwood and charcoal.

Despite the significant roles of services provided by forests and woodlands, reliable information on the vegetation resources of Ethiopia such as their spatial coverage, distribution, changes over time (deforestation or regrowth), growing stock in the standing vegetation, regeneration and recruitment status and other essential information are scattered and inconsistent (Teketay et al., 2010). According to the census by the Woody Biomass Inventory and Strategic Planning Project (WBISPP, 2004), Ethiopia owns a total of 59.7 million ha of land covered by woody vegetation. Of the total woody vegetation, 6.8% are high forest (about 4.07 million ha); 49% constitutes woodland (29.24 million ha) and 44.2% shrub land or bushland (26.4 million ha) and plantations cover estimated to 955,705 ha. In terms of regional distribution Oromia (62.5%), Southern Nations, Nationalities and Peoples (SNNP) (19%) and Gambella (9%) are the three regional states that account for the major high forests of the country, while Somali (33%), Oromia (32%) and Amhara (10%) are the regional states that account for the largest area of woodlands and shrub lands/bushlands (WBISPP, 2004).

1.3.2. Significance of forestry to the national economy and local livelihoods

The forest resources of Ethiopia play significant roles in the livelihood of the communities and the national economy at large. Their direct roles include the provision of energy, construction poles and timber and NTFPs that are highly valued for their food, medicinal and commercial values. Lack of reliable and consistent database and proper forest accounting systems constrains the valuation of the direct and indirect values of forest resources. Therefore, estimations of the contributions of forest resources are usually made based on case studies and site-specific assessments. There are several case studies that indicate the significance of forest resources.

It has been reported that 90% of the households in Bench Maji, Kaffa and Sheka zones and south-western part of the country are engaged in harvesting non-timber forest products (NTFPs) including forest coffee, forest honey, wild forest spices (Ethiopian cardamom, long pepper and turmeric) and bamboo (FFE, 2009). The same study showed that the households earn 73% of their annual cash income from sale of NTFPs. A conservative estimate of the values of NTFPs that include forest coffee reported by FFE (2009) showed that these products have annual values of about USD 249,638,556. According to FAO (2006), the sum of the values of fuelwood, industrial wood and NTFPs was estimated as USD 752,869,000, the share of fuelwood being 85%. Compared with the total GDP of about USD 12.7 billion, the contribution of the sector was about 6%. Nevertheless, this figure increases when the indirect values of the different ecosystems are taken into account. For instance, FFE (2009), based on an assumption of 4 million ha of high forest and global environmental values of forests, estimated that the Ethiopian high forest provides ecosystem services of about USD 6,276,000,000. If the forest resources are managed according to the needs of the REDD+ programme, forests can fetch a lot of money from the carbon trade. Regardless of the accuracy and the accounting system, the presented figures show a significant actual and potential value of the forestry sector. Semi-processed wood products, charcoal, bamboo, natural gum, ecotourism, spices and forest coffee are some of potential forest products that can be used through a sustainable management plan.

1.3.3. Sectoral policies and strategies

Over the past few decades, the Ethiopian Government has put in place several sectoral and cross-sectoral policies, strategies and programmes with the aim of enhancing the socio-economic and environmental contributions of the sector. These include the Rural Development Policy and Strategies, the Forest Conservation and Utilisation Policy and Strategy, the Federal Forest Law, the Environmental Policy of Ethiopia, the three successive 5-year development plans, the CRGE Strategy and REDD+ readiness programme of Ethiopia. These policy provisions and key programmes are briefly presented in the following subsections.

Environmental Policy (1997). This is one of the policies developed in the country that is directly related to forest development and conservation. The environmental policy of Ethiopia was approved in 1997. It aims to improve the quality of life of the people through sustainable development and utilisation of natural resources. It aspires to conserve traditional resource management practices. The policy includes soil management and sustainable agriculture, forests and tree resource management, genetic,

species and ecosystem diversity conservation and management. These policy provisions could play substantial roles in the promotion of afforestation and re-afforestation programmes.

The Rural Development Policy and Strategy (2001). Ethiopia issued a national rural development policy and strategy document in November 2001. This document underlines the need to rehabilitate and restore degraded natural resources of the country. It advocates objectively designed tree planting initiatives. Specifically, it emphasises integrating tree planting in agricultural landscapes. The encouraging achievements recorded in exclosures, sustainable land management undertakings and watershed management programmes emanate from this policy direction. Yet, achievements in afforestation and re-afforestation remain limited. Lack of implementation instruments, such as appropriate and resourced institutions, regulations and directives, are mentioned as key factors undermining success. For example, Lemenih and Tadesse (2010) reported that forestry sector received less than 10% of the overall budgets allocated to the Ministry of Agriculture both at the federal and regional levels during the last decade.

Environmental Impact Assessment Proclamation (2002). This law is one of the federal laws intended to protect the environment from the potential negative impacts of development investments. The law has a regulation and a guideline developed in 2004 to assist its implementation. The general aims of the EIA law are: to predict and manage the environmental effects of proposed developmental activities; to harmonize environmental, economic, cultural and social considerations into a decision making process; to implement environmental rights and objectives enshrined in the Constitution; and to bring about administrative transparency and accountability. The EIA law, regulations and the guideline are reasonably comprehensive to have put considered obligations on private investment and state development projects to present EIA reports from certified consultants before securing a license to invest. Guided by the federal EIA law many regional governments produced environmentally responsive investment directives particularly focusing on the protection of forests.

Forest Conservation and Utilization Policy and Strategy (2007). The formulation and enactment of this policy, which is the first in the history of the country, reflects the government's commitment towards enhancing the forest resource base of the country. The main objective of this document is to improve the economic contribution of the forestry sector and satisfying the forest product demands of the country by promoting sustainable forest management and utilisation practices. The policy also encourages the engagement of the private sector and the local communities in commercial and protective forest development. To promote the establishment and development of private and community owned forests, the policy provided incentive mechanism in the form of reduced land taxes. The policy recognised the need for certifying forest use right, which is an important provision to enhance afforestation and re-afforestation programmes. However, key provisions in the Forest Conservation and Utilization Policy and Strategy were not clearly translated into binding legal articles nor were there concrete implementation directives. Management of dry forests and woodlands as tool to promote natural regeneration of native trees and shrubs as well as sustainable utilisation and conservation of the same could benefit from this policy.

Forest Development, Conservation and Utilization Proclamation (2007). The forest Development Conservation and Utilization Proclamation number 542/2007 is the latest national forest law of the country. It is an exhaustive proclamation that attempts to provide legal grounds to the Forest Conservation and Utilisation Policy and Strategy of 2007. It recognises two types of forest ownerships i.e. State and private. It merges communal and private ownership and puts it under private ownership. It has been criticised by lawyers for consisting of punishment articles that are difficult to pass reasonable decisions. The lack of a regulation for effective implementation of this proclamation has been mentioned as a key bottleneck.

The 2011–2015 Growth and Transformation Plan and the 2011 CRGE Strategy. The Ethiopian Government launched the 2011–2015 Growth and Transformation Plan (GTP) with the aim of making Ethiopia a middle-income country by 2025. The GTP envisages that the country's GDP per capita would grow from USD 378 in 2010 to 1271 USD in 2025. The GTP stresses the need to strengthen natural resources conservation and management. In line with that, rehabilitation and restoration of degraded lands through exclosures, multipurpose tree planting, developing management plans for priority forests and tree seed collection and distribution were the major proposed activities of the forestry sector in GTP-1. The Climate Resilient Green Economy (CRGE) of Ethiopia is the recent green growth development strategy of the country. The plan has identified four pillars, one of which is forestry, where protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks, is emphasised. The CRGE targets sequestration of more than 40 million t of CO₂e through afforestation and reforestation of 3 million ha of land and sustainable management of 4 million ha of forests and woodlands by 2030. Moreover, Ethiopia's pledge at the New York Climate Summit to restore 15 million ha of degraded forestlands by 2030 is evidence of the government's determination to restore degraded lands. This is an opportunity to scale up successful exclosures and other tree planting practices. Managing dry forest and woodlands contributes to these national targets and pledges.

The National REDD+ Programme: REDD+ is expected to provide incentives for developing countries engaged in forest conservation and carbon sequestration. This global carbon offsetting mechanism provides a financial flow to forest dwelling communities. REDD+ is being embedded in the national CRGE implementation strategy. Ethiopia aspires to reduce deforestation and forest degradation by addressing their underlying drivers and immediate causes. Sustainable management of existing forests and creating additional forests are the strategic interventions that guarantee the achievements of the desired goals. Ethiopia considers REDD+ as an opportunity and viable source of sustainable finance for investment in forest management, forest conservation and forest restoration to enhance the multiple benefits of forests, including but not limited to carbon sequestration and biodiversity conservation, watershed management, increased resilience to climate change, improved livelihoods and reduced poverty. Therefore, REDD+ is expected to create additional opportunities for the forestry sector to develop and contribute more to the overall national goals of sustainable development.

1.3.4 Linkages of forestry with other sectors

Several sectoral policies and functions may directly or indirectly link with the forestry sector. These sectors with interacting functions should consolidate their development interventions. The integration helps in ensuring complementarity of their activities and better achieving the overall economic development goals of the country. Sectors that are closely linked with the forestry sector are briefly discussed below.

Agriculture: The agricultural sector has strong links with the forestry sector. Successful afforestation and re-afforestation programmes positively affect the productivity of agricultural landscapes by preventing soil erosion and downstream flooding. Forests maintain a healthy hydrological cycle, ensuring recharge and replenishment of groundwater. Moreover, availability of fuelwood from forests allows the use of crop residue to fertilise the farmland instead of burning it for cooking. The desire to increase grain production may trigger expansion of agricultural lands by converting forests and forestlands. The livestock sector is another sector with a close link to the forestry sector. Free grazing is a practice hindering natural regeneration and survival of planted trees. Free grazing causes a significant problem on the forestry sector in countries such as Ethiopia with high livestock population. Forests provide the much needed fodder for livestock especially during the dry season. This is particularly true in arid and semi-arid areas where trees also serve as shade for livestock.

Water and energy: Both the quality and quantity of water supply of a catchment is largely dependent on vegetation cover. Afforestation and re-afforestation of upper catchments with appropriate tree species guarantee a regular flow of clean water. Planting of tree species with high transpiration may deplete the water resources of catchment. Thus, management of tree species in a catchment is important in maintaining a positive water budget. The energy sector is closely linked to forestry. Trees planted in the upper catchments are vital in safeguarding hydroelectric power, generating mega-projects in the country. The forest cover in the upper catchment ensures downward infiltration of water and minimises downstream run-off and silt. Moreover, continuous flow of tributary rivers within the catchment of the mega-projects ensures sustainable water supply and uninterrupted power generation.

Tourism: Forests have positive impacts on tourism serving as habitats for wildlife. Forests provide attractive, green landscapes for tourists. Tourism may be beneficial for forests if part of the income from tourism is used to fund development and expansion of forests. Tourism may negatively affect forests. The need for felling trees for the development and construction of hotels and restaurants reduces forest cover. Moreover, campers may cause forest fires.

Roads: Road infrastructure development may necessitate clear felling of some important forests. The development of roads could bring opportunities by creating access for forest management. Moreover, roads may stimulate the engagement of private investors in the forestry sector that contributes to the overall development of the sector.

2. FORESTRY IN BENISHANGUL GUMUZ NATIONAL REGIONAL STATE

2.1. Forest resource base of the region

Benishangul-Gumuz Regional State (BGRS) is one of the most important regions of Ethiopia in terms of availability of intact forest resources but these forests have not been studied (Awais, 2007). The forests in BGRS are legacy of natural vegetative succession pathways, low-fire regime and traditionally exercised shifting cultivation practices with minimal damage (Teketay, 2000). As a result of this minimum disturbance, the population structure of the vegetation is healthy and exceptionally endowed with regenerating young individuals (Teshome, 2013). Awais (2007) indicated that the vegetation resources of BGRS comprises about 1,102 vascular plants; during his field study, he found seven plant species that were new to the flowering plants of Ethiopia and one species new to science. The forest resources in the region were considered sustainable under the pre-settlement disturbance regimes.

Of the vegetation types in Ethiopia, Combretum–Terminalia broad-leaved deciduous woodland and savannahs and riparian vegetation are the two vegetation types that dominate BGRS. Awais (2007) has classified the woody vegetation into five plant communities that have been structured by environmental variables, mainly altitude. Some of the plant communities in the region are endowed with higher species diversity and some level of endemism (Demissew et al., 2005; Awais, 2007). Combretum–Terminalia is the major vegetation type in the western escarpments of the Ethiopian highlands, generally on landscapes that receive less than 1,200 mm of annual precipitation and with mean annual temperature that varies between 20–35°C. The altitudinal range of the vegetation varies between 500 and 1800 m.a.s.l. The vegetation is characterised by small to moderately sized trees and shrubs, herbs, grasses and sedges (Awais, 2007). The vegetation harbour economically important tree species such as gum- and resin-bearing tree species and trees with edible fruits. The NTFPs in this type of vegetation are marketed nationally and internationally.

The lowland bamboo (*Oxytenanthera abyssinica*) is an economically important plant species in the Combretum–Terminalia vegetation found in dense thickets. About 0.4 million ha of lowland bamboo is found in BGRS that accounts for 55% the lowland bamboo in Ethiopia (INBAR, 2010). Reports elsewhere suggest that the lowland bamboo species has huge ecological and socio-economic benefits. Ecologically, it serves as a carbon sink and mitigates climate change owing to its very fast growth (Banik, 1985). Economically, it provides construction material, inputs for paper and pulp industries, agricultural implements and household utilities (INBAR, 2010; Kassahun, 2003). Despite its ecological and economic importance, the lowland bamboo resources in BGRS are declining due to encroachment, human induced fire, expansion of smallholder and commercial farmlands and resettlement programmes (BGR FSSR, 2004). Recently, the regional Bureau of Agriculture has developed guideline for the utilisation of dead culms. The guideline allows the local people to harvest the dead culm by establishing cooperatives. The cooperatives are now generating income from the sale of the dead culm and start to protect the bamboo resource from illegal cutting and human induced fire.

The moist, evergreen, montane forest ecosystem is the other vegetation type found in the BGRS. This vegetation occurs in some of the highlands areas of the region between 1,500 and 2,600 m.a.s.l. The vegetation is found in Dangur, Wenbera, Mao Komo, Bambasi, Yaso and Bello Jiganfoy woredas.

2.2 Major drivers of deforestation and degradation and mitigation measures in use

Identifying drivers of deforestation and forest degradation is key for developing national or regional strategies and action plans to sustainably manage forest resources. Understanding the drivers is needed both to assess how much forests are changing and to define proper policies and strategies and implementation plans for sustainable management of the remaining forest resources. The major direct drivers of deforestation and degradation in the region are related to human activities. During consultative meetings it was agreed that expansion of farmlands in the form of: commercial agriculture and subsistence farming, improper frankincense production, wild and/or human induced forest fire, wood harvest for biomass energy and construction purpose and shifting cultivation, were the major drivers of deforestation and forest degradation in the region. Responsible agents of deforestation in the region as identified by the workshop participants were large, commercial farmers (investors), expanding population of subsistence farmers, refugees from neighbouring countries, some members of the military, children setting fires, improper gum and resin tappers, illegal woodcutters and sellers as well as illegal settlers and miners. The specific underlining causes of deforestation in the region according to the workshop participants are conflicting land-use interests owing to lack of land-use plans and poor implementation of the land-use policy, open access to the forest resources, low law enforcement, high demand for crop and timber and NTFPs, mining, urbanisation, in adequate technology for proper harvesting of forest products, poverty, lack of awareness, high population growth, etc.

2.3. Governance of the forestry sector

The governance of the forestry sector refers to the legal and institutional framework for the administration of the forestry sector and/or for enforcing forestry and woodland management. In this regard, the Regional Bureau of Environmental Protection and Land Administration and Use (EPLAU) is responsible for identifying areas for conservation, forestry development, commercial agriculture, smallholder farmlands and resettlement areas. It is responsible for sustainable utilisation and conservation of forest resources and for identifying important forest areas to promote intensive forest management activities. The region has enacted different proclamations and guidelines that would directly or indirectly promote sustainable utilisation of forest resources. EPLAU has enacted rural land administration and use proclamation (85/2010) and regulation (44/2011), regional land-use guidelines to administer rural land while the Bureau of Agriculture led the drafting of a regional proclamation for the development, utilisation and protection of forest resources (Proclamation No. 114/2013). The proclamation empowered the Bureau of Agriculture to control and regulate the afforestation, conservation, management and utilisation of forest resources in the region. The Bureau of Agriculture then developed guidelines (Forest product utilisation and transport – 06/2014) to implement the proclamation particularly for the utilisation of forest resources. For instance, frankincense production from *Boswellia*

papyrifera and the harvesting and marketing of dead bamboo culm are administered by the guidelines (Flowering and dry bamboo utilisation and transport – 02/2012). The regional Bureau is decentralising the power of managing forest resources to lower level government structures and the local communities through a PFM approach. This has increased participation of the local communities and enhanced the role of CBOs and NGOs in forest management. Recently, the region has also developed a guideline to protect forest fire through mobilising the local communities (Forest fire control and protection manual). The region also issued a gum and resin royalty fee guideline (01/2012). The enactment and implementation of relevant proclamations and guidelines is an indication of the political commitment and interest by the regional government for the sustainable utilisation and conservation of the forest resources.

2.4 Challenges and opportunities for forestry development in the region

The major challenges of the development of the forestry sector in the region are competing land-use interests and biotic and abiotic stresses.

(i) Competing land uses/economic interests

Despite the availability of institutional and legal framework for the management of forest resources, the demand for land – often forestland – are increasing, especially for commercial farming. The Rural Development Policy and Strategy (RDPS) document issued by the federal government outlines national strategies concerning agricultural and rural development including forestry. This document is informed by the agricultural development-led Industrialization (ADLI) strategy issued in 1994. ADLI strategy reveals government commitment toward accelerated economic growth. Among the key features of the ADLI strategy, support for the development of large-scale commercial agriculture to address the specific needs of the country is one. But its implementation seems to be having negative impacts on the forest resources particularly as dry forests and woodlands are suffering from expansion of commercial farms even if it is stated that forestlands should not be allocated to agricultural investment.

The other major driver of deforestation and degradation in the region is the allocation of land by the Ethiopian Government to accommodate refugees that have come to Ethiopia after civil war broke out in neighbouring countries. The land allocated to refugees is in the middle of the forest resource. The extent of cutting trees for fuelwood and shelter and charcoal-making by refugees has been increasing. It is being reported that the refugees are even cutting drought-resistant trees such as acacias. Tree removal in these ecologically sensitive areas will have major impacts on the environment and will make the area very susceptible to soil erosion and even desertification.

(ii) Biotic and abiotic stresses

Climate change is expected to exacerbate moisture stress in dryland areas and thus reduce the productivity of forests and farmlands. The increased air temperature dries up the biomass (grass, dead leaves and small trees) quickly increasing the frequency and intensity of forest fires. Besides, with increased fire stress, economically important tree species could become more susceptible to draught stress, insect pests and pathogens. Climate

change may also alter the current low level of damage by existing insect pests to probably higher level, or may favour the appearance of other insect pests and pathogens from other regions. New insect pests are being inadvertently introduced through global trade. Hence, incidence and severity of fire and damage by insect pests are the two most important threats to the sustainable management of dry forests and woodland resources of the region.

There are opportunities for the development of the sector. The Government of Ethiopia is committed to the sustainable management of forest resources through the green development path. To achieve this goal, the government has formulated, enacted and started to implement a number of sectoral and cross-sectoral policies, strategies and laws in recent years to tackle the daunting challenges of bringing about faster economic development while also responsibly managing forests and other environmental resources. Ethiopia has also either ratified or signed several forest and environment related international treaties and conventions that can support sustainable forest resources management and facilitate carbon service payments. The country is actively engaged in implementing international initiatives related to climate change and enhancement of forest carbon stocks, e.g. the REDD+ (Reducing Emissions from Deforestation and forest Degradation through increasing forest cover) and CDM (clean development mechanism) pilot projects. In 2013, the Ministry of Environment and Forest was established to manage and protect forests and other environmental resources and to implement all relevant policies and strategies.

The 2007 Forest Policy encourages active participation of the local people in the planning and implementation of sustainable forest management. Accordingly, a number of cooperatives have been established and started to manage the forest resources through participatory forest management arrangements. The numbers of cooperatives established are increasing over time and active participation of local people in responsible forest management practices is observed. Cooperatives have developed community by-laws regarding utilisation and protection of forest resources including benefit-sharing arrangements and in some places by-laws are enforced. The favorable environment created by the government for sustainable management of forest resources enabled NGOs and donors to contribute to a more coordinated support to PFM. The Government of Ethiopia is developing roads and other social infrastructure that would create opportunities to improve the marketing of some forest products.

3. EFFECTIVE FOREST MANAGEMENT PRACTICES FOR SCALING UP

3.1. Management of dry forests and woodlands

3.1.1. Global trend and relevant experiences

In a global context, dry forest and woodlands are perceived as vegetation types dominated by woody plants, primarily trees, whose canopy covers more than 10% of the ground surface and occurring in climates with a dry season of 3 months or more. Drylands account for 54% the world's and 61% of Africa's productive land (UNDP, 2005), and encompass 42% of all tropical forests (Murphy and Lugo, 1986). It is estimated that close to 1 billion people worldwide depend upon dryland products for their livelihoods (UNDP, 2005). The largest proportion of dry forest is found in Africa, where it accounts for 70–80% of the forested area (Murphy and Lugo 1986). Dry forests in Africa occupy an area between rain forests in the Congo Basin and open woodlands of Western and Southern Africa.

Dry forests contain a wealth of unique biodiversity (Janzen, 1988) and yet are among the least protected ecosystems in the world (Janzen, 1988). The dry forests and woodlands of Africa have rich flora and big elements of endemism (White 1983, Linder et al., 2005). The Zambebian regional centre of endemism has eight endemic genera compared to four in the Sudanian regional centre of endemism and 50 endemic genera in the Somali-Masai regional centre of endemism (White, 1983). In sub-Saharan Africa, they are found in 31 countries in Western, Eastern and Southern Africa and are the dominant vegetation type in 63% of these countries. They cover approximately 17.3 million km² and are inhabited by nearly 505 million people (Chidumayo and Marunda, 2010).

Non-wood forest products (NWFPs) are important in dry forest and woodlands (Belcher, 2003). The most important NWFPs are: fruits, seeds, exudates, leaves, bark, roots, fibres, Oleo, gum, resins and honey which can be used for subsistence or traded for food, pharmaceutical and cosmetic industries. The *Acacia-Commiphora* and *Combretum-Terminalia* woodlands which occur in large parts of the Horn of Africa and the Sahelian and Sudanian zone (White 1983; Friis, 1986) are endowed with various species of *Acacia*, *Boswellia* and *Commiphora* that are known to produce Arabic gum, frankincense and myrrh (Lemenih and Teketay, 2003). Dry forests and woodlands are sources of wood for local people but the wood is mostly used for local construction of houses, fences or livestock pens. They are also a major source of wood for fuelwood and for making charcoal. Livestock production is the mainstay of people living around dry forests where animal production is based on free-ranging regimes (FAO, 2009). Besides being sources of NWFPs and biodiversity reservoirs, dry forests also give protection for head water hydrology (Lemenih 2005) and climate stabilisation through carbon sequestration (Nair and Tieguhong, 2004).

3.1.2. Dry forest and woodland resources of Ethiopia

Dry forests and woodland resources of Ethiopia are among the nine broad vegetation types that have been recognised in Ethiopia (Sebsebe, 1996) which include: (1) the dry, evergreen, Afro-montane vegetation, (2) the *Combretum-Terminalia* (broad-leaved) deciduous woodland, (3) the *Acacia-Commiphora* (small-leaved) deciduous woodland, (4) the lowland dry forests, (5) the lowland semi-desert and desert vegetation, (6) the evergreen

scrub, (7) the wetland (swamps, lakes, rivers and riparian) vegetation, (8) the moist, ever green montane forest and (9) Afro-alpine and sub-Afro-alpine vegetation. Access to reliable information on the vegetation resources of Ethiopia was difficult for several reasons (Teketay et al., 2010). The work of the Woody Biomass Inventory and Strategic Planning Project (WBISPP, 2004) was the first national inventory that provided reasonably reliable statistics on the forest resources prior to the ongoing forest inventory by FAO. According to WBISPP (2004), Ethiopia owns a total of 59.7 million ha covered by woody vegetation among which 6.8% were forest, 49% woodland and 44.2% shrub land or bushland. Somali (33%), Oromia (32%) and Amhara (10%) regions shared the largest area of woodlands and shrub lands/bushlands (WBISPP, 2004). Expansion of commercial farming and smallholder agriculture, fire, unregulated removal of fuelwood and open grazing were the major problems (Lemenih et al., 2007).

3.1.3 Global experiences in selecting dry forest management practices

The concept of sustainable forest management accommodates social, economic and ecological issues. These three cornerstones of the principle of sustainable forest management are referred to as “the triple bottom line” (FAO, 2010). Through sustainable management, forests can contribute to the resilience of ecosystems, societies and economies while also safeguarding biological diversity and providing a broad range of goods and services for present and future generations. For sustainable forest management practice, active involvement of local communities and other stakeholders is crucial as local government structure and communities are expected to share responsibility for a given forest resource for the conservation of its biodiversity, production of timber and NTFPs and maintenance of its regeneration capacity under varying land tenure (Bray et al., 2003; Wilkie et al., 2003).

Identifying and scaling up best dry forest and woodland management practices is important. To track progress toward the goal of sustainability, there is a need to establish mutually agreed upon criteria and indicators which would provide a framework for data collection and evaluation (e.g. FAO, 2010). Criteria define the essential components of forest values to be addressed in sustainable forest management while indicators are ways to measure or describe a criterion (Castañeda, 1999). The International Tropical Timber Organization (ITTO), Dry Zone Africa Process and Montréal Process are some of the global initiatives for the development of criteria and indicators (Prasad, 2001; FAO, 2010). The Montréal Process identified seven criteria and 67 indicators for the sustainable management of temperate and boreal forests. According to FAO (2010), the seven criteria of the Montréal Process are: (1) conservation of biological diversity, (2) maintenance of productive capacity of forest ecosystems, (3) maintenance of forest ecosystem health and vitality, (4) conservation and maintenance of soil and water resources, (5) maintenance of forest contribution to global carbon cycles (6) maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies and (7) legal, institutional and economic framework for forest conservation and sustainable management. It can be observed from the following table (Table 1) that the criteria from ITTO, Dry Zone Africa and Dry Zone Asia are similar to each other (FAO, 2000) and that of the Montréal Process (FAO, 2010) indicated above.

There is a need to establish mutually agreed-upon criteria and indicators that would provide a framework for selection of best forest management practices (FAO, 2010). Criteria and indicators developed based on international experiences (Castañeda, 1999; FAO, 2000; 2010; Prasad, 2001), wisdom of experts and consultative regional workshops were used to identify best dry forests and woodland management practices in the region. The team used these mechanisms in selecting effective forest management practices in BGRS.

Table 1. Criteria and indicators used by ITTO, dry zone Africa and dry zone South Asia.

ITTO	Dry Zone Africa	Dry Zone South Asia
Criterion 1: Enabling conditions for sustainable forest management	Criterion 7: Adequacy of legal, institutional and policies frame work for sustainable forest management	Criterion 8: Adequacy of policy, legal and institutional framework
Criterion 2: Forest resource security	Criterion 1: Maintenance and improvement of forest resources, including their contribution to global carbon cycles	Criterion 1: Increase in the extent of forest and tree cover
Criterion 3: Forest ecosystem health and condition	Criterion 3: Maintenance of forest ecosystem health, vitality and integrity	Criterion 4: Maintenance and enhancement of ecosystem function and vitality
Criterion 4: Flow of forest products	Criterion 4: Maintenance and enhancement of production functions of forests and other wooded lands	Criterion 6: Optimization of forest resource utilization
Criterion 5: Biological diversity	Criterion 2: Conservation and enhancement of biological diversity in forest ecosystem	Criterion 2: Maintenance, conservation and enhancement of biodiversity
Criterion 6: Soil and water conservation	Criterion 5: Maintenance and improvement of protective functions in forest management	Criterion 3: Conservation and maintenance of soil and water resource
Criterion 7: Economic, social and cultural aspects	Criterion 6: Maintenance and enhancement of socio-economic benefits	Criterion 7: Maintenance and enhancement of social, cultural and spiritual benefits

3.1.4. Selected effective practices in managing dry forests and woodland

The major selection criteria agreed upon by the team and the experts focused on forest management (ecological, socio-economic and adequacy of policy and legal framework) and each of the major criteria has sub-criteria and indicators. A total of three major criteria, nine sub-criteria and 112 indicators were developed for selection of best dry forest and woodland management practices in BGR. The major criteria and sub-criteria were given different weights (Table 2) but each of the indicators was given equal weight.

Table 2. Criteria and indicators used in selecting best DFM practices.

Major criteria (weight in %)	Sub-criteria (weight in %)	Number of indicators
Forest management (25)	Improvement of forest resource (40)	17
	Maintenance and enhancement of productive functions of forests (25)	19
	Maintenance and improvement of forest health (20)	6
	Maintenance and improvement of forest ecosystem services (10)	20
	Landscape planning (integration with other sectors) (5)	11
Socio-economic benefits (35)	Maintenance and enhancement of economic benefits of forests (60)	14
	Maintenance and enhancement of cultural benefits of forests (40)	5
Legal and institutional framework (40)	Enabling legal framework (40)	10
	Enabling institutional framework (60)	10

3.1.4.1. Candidate practices

Candidate dry forest and woodland management practices in BGR were identified during a consultative workshop in which planners, experts and extension workers from government organisations (GOs), NGOs and the private sector were involved; this was carried out at the region's capital (Table 3).

Table 3. Candidate best dry forest management practices in BGR.

Practices	Location/Woreda	Major actors
Gum and resin-based DFM (PFM)	Kumruk	Boa, Farm Africa
Private nursery	Amba 13 (Assosa)	Individual, BoA, EPA
Conservation of medicinal plants	Bambasi	EIB, BoA, EPA
Gum- and resin-based DFM (private)	Serkole	NGMPE, BoA
Bamboo-based DFM (PFM)	Homosha	BoA, Farm Africa
DFM for beekeeping	Amba 2 (Assosa)	BoA
Bamboo-based agroforestry	Ateto (Assosa)	BoA, Bamboo star

3.1.4.2. Identified practices

Based on the evaluation, gum- and resin-based and bamboo-based dry forest management practices were selected as the two best practices among the evaluated candidate practices (Table 4).

Table 4. Selected dry forest and woodland management practices and their ranks in BGRS.

Practices	Average	Rank
Gum- and resin-based DFM (PFM)	91	1
Private nursery*		
Conservation of medicinal plants	81	3
Gum- and resin-based DFM (state enterprise)	78	5
Bamboo-based DFM (PFM)	83	2
DFM for beekeeping*		
Bamboo-based agroforestry	86	4

* = Excluded from evaluation by planners, experts and farmers

Both practices are under the framework of PFM being facilitated mainly by SoS-Sahel/Farm Africa. The Gum and resin based dry forest management found in Kurmuk focuses mainly on production of frankincense from *Boswellia papyrifera* while the bamboo-based management focuses mainly on utilising dead bamboo calms (due to flowering). Both management practices are technically supported by experts from BoA and SoS-Sahel/Farm Africa. Both interventions have only existed for the past 2 years, which clearly shows that management of the dry forests and woodlands in the region is largely neglected. For both cases, the PFM process is similar to what has been stated in guidelines developed by Temesgen and Lemenih (2012).

3.1.4.3. Brief description of selected management practices

(i) Gum and resin based dry forest management (DFM) in Kurmuk

The results from the analysis of criteria and indicators show that gum and resin based dry forest management (DFM) in Kurmuk has a detailed management plan which was prepared through participatory approaches; the management prescription in the management plan are being executed according to the plan. The growing stock is monitored and most of the respondents reported an improvement of the composition and diversity of plant species in areas under PFM practice. The result also showed that there exists a clear guideline on the level of exploitation, targeted improved services (medicinal plants, grasses, etc.) and planned forest protection activities against fire and any other illegal acts. In terms of socio-economic attributes, it was understood that the process is participatory, community members participating in PFM get more income and vulnerable groups are addressed. The resource is well demarcated, community by-laws are well respected and enforced and there are also clear guidelines for benefit-sharing. The weaknesses identified were: planning for carbon credit schemes, lack of pest management and integration with other sectors (landscape approach), inadequate efforts to diversify products. For example, there are fruit trees such as *Adansonia digitata* (Baobab, “Agangulish”) and *Tamarindus indica* (“Mela”) that can increase household income.

(ii) Bamboo-based DFM in Homosha

The practice contributed significantly to massive regeneration of bamboo. The seedlings are protected against fire, grazing and termite (termite control – through use of ash and

digging a kind of trench). Increased income, good market opportunity and better job opportunities following the market chain are some of the economic benefits praised by farmers and experts. Clear benefit-sharing mechanism, clear demarcation of the resource and good enforcement of by-laws were also mentioned as positive attributes of this particular practice. The existence of monitoring system, engagement of State and non-State agencies in the process (PA, BoA, Bamboo star/private company, SoS-Sahel/Farm Africa (an NGO), community participation in all phases and gender sensitivity (women associations exist) were also additional positive attributes of the practice.

Lack of enrichment planting with other valuable species, lack of silvicultural practice to better manage bamboo (e.g. on spacing, on harvesting frequency and intensity (how many calms to retain), reliance on only one product type (lack of product diversification – e.g. there is potential for beekeeping), little or no value addition, inadequate extension and market support, uncertainty on continuity of the cooperative when all dead bamboos have been collected, are some of the weaknesses identified from the bamboo-based dry forest management in Homosha.

3.1.5. Suggested improvement measures and potential scaling up areas

Options to further improve the selected practices to enhance their positive impacts on the landscapes and on people's livelihoods were identified by the team. Then, ex ante evaluation of proposed measures was conducted by the team and a number of regional experts. The five measures that ranked high during the evaluation were:

- i. awareness creation on legal framework regarding forestry and related sectors (clear rules and regulations), and law enforcement (implementing laws)
- ii. increased commitment and active involvement of governmental institutions to support forest management initiatives
- iii. clearly define entry and exit strategies for non-State agencies such as NGOs and other project implementers.
- iv. ensure complementarity and integration of plans (based on clearly defined mandates and roles of the respective institutions) to maximise synergy and reduce gaps and overlaps of activities.
- v. integrate concept of carbon trade in the dry forest and woodland management practices
- vi. strengthening research undertaking and extension service

Table 5. Zones and woredas in which dry forests and woodlands management practices can be scaled up in the BGRS.

Practice	Zone	Woreda
Gum- and resin-based PFM	Assossa	Kurmuk, Sherkole, Mange Signor, Oda, Assosa, Homosha Bamadon, Molo
	Kamashi	Sadal, Agalo-Meti, Yaso,
	Metekel	Guba, Wonbera, Dangur,
	Ma'o Komo	Ma'o Komo
Bamboo-based PFM	Assossa	Kurmuk, Sherkole, Mange, Oda, Assosa, Homosha, Bambasi
	Kamashi	Sadal, Agalo-Meti, Yaso, Kamashi,
	Metekel	Guba, Wonbera, Dangur, Pawe, Mandura
	Ma'o Komo	Ma'o Komo

3.2 Other forest management practices for scaling up

3.2.1 Promoting agroforestry systems

3.2.1.1 Global trend and relevant experiences

Degradation of forests caused by unsound exploitation, conversion of forests to other land uses, forest fires, pests and diseases have led to the deterioration of forest ecosystems and a reduction in biodiversity. The problem continues unabated and thus large areas of the world's forests have been converted to agricultural lands and other uses or lost through natural causes each year (FAO, 2010). In most developing countries, the agricultural sector plays a key role in fighting poverty. To achieve the objective of reducing poverty, agriculture is getting more attention by governments. Increasing agricultural production has generally involved promoting mono-cropping using high inputs, expanding areas by converting forests and marginal lands with little attention to environmental sustainability. The overall effect of such a loss and widespread forest degradation is a decline in environmental goods and services, including climate stabilisation and loss of biodiversity and reduction in human well-being in general (Lamb and Gilmour, 2013).

Agroforestry is one of the tools for achieving sustainable development and improving the quality of life of rural communities and simultaneously reversing the process of environmental and land degradation (Nair et al., 2009). Agroforestry is a land-use practice that integrates trees, agricultural crops and livestock in a single piece of land where trees are planted or maintained by communities along with agricultural production systems, including livestock. In other words, it is the practice of land use that involves deliberate retention, introduction or mixing of trees or other woody perennials in crop/animal production fields to gain benefit from the resultant ecological and economic interactions (Lundgren and Raintree, 1982). It helps to change conventional monoculture that is dependent on agrochemicals to sustainable multi-functional systems that enable small-scale farmers to increase their production. Ecological, economic and social benefits of agroforestry are well documented (Kang and Akinnifesi, 2000; Neupane and Thapa, 2000). The system allows increase in income through product diversification while also

providing environmental services. This is particularly important for in-situ biodiversity conservation and to adapt to and mitigate climate change (Verchot et al., 2007; Méndez et al., 2010). Because of its various positive contributions, emphasis has been laid on promoting agroforestry as a viable land use in different parts of the world, particularly in developing countries, including Ethiopia.

3.2.1.2. Agroforestry practices in Ethiopia

Ethiopia has diverse agroforestry systems that have been practiced for generations (Hoekstra et al., 1990). The most common agroforestry practices in the country include scattered trees in croplands or parkland agroforestry practiced in large parts of the Ethiopian agricultural landscape (Hoekstra et al., 1990), home gardens found in many parts of southern and south western regions of Ethiopia (Getahun, 1988; Abebe, 2000; Negash et al., 2002), hedgerow intercropping from *Catha edulis* in the Hararghe Highlands of eastern Ethiopia (Bishaw and Abdelkadir, 1989), alley cropping that entails the growing of food crops between hedgerows of planted shrubs and trees (Hoekstra et al., 1990), riparian zone vegetation along the Awash and Eliwoha waterways mainly practiced by pastoralists, and enclosures and natural regeneration of species in woodlands and pastures, mainly practiced in the northern part of the country (Yami et al., 2012). Different management practices such as lopping and pollarding of trees to minimise the impact of integrated trees on crops is used (Poschen, 1986; Abebe, 2000). Agroforestry contributed to the sustainable development of agriculture and promoted economic progress in Ethiopia. The system has been providing different forest products such as fodder, poles, farm equipment, fuelwood and improved agricultural productivity (Poschen 1986; Abebe 2000). In addition to the provision of forest products, agroforestry practice is also playing an important role in adaptation to and mitigation of climate change (Tsfaye, 2011; Molla, 2013; Negash, 2013).

3.2.1.3. Identifying and scaling up effective agroforestry practices relevant to the region

Agroforestry is one of the recommended practices in Ethiopia for enhancing agricultural productivity while also supporting ecological sustainability. The forest policy enacted in 2007 promotes agroforestry. The commitment of the Ethiopian Government to sustainable development through a green path indicated in CRGE document (CRGE, 2011) has also emphasised forestry and agroforestry to enhance overall environmental protection and agricultural productivity.

Three agroforestry practices, one each from the three agro-ecologies (highland, mid-highland and lowland) have been identified as effective practices for scaling up by a team evaluating agroforestry practices in SNNP regional state. These are:

- apple and bamboo-based agroforestry at Hulla woreda (district), Teticha PA from the highland agro-ecology. This system encompasses three components in a very harmonised and sustainable way. The three components are, the trees, crops including vegetables and livestock.
- coffee–fruit tree–enset based agroforestry at Dilla Zuria woreda, Chichu PA from mid highland areas. The system is characterised by multipurpose tree

species diversity that provides fruit and forest products and cash crop. The species have different vertical and horizontal arrangements. The system also includes different types of crops, vegetables and livestock. The system is an important source of income for households, providing regular and fairly low-risk returns.

- Moringa tree-based agroforestry system at Konso woreda, Gocha PA from the lowland areas. This agroforestry practice integrates many scattered tree species, mainly native Moringa trees intercropped with diversified crop types, mainly sorghum. Coffee, chat and pigeon pea are the other cash crops found in the system, apart from livestock.

Considering the socio-economic attributes and the agro-ecological set up of BGRS, the following agroforestry practices are recommended for scaling up (Table 6).

Table 6. Best agroforestry practices for scaling up in zones and woredas.

Agroforestry practice	Zone	Woreda
Lowland bamboo agroforestry (integration of bamboo into farmlands)	All zones	All woredas
Fruit tree-based agroforestry system (mainly mango trees with annual crops, vegetables, grass species)	All zones	All woredas
Moringa-based agroforestry	All zones	All woredas
Scattered trees (indigenous tree species e.g. <i>Balanites aegyptiaca</i> , <i>Adansonia</i> , <i>Tamarindus indica</i> , <i>A. senegal</i> , <i>F. albida</i> and <i>Grevillea robusta</i>)	All zones	All woredas

3.2.2. Managing plantation forests

3.2.2.1 Global trend and relevant experiences

Plantations provide means to reduce potential future wood shortages and to ensure continuity of supply for existing industrial enterprises or household wood fuel needs. The Food and Agriculture Organisation of the United Nations (FAO) estimated that in 2010, 31% of the land surface of the world was forested and 6% of this was planted forest. The plantations in five countries (China, India, Japan, Russia and the USA) account for more than half of the total plantation area. Plantations are established both for commercial and protective functions such as environmental protection, catchment protection, etc. Globally, plantation areas increased by an average of 4.9 million ha/year in 2010 and are expected to continue, so that the total plantation area is anticipated to rise to about 300 million ha by 2020 (FAO, 2010). Plantations are commonly established from one tree species that is economically important. *Pinus* species are the dominant tree species grown in temperate regions accounting for more than 40% of the world's forest plantations. Tropical countries plant *Eucalyptus* species; Brazil and India account for more than half of the plantation areas. Other major forest plantation genera include *Picea abies*, *Larix*, *Acacia*, *Cunninghamia* and *Tectona*.

3.2.2.2. Experiences in the management of plantation forests

In Ethiopia, large-scale plantation programmes aimed at meeting the ever-increasing demand for wood and other forest products were started with the primary purpose of supplying industrial round wood i.e. for the production of sawn wood, wood-based panels

and wood pulp in the early 1970s. An increase in the area of forest plantations was observed from 189,000 ha in 1990 (FAO, 1990) to 972,000 ha in 2010 (Bekele, 2011). Commercial plantations that produce timber for sawn wood and poles account for 20% of the current plantations. The supply of industrial wood from the plantations was of poor quality due to the current low management practices. The remaining 80% are non-industrial plantations, mainly woodlots. These plantations produce fuelwood and construction timber wood, as well as NTFPs.

The expansion rate of plantations in Ethiopia is not comparable to demands for forest products in the country. Recently, smallholder plantations are increasing although they are limited to just a few species (mainly *Eucalyptus* spp. and *Acacia decurrens*). Farmers are now getting a reasonable cash income from their woodlots. Some of the forest products such as poles and posts are currently exported to neighbouring countries and contribute to foreign currency earnings of the country. The promotion of smallholder plantations by farmers and large-scale plantations by private investors is an important strategy to enhance the supply of forest products and cash income to farmers and foreign currency to the country. Plantation development started in the 1970s in the BGRS. The main purposes of plantations were to supply fuelwood and wood for construction purpose. Reports suggest that about 5,187.5 ha of plantations have been established in six woredas by the public, community and Tana Beles project (1979–1984) using mainly *Eucalyptus* species. Individual farmers as well as private investors have also started established plantations for commercial purpose mainly from *Eucalyptus* species and lowland bamboo. However, no quantitative data were available to include in this document. Plantations from *Acacia polyacantha* and *Eucalyptus* spp. have also been established for industrial purposes, as an input for manufacturing plastic containers and pipe at Pawe woreda. Settlement areas and refugee camps were also important areas for the establishment of woodlots.

3.2.2.3. Identifying and scaling up effective plantations management practices relevant to the region

The high rates of economic development and expansion in Ethiopia, plus significant imports and a decreasing supply from natural forests in the country suggest that forest plantations have a role to play. The ever-increasing demand for forest products entails establishment of plantations either on a large scale or at smallholder level.

A team that assessed smallholder plantation practices in Amhara region identified an *Acacia decurrens* based smallholder plantation in Fagita Lekoma woreda, Awi zone and *Eucalyptus globulus* based plantation found in Lay Gaint woreda, South Gonder, Amhara region as best practices. Both practices use tree species with better adaptable and faster growth rates. The former practice in particular was also compatible with other land uses besides enabling farmers to get better market prices for their tree products. It is also reportedly improving soil fertility and allowing farmers to practice crop rotation with trees. Besides, the silvicultural management of the plantation, especially those of the spacing, planting techniques and tending operations are well developed. Some of the growers are raising quality seedlings using different inputs that enhance seedling performance.

Smallholder plantations that need to be scaled up in BGRS are: lowland bamboo, *Acacia decurrens*, *Eucalyptus globulus*, *Eucalyptus camaldulensis*, *Acacia polyacantha* and *A. Senegal*-based plantations. The scaling up area of each of these species depends on the agro-ecological requirement of the species. Accordingly, *A. decurrens* and *E. globulus* could be scaled up in the highland areas, *E. camaldulensis* in the mid-highland areas, and lowland bamboo, *A. polyacantha* and *A. senegal* in the lowland areas of the regional state. The specific woredas where each of species could be scaled up and the necessary techniques are indicated in Table 7

Table 7. List of tree species, management techniques, woredas and actors for scaling up smallholder plantations in BGRS.

Species	Zone	Woreda	Techniques	Actors	Remarks
Lowland bamboo	All zones	All woreda	Planting space 4 m x 4 m	Farmers, investors, youth	
<i>A. decurrens</i>	Metekel	Wenbera	Planting space 1 m x 1 m with a rotation period of 5 to 6 years	Farmers	At the early stage crops can be integrated
<i>E. globulus</i>	Metekel	Wenbera	Planting space 0.75 m x 0.75 m	Farmers	Planting site should avoid water sources
	Mao komo	Mao komo			
<i>E. camaldulensis</i>	Metekel	Most woreda	Planting space 1 m x 1 m	Farmers	Planting site should avoid water sources
	Kemash	Most woreda			
	Assosa	Most woreda			
	Mao komo	Mao komo			
<i>Grevillea robusta</i>	Metekel	Most woreda	Planting space 2m x 2m	Investors	At the early stage crops can be integrated
	Kemash	Most woreda			
	Assosa	Most woreda			
	Mao komo	Mao komo			
<i>A. polyacantha</i>	Assosa	Assosa, Bambassi, Homosha	Planting space 2 m x 2 m	Youth, entrepreneurs	
	Metekel	Pawe, Dangur, Mandura,			Entrepreneurs, charcoal production
<i>A. senegal</i>	All zone	All woreda	Planting space 4 m x 4 m	Investors	Enterprises

3.2.3. Managing exclosures

3.2.3.1 Global trends and relevant experiences

Degradation of forest ecosystems and reduction of biodiversity have become global problems. The prolonged degradation of forestland continues to affect the productivity and genetic diversity of forests, woodlands and bushlands. The unwise utilisation of the forest resources has led to the deterioration of forest ecosystems (Dobson et al., 1997). Exacerbated by the recurrent drought, the ultimate outcome of deforestation and degradation of these resources may be desertification. As a result, many countries in the world have already faced a series of hazards and disasters including soil erosion, desertification and floods (Vitousek et al., 1997; Tilman et al., 2001). The overall effect of the process of forest degradation is a reduction in human well-being and a loss of biodiversity and ecological goods and services (Lamb and Gilmore, 2013). Sustainable conservation and utilisation of the remaining dryland vegetation resources and rehabilitation of those that have already been degraded would provide economic, social and ecological benefits. Restoration and rehabilitation of degraded forestlands has been taking place in a number of South-East Asian and South American countries). Among others, establishment of exclosures is suitable for degraded lands. Exclosure improves the productivity of degraded lands and protects downstream fields and properties from flooding and improves groundwater recharge. Rehabilitation of degraded lands has been a tradition in most pastoral societies around the world. Rotational grazing and deferred pasturing that allow the vegetation to regenerate during the rainy season have been practiced in Algeria, Niger, Somalia and Tunisia for many centuries (FAO 1979; Birhane, 2002).

3.2.3.2. Practices in establishing and managing exclosures

Rapid deforestation and land degradation is severe and has a long history in Ethiopia, especially in the central and northern highlands where subsistence farming and settlements have been changing landscapes for millennia. Extensive forest clearing for agricultural use, overgrazing and exploitation of existing forest for fuel, fodder and construction materials are the major drivers of deforestation (Bishaw, 2001). Rehabilitation of degraded lands is a recommended practice to bring back the productivity potential of abandoned and deforested lands. The practice of rehabilitating degraded lands through establishing exclosures has been traditionally carried out for centuries in Ethiopia by restricting the use of forests around churches (Wasse, 2002). The rehabilitation practice involves mainly building physical structures to control soil erosion and afforestation and re-vegetation of fragile and hillside areas. Massive efforts were undertaken that have resulted in many ecological benefits such as restoring farmlands, increasing soil depth, water holding capacity and improved woodlot and pastures (Tato, 1991).

Nowadays, establishing exclosure is one of the most widespread and successful forms of rehabilitating degraded lands in Ethiopia. It involves protecting areas mainly through social fencing from any form of cultivation, cutting trees and shrubs or grazing by livestock. The principal objective of the practice is to maintain economically productive and biologically diverse vegetation (Zoebisch and Masri 2002) rather than less valuable, open degraded lands. In BGRS, there are some initiatives for rehabilitating degraded lands mainly at Bambasi, Assosa and Homesha woreda.

3.2.3.3. Identifying and scaling up effective enclosure practices relevant to the region

A team of researchers examined enclosures in Tigray using a set of criteria and indicators to select better enclosure sites in the highland, midland and lowland agro-ecological zones. The selected ones were enclosures practiced in Enda-medihanialem, Rafael and Erbba sites in lowland areas; Enda-chiwa, Abreha Atsbeha and Ziban Serawat in mid-highland areas; and Mugulat, Gereb Hara and Dabre in highland areas. The team considered success levels in rehabilitation of degraded lands, their economic contribution to the local community, presence and use of an appropriate management plan, presence and enforcement of by-laws, the presence and clarity of responsibility and benefit-sharing mechanisms, awareness and level of community participation in decision-making and in the management and use of enclosures, etc. The team concluded that biophysical and conservation objectives were the main focus and much needed to be done to enhance the economic contribution of enclosures. Thus, establishing area enclosures should begin with setting and agreeing among key stakeholders the short-, medium- and long-term ecological and socio-economic objectives, responsibility benefit-sharing arrangements and the establishment and enforcement of by-laws. Also, product diversification, value addition and creating market links were recommended to increase economic returns of enclosures. In BGRS, area enclosure is likely to expand. The specific woredas where each the practice of enclosures expected to be scaled up are indicated in Table 8.

Table 8. List of proposed woredas in BGRs where enclosure practices can easily be scaled up

Zone	Woreda
Metekel	Dibate, bullen, wenbera,
Assosa	Assosa, Bambasi, homesha,
Mao Komo	Mao Komo
Kamashi	Kamashi, Bello jiganfoy

3.2.4. Participatory forest management (PFM)

The selected best dry forest and woodland management practices collated from BGRS were all PFM practices as applied on woodlands. These practices are product-based (e.g. gum/resin, bamboo) interventions and are supported by Farm Africa/SoS-Sahel. The practice is implemented following national PFM guidelines. PFM as one of forest management practice was studied in detail in Oromia region, where this practice is believed to be older and widely applied in high forests. Hence, we should include the lessons from this team to help BGRS to apply PFM in high forest areas.

3.2.4.1. Global trends and relevant experiences

Participatory forest management approach focuses on engaging and empowering local communities to take the lead in NRM. In participatory approaches, the government is expected to play more of a facilitation role rather than commanding, controlling and policing roles. Proponents of this approach to forest maintenance argue that by engaging local communities that have a huge stake in and are the primary beneficiary of maintaining the forests, a win-win outcome (i.e. improved biodiversity

management and local development) can be successfully and sustainably achieved. The underlying premise of PFM is that sustainable forest management is most likely to occur when local communities develop a sense of ownership, assume the responsibility of managing local forests and are incentivised in their forest management from direct forest-based income (Ostrom,1990; Agrawal and Ostrom, 2001). Participatory forest management has been used in many countries across Asia, sub-Saharan Africa and Latin America. It has been estimated that around 25% of forest resources in the developing world are now under some degree of local control (White and Martin, 2002). For instance, about 35 countries out of the total of 51 in sub-Saharan Africa are practicing PFM (Barrow et al., 2008).

Participatory forest management started as a response to constraints by governments in developing countries to ensure improved forest management. Many developing country governments do not have sufficient resources and institutional capacity to enforce forest management laws (Wily and Mbaya, 2001). Governments usually claim ownership over forests but fail to put in place institutions capable of protecting and managing them. Hence, forests are largely de facto “open access”. Participatory forest management fills this institutional gap at the grass roots by mobilising local communities living in and around the forests, organising them into various forms of legally recognised CBOs and developing by-laws and means to enforce the by-laws that reverse de facto open access. It is largely believed that empowering communities to legally own and use forest resources increases their motivation to sustainably manage those resources. Hence, PFM bridges these gaps by creating and sustaining strong local institutions and developing a sense of ownership (Charnley and Poe, 2007; Amaha, 2013). However, the degree of power and benefits devolved to communities, which are often limited, still challenges PFM initiatives (Ribot et al., 2010).

3.2.4.2 PFM experiences in Ethiopia

Participatory forest management (PFM) was introduced to Ethiopia in the 1990s. Currently, around 2.4 million ha of natural forest, plantation and degraded forestlands are believed to be managed with PFM. Coverage of PFM has increased with EU/EDF supported projects. Forest policies and regulations at regional and federal levels have given good recognition to PFM. In the south-west forest, PFM is being implemented with the support of NGOs such as Farm Africa/SoS-Sahel and NABU in Kaffa Forest, the Ethiopian Evangelical Mekaneyesus Church in Bench-Maji Forest and EWNRA (along with other members of the SWFLG) in Sheka Forest and the WCC-PFM project in Bench Maji Forest.

In terms of improvement measures, the PFM team identified enhancing households’ capacity, improvements in policy and legal framework and improving forest management as the top three priority areas under the goals of livelihood security, governance and environmental well-being, respectively. When indicators are considered, taking measures to improve the skill of households (human capital), better enforcement of PFM institutions and enforcement and implementation of forest management plans were the indicators prioritised under each of these sub-objectives, respectively.

3.2.4.3 Identifying and scaling up effective PFM practices relevant to the region

In view of the specific particularities and the overriding challenges of PFM in the context of Ethiopia, the team that worked on PFM used six criteria/sub-criteria to evaluate and identify the best PFM practice; (1) participation and level of empowerment, (2) institutional and organisational set up of PFM, (3) level of livelihoods impacts, (4) status of the forest resource, (5) equity in terms of protection of the interests of disadvantaged and women groups, (6) nature and effectiveness of conflict resolution mechanism were considered. As indicated earlier, the best dry forests and woodlands management practices identified in BGRS were all under PFM. This shows that the experiences collated from BGRS in managing dry forests and woodlands can be cross-fertilised with the experiences gained by the PFM team in Oromia to extend PFM to other dry forests within BGRS. The model developed by the PFM could be used to scale up best PFM practices to high forests in BGRS. The high forests in Metekel zone and Ma'o Komo area can be treated with PFM following the suggestions forwarded by the PFM team.

4. STRATEGY FOR SCALING UP EFFECTIVE FOREST MANAGEMENT PRACTICES

4.1 Rationale and objectives of the regional strategy

The CRGE strategy issued in 2011 aims to making Ethiopia a middle-income country by 2025 and to make its economic growth carbon neutral by 2030. The CRGE Strategy is based on three complementary objectives: fostering economic development and growth, ensuring mitigation of greenhouse gases (GHGs) and supporting adaptation to climate change. The CRGE is meant to reduce the emission of GHGs that would come from the rapid economic growth of the country. The CRGE follows a sectoral approach and plans to limit emission of GHGs to the 2010 level, estimated at 150 Mt CO_{2e}, around 250 Mt CO_{2e} less than what would have been under the conventional development path (CRGE, 2011). The CRGE is based on four pillars: agriculture, forest, energy and transport and industry and construction. Forests play critical role in mitigating the effects of global climate change because they are large storehouses of carbon and have the ability to continually absorb carbon dioxide from the atmosphere. The strategy document demonstrates that without the green development path, Ethiopia's development would lead to unsustainable use of natural resources.

The contribution of the forestry sector in building a greener economy is mainly through GHG sequestration via protecting and re-establishing forests for their economic and ecosystem services including as carbon stocks. Accordingly, a number of activities have been planned, including reducing deforestation and forest degradation through enhancing agricultural productivity and provision of a wide range of efficient stoves and alternative energy sources, afforestation, establishment of area closures and sustainable management of forests and woodlands (CRGE, 2011). Although such initiatives have been started, deforestation and degradation (D&D) of forest resources of the country is still acknowledged. One important challenge that needs to be addressed is the lack of a management plan to responsibly use forest resources for multiple and sometimes competing products and services in a sustainable way. Sustainable management is central to any planned management and conservation of forest resources. Scaling up of effective forest management practices that aim at better livelihood and ecological outputs is vital for achieving the CRGE goals/targets and GTP set by the Ethiopian Government. Hence, the scaling-up strategy contributes to major national plans and international pledges.

The general objective of this strategy is to support efforts of the BGRS to scale up effective forest management practices over a wider geographical area and to bring about more equitable and lasting livelihood and ecological benefits from forests and woodlands. Its specific objectives are:

- to enhance the role of dry forests and woodlands for the maintenance and improvement of people's well-being and livelihood security by increasing the opportunities for forest-based income generating activities and active stakeholder participation
- to significantly increase the role of the forestry sector to national development goals of poverty alleviation through the development of appropriate production and

processing technologies and better market access that maximise the contribution of the sector to income, employment and trade

- to contribute to achieving major forestry targets set in national development plans and in the CRGE Strategy in terms of reducing deforestation and forest degradation, increasing afforestation, reforestation and forest management to enhance carbon sequestration
- to help integrate all forestry related activities so as to optimise the economic, social and environmental benefits of development interventions
- to enhance the level of participation of key stakeholders in developing strategy for the conservation and responsible management of forests and woodlands by various stakeholders
- to sustainably manage the dry forests and woodlands for multiple products and services.

4.2 Strategy development process

A strategy to scale up effective forest management practices should aim to promote sustainable forest management practices for better livelihood and conservation outcomes. The strategy should also promote active participation of key stakeholders, notably policymakers, communities and experts. Participation helps to build ownership and facilitates implementation and assessment of the process and outcome of the strategy.

In developing this strategy, a team of senior experts drawn from higher learning and research institutions, from regional Bureau of Agriculture and from forest products marketing company was established. The team began by developing procedures and identifying criteria and indicators to select effective practices in managing dry forests and woodlands in BGRS for scaling up both in the region and in the country at large. To do so, it reviewed international experiences (e.g. Castañeda, 1999; FAO, 2000, 2010; Prasad, 2001) and the available national literature. The major selection criteria agreed upon among the team members focused on forest management (ecological), socio-economic and the adequacy of policy and legal framework. Sub-criteria were developed for each major criterion. The criteria and indicators developed by the team of experts were commented on and enriched by regional experts during a consultative meeting. That was then presented at a national-level meeting to other teams of experts working on other forest management practices (i.e. exclosure, PFM, smallholder plantations and agroforestry) were present. The comments of these teams and of the regional experts were used to enrich and refine the criteria and indicators used in the selection process.

The selection of candidate best dry forest and woodland management practices in BGRS was conducted through active participation of the team members as well as the regional experts after having organised a second round of consultative meeting in the regional capital, Assosa. The team members, the regional experts, district and local administration officials and selected members of the communities have also evaluated individually the candidate practices using evaluation formats in the form of a questionnaire. Group discussions with selected members of the communities were also conducted using a checklist prepared specifically for each of the practices. The data

collected were then evaluated and practices were ranked against the criteria set and scores obtained. The output of the analyses was also presented and discussed upon with regional level senior officers to validate findings and share the processes and outcomes of the study. In view of generating additional evidences for their effectiveness, the ecological, economic and legal and institutional impacts of the selected practices were evaluated. In addition to providing additional data on the relevance and effectiveness of the selected practices, the findings of these evaluations also highlighted areas where some measures might be needed to improve the effectiveness and efficiency of the selected practices before being scaled up. For that, ex-ante evaluation was conducted using relevant criteria and by involving the same stakeholders who were involved in the process in order to identify and propose improvement measures to be included in the practice. Finally, external reviewers evaluated the processes and outputs of the selection process as well as the report produced. The whole process and inputs obtained from different stakeholders enabled the team to strengthen the technical and scientific standard of the selection process of effective dry forests and woodlands management practices in BGRS. The scaling-up strategy development process is shown in Figure 1.

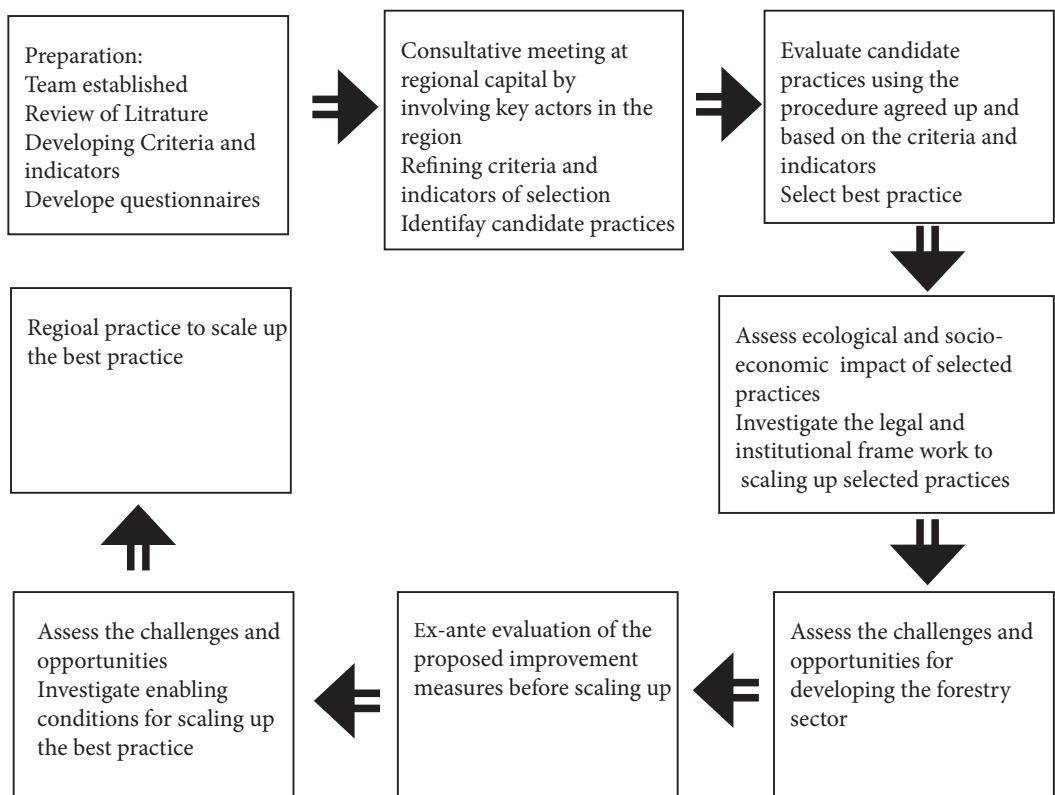


Figure 1. Schematic diagram of the processes involved in developing the scaling up strategy document.

4.3 Scaling up effective forest management practices

4.3.1 Scope and guiding principles in scaling up

In this study, scaling up of best forest and woodland management practices is defined as “a process and mechanism to adopt and further expand best forest and woodl and management practices horizontally and vertically to new and different areas using landscape approach for greater and sustained impact with improved and equitable livelihood benefits and environmental well-being”. Vertical processes involve expansion from the level of grass-roots organisations to national institutions and policies while horizontal processes refer to geographical spread or replication on a larger human scale. The mechanisms identified by the team for scaling up of best forest and woodland management practices at local, regional and national level include the setup of a support system, technology transfer using packages and manuals, experience sharing, training and awareness creation for different stakeholders including the community and research/piloting on resources and technology.

Best practices may efficiently be scaled up whenever adequate support from the government is available. Scaling up relies on enhancing human capital and empowering communities through training and participatory methods that consider the farmers’ needs, aspirations and circumstances (Altieri et al., 2012). Improved security of tenure is also important to encourage farmers to invest in the long-term sustainability of the environment (e.g. through planting of trees, the more responsible use of soils and other practices with long-term payoffs). Scaling up of best practices require the supply of public goods such as rural infrastructure (roads, information and communication technologies, irrigation systems, etc.); therefore access to local and regional markets, access to credits and insurance against weather-related risks, forest research and extension services and education are important (McKay, 2012).

Successful scaling up requires enabling environments in which an initiative can grow. Some of these include:

- financial resources to support the scaling up of innovations (here forest management practices)
- favourable policy and legal framework to support scaling up efforts
- the capacity to identify and address market related constraints
- enhancement of institutional, organisational and staff capacity to meet the requirements of the scaling-up activity
- periodic assessment of impact of scaled-up interventions in view of proposing mitigating measures if there are negative socio-economic and environmental outcomes
- assessing and addressing any socio-cultural obstacles that may impede wider adoption of effective practices
- the capacity to identify and actively engage stakeholders so that they also join hands in the efforts of scaling up
- critical evaluation of what does and doesn’t work in scaling up using appropriate M&E tools that involve key stakeholders
- building a mechanism to facilitate learning from improved management and sharing of knowledge in scaling up best practices
- an increase in international focus for climate change
- REDD+ programme

4.3.2. Scaling-up modalities

Scaling up of the different forest management practices (dry forests and woodlands, agroforestry, plantations and exclosures) may require different modalities for scaling up. For instance, managing dry forests and woodlands using PFM can be scaled up through cooperatives while small-scale plantations and agroforestry can be scaled up on individual household basis. There are also cases where both options (individual households and cooperatives) can be combined. One such example is exclosure management that can be done both individually and through cooperatives. Hence, the modalities can be through individuals (households, investors) or community organisations (coops, CBOs). However, cooperative needs to be adapted to the challenges and modalities of sustainable management of forest resources.

4.3.3. Opportunities and challenges for scaling up

The following were suggested as opportunities for scaling up of best forest management practices in BGRS:

- the establishment of the Ministry of Environment and Forests
- forestry targets set in Ethiopia's CRGE Strategy and the New York Climate Summit pledges made by Ethiopia
- increased public participation in sustainable forest management practices
- availability of market opportunities
- availability of experiences in engaging communities in forest management
- availability of experience locally in cooperative establishment on natural resource management
- availability of experience locally in establishing community by-laws and their enforcement
- infrastructure development
- promotion of multiple benefits of forest management; food security, wood, NTFPs, fruit trees and carbon trading
- presence of lessons for experience sharing
- resource availability (forest resource)
- legal framework (rural land proclamation, forest proclamation, gum and resin and bamboo development guidelines, etc.) that is designed and implemented properly.

Several challenges were indicated during the different regional consultative meetings. These are:

- growing competition for other uses of forest and woodland. The pressure is mounting from both small scale and large scale agricultural developments
- lack of land-use planning that dictates which land should be used for specific uses and which could have minimised the conflict over the limited resource, the land
- lack of forestry extension services due to inadequate number of skilled manpower, weak institutional setting and limitations in resources or budget especially at the lower levels kebele and districts levels
- gaps and overlaps in forestry sector development work as many agencies tend to be doing forest management activities at different levels, indicating the need for setting-up lead and coordinating institution at regional and lower levels,

- Poorly harmonised policies of the forest and other sectors (e.g. investment, water, energy, food security, etc.),
- open-access situation in the dry forests and woodland areas – i.e. a lack of defined ownership,
- high dependence of the community in the region on forest resources for livelihoods, frequent forest fires
- lack of proper technologies for propagation, nursery management and silviculture of indigenous species.

4.3.4 Enabling conditions for scaling up

(i) Aligning with ongoing government plans and initiatives

The strategy is consistent with the government's 5-year development plan, its CRGE strategy and international treaties and conventions pertinent to the conservation of biodiversity,¹ sustainable use of forest resources and rehabilitation of degraded lands. Ethiopia is implementing its first Growth and Transformation Plan and set an objective of becoming a middle-income country by 2030, as indicated in the CRGE strategy issued in 2011. This strategy stresses the need for sustainable management of natural resources in general and forests in particular. The New York pledge to rehabilitate 15 million ha of degraded and deforested land is another commitment that Ethiopia has promised to undertake in the next 10 years. Ethiopia is among 11 African countries engaged in an ambitious ecological buffer zone, called the Great Green Wall, establishment to help shield productive land from the ravages of the Sahara Desert. This initiative is expected to lead to sustainable management of land, water and vegetation on up to 2 million ha of croplands, rangelands and dry forest ecosystems per country and protection of threatened dryland biodiversity. Efforts to sustainably manage forest resources of the country are also in line with the Convention on Biological Diversity to which Ethiopia is a signatory.

(ii) Linking with livelihood strategies of communities

Dry forests and woodlands support the pastoralist, agro-pastoralist and farming communities of the country. People extract timber and NTFPs (such as fuelwood, charcoal, gum and resins, etc.) for consumption and sale. Such products serve as food and income sources especially when other products are scarce especially for filling the needs of women, vulnerable and marginalised segments of society. Thus, any plan to scale up forest management practices should carefully consider the roles these practices would play in improving the livelihood options and well-being of forest-dependent communities.

(iii) Active participation of communities and increasing their benefits

The lessons from the selected best practices show that forest management practices that engage communities and provide tangible benefits to them have higher chance of becoming successful. The oldest candidate management practice – the gum and resin based management practice managed by the Natural Gum Processing and Marketing Enterprise – failed to top the selection table due to mainly lack of community participation and benefit-sharing by the local community. This is true across the different forest management practices such as exclosures. Hence, active participation of communities and

¹ http://www.thegef.org/gef/press_release/great_green_wall_2011

increasing their benefits play a pivotal role in the sustainable management of dry forests and in facilitating the scaling up of efforts of the selected practices.

(iv) Building capacity of local government structures and CBOs

The selected best practices are mainly being run by Farm Africa/SoS-Sahel. There is huge material, logistical and technical support from this organisation, which has contributed to their success. This NGO worked with government structures such as Bureau of Agriculture, Cooperatives office, EPLAU and administrative authorities at all levels. It also conducted various capacity building activities at different levels. Capacity building of local government structure is vital to ensure sustainability of the forest management practice beyond the involvement of the NGOs. Scaling up of such practices to other potential sites within and outside the region requires strong technical, institutional and logistical capacity at local government structure. Hence, without having the required capacity of the relevant institution at local level, scaling up of these practices to other areas within the BGRS as well as to other regions with a similar resource base and socio-economic setting will be a challenge. Some specific institutional issues that require attention to successfully scale up the practices include: (i) the presence of regional forest proclamation and regulation that addresses the sustainable use of dry forests and woodland resources, (ii) transparent and timely market information and (iii) incentives and institutional assistance for private investment in forestry.

(v) Enhancing the role of State agencies and non-State actors

Scaling up of effective forest management practices requires an integrated approach whereby different State and non-State actors work together. Due to the complexities in resource base, socio-economic characteristics and legal and institutional frameworks, it is important that scaling-up efforts are guided by action research. Hence, active involvement of the research institutions to support scaling up efforts would be vital. Coordinated efforts will enable actors to identify the best possible scenario under which specific practices can perform and to pack existing knowledge in the form of extension packages to facilitate extension work and wider dissemination. Moreover, the best practice approach also needs to be part of the curriculum of relevant education programmes such as forestry and NRM at higher learning institutions and should also be part of extension messages to regional bureaus. Non-State actors (i.e. NGOs, CBOs, private investors) could support government and community initiatives for sustainable management of forest resources. It is widely observed that there are initiatives in BGRS with this regard. For instance (1) the selected best practices selected to be scaled up are being supported by Farm Africa/SoS-Sahel, (2) a natural gum marketing and processing enterprise has been working on the production and marketing of frankincense in the region, (3) about 20 private concessioners are engaged in a similar activity of production and marketing of frankincense, (4) Bamboo Star company is engaged in the management and processing of bamboo products and (5) community groups are engaged in the production and sales of seedlings using private nurseries. These are some of the initiatives that the region should collate and effectively use for the goal of sustainable management of forests in the region. The role of these actors in contributing to the sustainable management of the forest resource, capacity building, technology transfer, generating income locally and nationally and creating marketing links could be significant. Hence, the region needs to create favourable working conditions for these non-State actors and to monitor and support their activities in the region.

5. IMPLEMENTING THE STRATEGY

5.1 Strategic directions

This strategy presents suggestions for scaling up of recommended best forest management practices for sustainable management of dry forests and woodlands, agroforestry practices, smallholder plantations and exclosures. All of these practices have been proven to be economically viable, socially acceptable and ecologically sustainable. The limitations of the existing practices have also been identified and improvement measures are suggested before the scaling up of the respective current practices. Thus, each of the proposed practice will be scaled up in an appropriate landscape within the regional state. Each practice needs to have a clearly defined management plan including forest development and product harvesting and marketing and forest protection activities. The availability of scientifically proven development and harvesting technologies for commercial forest products also plays an important role in the sustainable management of the forest resources in the region. The recommendation is to proceed with scaling up of dry forests and woodland management practices that have been confidently studied in the region and precede scaling up of the other practices with research.

5.2 Preparing an operational plan

The scaling up of the identified best practices requires preparing an operational plan. An operation plan is a plan that describes in detail the main development, protection and utilisation activities to be undertaken in the upcoming operational year. The operational plan shall clearly identify activities to be performed for each of the selected practices, where the activities will take place, how they will be carried out and the responsible people or organisations for each activity. The operational plan shall be prepared based upon the objectives of the selected best forest practices and needs to be consistent with national and regional policies, practices and standards for forest management.

The operational plans are usually prepared based upon the objectives of the long-term strategic plan for the sustainable forest management plan. The long term strategic plan is expected to include, but not limited to: community land-use needs and requirements; identification of areas to be reserved for biodiversity conservation; identification of areas to be reserved within proposed harvest areas (e.g. watercourse protection); ensuring sustainability criteria are met through adequate regeneration; the future harvest areas and an approximate time schedule for harvesting; the approximate size and boundaries of each harvest area; the approximate volumes and types of wood to be produced from each harvest area; monitoring standards to ensure adequate rehabilitation of sites. Once the long term strategic plan are developed, operational plans will then be developed for each individual forest/agroforestry area, based mainly on site inspections. Maps of the forest/agroforestry area, showing a detailed plan of the activities to occur, form the main elements of the operational plan.

Major points to be covered in the operational plan include identifying:

- awareness creation for local community about the need for the sustainable management of forests
- forest/agroforestry area, location and boundaries (which should follow topographic

or natural features)

- areas to be excluded from harvesting through prescriptions for flora and fauna protection, water quality protection, or other identified reasons
- forest inventory activities projected to be undertaken
- silvicultural prescriptions to be adopted for different forest types
- methods of tree marking for selection and protection
- volume of wood or other NTFPs to be harvested by species and size classes
- infrastructure projected to be undertaken
- location, design, construction, and maintenance of roads and other infrastructure to minimise disturbance to forest, soil and water resources.

The operational plan for each best practice will be developed by regional governmental organisations responsible for the forestry sector (Regional Bureau of Agriculture and Environmental Protection and Land Use and Administration) in consultation with relevant stakeholders (local community, NGOs, Ministry of Environment and Forest). The draft operational plan needs to be approved by relevant organisations and local communities before its implementation.

5.3 Addressing organisational, human resources and financial requirements

Sustainable forest management of forest resources can be achieved if it is backed up by an adequate institutional framework. An institutional framework is important to promote sustainable forest management, to curb deforestation, to enhance the environmental role of forests and/or improve the contribution of the forests and forest resources to the local and/or national economy.

Through sustainable management, forests can contribute to the resilience of ecosystems, societies and economies while also safeguarding biological diversity and providing a broad range of goods and services for present and future generations. Thus, forest ecosystems must be kept in good condition and criteria for this condition need to be described and clearly understood by all interest groups. To achieve sustainability, forest policy, legal and institutional framework must ensure that desired future conditions are defined and direct that actions taken are compatible with maintaining and restoring this condition. This is because legal, policy and institutional frameworks have strong impacts not only on the way the forests are managed but also on the behaviour of people and their governance of the forest resources. Thus, establishment and strengthening of forest institutions is a necessary step for the successful and widespread implementation of sustainable forest management practices. Strong forest institutions shall be established at grass-roots level to implement all operational plans successfully.

A strong forest institution needs to be adequately staffed with skilled professionals that can design and implement and/or scale up best forest management practices. A training plan has to be developed for employees of the forest institutions to better equip them to carry out their responsibilities. Provision of adequate funds is also essential for sustainable management and conservation of forest resources. This needs political will and commitment to promote forestry development. The federal government has shown strong political will

and commitment, expressed in terms of enacting policies related to environment and forest resources, establishment of MEF and provision of adequate funds. Such political will and commitment are also expected from the regional government.

5.4 Implementation arrangements: Identifying key actors, negotiating roles and coordination

The State agencies at different levels, private investors, local communities, cooperatives, NGOs and civil society, all have important roles to play in the successful implementation of the strategy.

5.4.1. The role of the State

To achieve sustainable management of forest resources, the State agencies at different levels (federal ministry, regional bureaus, woreda (district) and kebele (neighbourhood/ward) offices) need to:

- create an adequate legal and regulatory framework for the management of forest resources through PFM to maximise benefits from all potential uses of forests and to grant use and management rights and responsibilities to forest users with concomitant responsibility for its sustainable management
- Increase public awareness about sustainable forest management and community participation in forest management through participatory management of forest areas.
- locate, demarcate and promote PFM to improve management and use of dry forests and woodland resources.
- encourage the production of diversified forest products (timber and NTFPs) from forest and woodlands based on well-studied management plan
- generate new technologies and innovations to improve forest management and use set up effective monitoring and evaluation system of forest use and product marketing
- update the skills of all stakeholders to raise forest management to an international standard, through formal training and on-the-job tailored training.
- assess the needs for research to support forest management, harvesting and processing and commission research in high priority areas.

5.4.2. The role of non-State actors

This category includes communities, the private sector and NGOs. The envisaged roles of these actors in the scaling up of effective forest management practices are indicated below.

- NGOs have a fundamental role:
 - in organising local people into cooperatives
 - in providing technical training
 - in building their capacity (infrastructural – e.g. offices, stores, etc. and in building human capital through training) in further consolidating the strategy and supporting its realisation through funding certain activities
- Local communities/cooperatives can:
 - actively participate in decision-making on forest rules, regulations, use and

conservation

- implement forest management plan to achieve its conservation and use objectives put in place by-laws to do so and respecting those by-laws
- assess forest resources through the participatory forest resource assessment (PFRA)
- organise themselves in forest management groups/cooperative to increase their bargaining power and to benefit more from market opportunities
- resolve conflicts between members within forest management group/cooperatives and between members and non-members, etc.
- The private sector can:
 - create market for forest products
 - create employment opportunities
 - transfer knowledge and skills

The following table presents suggested roles of key stakeholders in scaling up of selected forest management practices in the region.

Table 9. The role of actors for implementing the strategy in BGRS.

Actor	Role
	In promoting good practices in PFM
Bureau of Agriculture	<ul style="list-style-type: none"> • Capacity building (technical, facility) and awareness creation • Technology provision (harvesting, inputs, value addition) • Technical support (management plan, project development, etc.) • Legal and institutional framework about access to and use of forests • Monitor and evaluate implementation and impacts of practices • Identify gaps and suggest improvement measures for adoption and wider use of selected practices • Support cooperatives and recognise/incentivise successful ones
Bureau of Environmental Protection and Land Administration and Use	<ul style="list-style-type: none"> • Locate and demarcate dry forests for scaling up of effective practices • Provide communal forestland certificate • Ensure sustainability of the management practice • Facilitate project development to access climate related funds • Monitor and evaluate practice using criteria and indicators to assess sustainability
Bureau of Cooperative Promotion	<ul style="list-style-type: none"> • Establish and certify PFM cooperatives • Capacity building related to business and institutional management and to devise effective benefit-sharing mechanism • Support coops to access credit and to be linked with markets • Conduct financial auditing
Administration	<ul style="list-style-type: none"> • Provide political support and adequate legal framework for responsible and participatory management of forest resources in the region • Establish a framework for PFM that allows communities to maximise benefits from all potential uses of forests and to grant user and management rights and responsibilities to them • Empower local communities to identify opportunities, set objectives and local management rules and liaise with government and other interested stakeholders
Research and higher learning institutions	<ul style="list-style-type: none"> • Adapt, develop and provide technologies through research • Capacity building (through training)

Actor	Role
	In promoting good practices in PFM
Bureau of Justice	<ul style="list-style-type: none"> • Awareness creation about the legal framework • Enforce legal framework • Give adequate legal protection for cooperatives and forests
NGOs	<ul style="list-style-type: none"> • Provide technologies as well as financial and material support • Capacity building (training, experience-sharing, infrastructure, facility) • Provision of technical support to implement the practice and for establishment of cooperatives
Community	<ul style="list-style-type: none"> • Participate in forest resources assessment through the participatory forest resource assessment • Actively participate in decision-making on forest rules, regulations, use and conservation • Develop internal by-laws and obey the by-laws • Develop, protect and use the forest resources in line with the management plan • Provide information and knowledge for members of the cooperative and others • Practice as legal forest resource managers and forest resource users • Develop short- and long-term business plan and manage accordingly • Monitor and evaluate the implementation process • Manage forest management group/cooperative
Private sector	<ul style="list-style-type: none"> • Create market opportunities
	Role in promoting good practices in smallholder plantations
Bureau of Agriculture	<ul style="list-style-type: none"> • Capacity building (technical, facility, material for nursery) • Awareness creation to promote smallholder plantations • Technology provision (for harvesting, value addition) and technical support (seeds, training) • Legal and institutional framework about plantation development and use • Monitor and evaluate the practice related to implementation of the practice • Identify gap and improvement measures for successful implementation • Recognise successful growers
Bureau of Environmental Protection and Land Administration and Use	<ul style="list-style-type: none"> • Identify, locate and demarcate lands for plantation development • Provide certificate for plantation and natural forest owners/users • Support in project development and facilitate access to climate related funds • Monitor and evaluate practices for impacts and sustainability
Micro and small-scale enterprises	<ul style="list-style-type: none"> • Establish and certify enterprises • Capacity building in business management, value addition and market links and institutional management • Facilitate access to credits and markets
Administration	<ul style="list-style-type: none"> • Create adequate legal and regulatory framework to promote the development and use of plantations • Give direction for lower administration bodies to provide land and promote plantations
Bureau of Investment	<ul style="list-style-type: none"> • Provision of investment license • Promote plantation investment

	Role in promoting good practices in smallholder plantations
Research and higher learning institution	<ul style="list-style-type: none"> • Adapt, develop and provide technologies through research • Capacity building (training)
NGOs	<ul style="list-style-type: none"> • Provide technologies (seed, seedlings) • Capacity building (training, experience sharing, infrastructure, facility) • Financial and material support (nursery materials) • Provision of technical support for the implementation of the practice and establishment of plantation
Individual households and communities	<ul style="list-style-type: none"> • Allocate land for plantation development • Actively participate in testing technologies for plantation development & implement recommended practices • Develop short- and long-term business plan and manage accordingly • Decision-making on forest rules, regulations, use and conservation • Develop by-laws and obey the by-laws for the development of plantations on communal lands • Practice as legal forest resource managers and forest resource users • Monitor and evaluate the implementation process
Private sector	<ul style="list-style-type: none"> • Engage in development of plantations • Establish out grower schemes and help create market opportunities • Actively participate in selection of technologies for plantation development • Contribute in introducing technologies (seed, seedlings, harvesting and processing of forest products) • Establish wood processing industries and expand value addition
	Role in promoting good practices in area exclosures
Bureau of Agriculture	<ul style="list-style-type: none"> • Identify area of degraded lands for exclosures and undertake awareness creation at local level • Legal and institutional framework for establishing, managing and using exclosures in a sustainable, inclusive and equitable ways (by clearly defining boundaries, ownership rights, benefit-sharing mechanism, etc.) • Agree on objectives communities and develop management plan with active participation of local communities (identify short- and long-term benefits) • Capacity building (training, technical, facility) • Technology provision (harvesting, inputs, value addition) • Monitor and evaluate the practice related to implementation of the practice • Identify gap and improvement measures for the practice • Recognise successful communities
Bureau of Environmental Protection and Land Administration and Use	<ul style="list-style-type: none"> • Provide communal forestland certificate • Ensure sustainability of the management practice using criteria and indicators • Facilitate project development to access climate related funds • Monitor and evaluate practices with emphasis on environmental sustainability
Administration	<ul style="list-style-type: none"> • Create an adequate legal and regulatory framework to promote the practice of exclosures • Give direction for lower administration bodies to promote practice of exclosures
Research and higher learning institution	<ul style="list-style-type: none"> • Adapt, develop and provide technologies through research • Capacity building (training)
NGOs	<ul style="list-style-type: none"> • Provide technologies (seed, seedlings) • Capacity building (training, experience sharing, material, facility) • Provision of technical support for the implementation of the practice exclosures

Community	<ul style="list-style-type: none"> • Actively participate in decision-making on rules, regulations regarding use of rehabilitated lands • Develop internal by-laws and obey the by-laws • Develop, protect and use the forest resources in line with the management plan • Provide information and knowledge for members of the cooperative and others • Practice as legal forest resource managers and forest resource users • Develop short- and long-term business plan and manage accordingly • Monitor and evaluate the implementation process • Manage forest management group
	Role in promoting good agro forestry practices
Bureau of Agriculture	<ul style="list-style-type: none"> • Awareness creation to promote agroforestry practice • Identify potential areas for recommended agroforestry practice • Capacity building (technical, facility, material for nursery) • Technology provision (seed, harvesting, inputs, value addition) • Technical support (training) • Legal and institutional framework about the practice of agroforestry • Monitor and evaluate the practice related to implementation of the practice • Identify gap and improvement measures for successful implementation • Recognise successful growers
Bureau of Environmental Protection and Land Administration and Use	<ul style="list-style-type: none"> • Identify, locate and demarcate lands for investors in agroforestry practice • Provide land certificate • Ensure the agroforestry practice is economically, socially and ecologically accepted • Monitor and evaluate practice related to sustainability
Administration	<ul style="list-style-type: none"> • Create an adequate legal and regulatory framework to promote the practice of exclosures • Give direction for lower administration bodies to promote practice of exclosures
Administration	<ul style="list-style-type: none"> • Adapt, develop and provide technologies through research • Capacity building (training)
Research and higher learning institution	<ul style="list-style-type: none"> • Provide technologies (seed, seedlings) • Capacity building (training, experience sharing, material, facility) • Provision of technical support for the implementation of the practice of agroforestry • Policy dialogue and research
NGOs and international research centres (e.g. ICRAF, CIFOR)	<ul style="list-style-type: none"> • Engage in promoting agroforestry practice through for e.g. out grower schemes for bamboo agroforestry • Introduce technologies (seed, seedlings, development, harvesting and processing of forest products) • Get involved in value addition practices • Create market opportunities

5.5 Identifying potential risks and mitigation measures

The implementation of the forest product based dry forest and woodlands management practice through PFM approach assumes that:

- the current forest policy and regulation of the regional government will result in a progressive strengthening of local administrative organs and district councils for the sustainable management of forest resources
- regional government authorities will facilitate the progressive devolution of forest and woodlands use and management rights and associated decision-making powers to the lower level government structures and to the local people/resource users
- the local people will actively participate and become member of a cooperative established for the sustainable management of the forest resources
- the active involvement of the forest and woodland resource users in preparing PFM plans will contribute to increasing income from the forest while maintaining ecological sustainability
- the scaling up of the practice and its wider use will get very strong political support sufficient and diversified forest products can be produced to create economic incentives for resource managers to sustainably manage dry forest and woodlands

There are some risks associated with implementation of the practice. These include:

- resistance to change in terms of management style of forest resources at all levels of government and local community
- exploitation of forest and woodland resources under PFM by others (external groups),
- lack of support and commitment of stakeholders to the implementation of the practice
- the local government officials and experts undermine communities' capacity for sustainable management of forest resources through PFM
- local communities and cooperatives included in the PFM are unable to meet the conditions required for them to sustainably manage the forest resources (for instance, management failures, conflicts with neighbouring villages, fire outbreaks, etc.)
- forest products harvested for commercial purpose might get lower monetary value conflict of interest between members and non-members of the cooperatives benefits from the practice may be unequally distributed and may not contribute to poverty alleviation
- the forest policy and regulation and other relevant policies may not be fully implemented.

The measures proposed to mitigate these risks are shown in the following table.

Table 10. Risks and proposed mitigation measures for scaling up best practices in BGRS.

Risks	Mitigation measures proposed
Management of natural Forests	
Conversion of forests to other land uses	Land-use plan and enforcement
Encroachment by smallholder farmers	Law enforcement
Human induced forest fire	Awareness creation
Limited commercial products with low monetary values for forest products	Diversification of marketable forest products, increasing their quality and volume and create market links
Lack of law and/or by-law enforcement	Law enforcement
Partial implementation of the practice	Full implementation of the management plan
Resistance to change in terms of management style of forest resources by the community and experts	Awareness creation
Conflict between non-members and members of forest user groups	Awareness creation, law enforcement and more equitable benefit and responsibility sharing
Limited or absence of adequate support and commitment of stakeholders to the implementation of the practice	Strong and integrated institutional support
Plantations	
Low survival rate of planted seedlings	Provision of quality planting materials, better establishment and management techniques
Controversy over establishment of Eucalyptus plantations	Proper site-species-matching, Awareness creation and experience-sharing
Unavailability of adequate technologies (seed, silviculture) for certain species	Provision of technologies
Pest infestation, fire hazard and free grazing	Awareness creation Integrated pest and fire management
Smallholders reluctance to establish plantations	Awareness creation
Establishment and management of exclosures	
Encroachment	Awareness creation and law enforcement
Fire hazard and free grazing	Awareness creation and law enforcement
Lack of willingness by local people to involve	Awareness creation and supporting experience-sharing
Encroachment by less valuable invasive species	Implement active restoration process
Agroforestry	
Lack of well-developed technologies	Provision of technologies
Free grazing	Awareness creation Law enforcement

5.6 Monitoring, evaluation, reporting and improvement strategy

Forest product-based dry forest and woodlands management practice needs to be monitored and evaluated by both government and resource users, notably communities themselves. At community level, the cooperatives should be responsible for ensuring the effective implementation, monitoring and

evaluation of the management plan through a special subcommittee to be established with responsibility for monitoring and evaluation. Quarterly meetings will be arranged to provide a forum to discuss implementation of the action plan and monitor progress towards achievement of the strategic objectives. The forest users' cooperatives will review implementation actions and approaches, address any challenges encountered and suggest possible solutions. At government level, the mandated Bureau (of Agriculture or Forests) will be responsible to ensure effective implementation, monitoring and evaluation of the management plan through a special technical team with responsibility for monitoring and evaluation. Quarterly field visit will be arranged to collect reports from cooperatives to get information about achievements of activities planned in the management plan. The technical team will also monitor the change in the forest cover/status every 2 years using participatory forest resource assessment techniques and evaluate the economic contribution of the forest resources to households and the national economy. The level and type of participation of the local communities in decision-making and other issues need to be monitored by the government offices and reviewed. The outcome of the review will be used to suggest future improvement measures of forest management practices.

The following are the main aspects that need to be included in the reports of the cooperatives and of the relevant Bureau to document progress and lessons in scaling up the proposed forest management practice:

- Quarterly implementation progress reports to be shared with members of the cooperatives and office of Agriculture at woreda level
- Annual progress reports to be submitted to the concerned district level office with a legal mandate to manage the forest resource areas and to development partners providing technical or financial support to strengthen the management of the forest resources.
- Annual updates of the regional database of managed forests under forest product based dry forest management system by the regional authority to be shared regionally and nationally with interested parties.

6. THE WAY FORWARD

6.1. Aspects requiring attention at national level to facilitate scaling up

Dry forests and woodlands account for the largest vegetation cover of Ethiopia. The area covered by these vegetation types are used by communities from various socio-economic backgrounds. The resource endowments of various regional states as well as their values to the communities also differ. The pastoralist communities dominating the dry forests and woodlands of Somalia, Oromia, Afar and SNNP regional states value these resources mainly for their benefits to livestock production (i.e. its use as a source of fodder, shade, medicine, etc.). In the northern and north-eastern part of the country, the same resources are highly valued for gum and resin production. There are also differences in traditional management of the resources at national level (e.g. Woldeammanuel, 2011). For instance, management of these resources is embedded in the Gada system in southern Ethiopia whereas access is restricted by the government authorities in north-western Ethiopia (Gebru et al, 2014). Scaling up of best practices of management of dry forests and woodlands as assessed from BGR cannot be copied to other regions with different resource endowment, livelihood strategies and cultural management practices. Hence, it is advisable to identify and scale up the best dry forest and woodland management practices that suit the resource conditions, livelihood strategies, traditional management regimes and other relevant area-specific contexts. During scaling up operations, it is also important to look into successful forest management practices closer to the areas considered for scaling up.

6.2. Key issues that should be considered at regional level

This strategy covers different forest management practices that are prevalent in the region. However, the detailed work is done only on scaling up of best dry forests and woodlands management practices. Hence, it lacks depth in analysing effective forest management practices in other vegetation types of the region. Hence, a fully-fledged regional forest strategy that covers all vegetation types is needed. Thus, this study contributed to setting a methodological foundation for identifying best forest management practices and an appropriate scaling-up strategy.

There are many challenges that need to be addressed for the success in sustainable management of the forests in the region. One of these major challenges (as already mentioned) is forest fire. The sources of fire include tappers who want to get rid of snakes and dangerous wild animals, beekeepers during honey collection, clearing for agriculture, burning to reduce ticks and to initiate growth of new grasses and clearing for security reasons. Even if fire is part of the ecology in dry forest areas, the increased frequency and intensity of fire from these multifaceted sources hinders regeneration and increases the mortality rate of some important tree species such as *Boswellia papyrifera*; this change the population structure as well as species composition of the forests. The ecosystem carries a high fuel load during the dry seasons due to dry grasses and the deciduous nature of most species. As a result, the effect of frequent fires is aggravated. Hence, intensive awareness creation that involves all agents and a fire management plan that will address the problem are both essential.

The region is well known for its bamboo resource. It is locally used for food, as a construction material and as a source of income. A private company, called Bamboo Star, is involved in the management and utilisation of the bamboo resource in the region. This resource is also exported to Sudan from the PFM community in Homosha. Hence, on top of its ecological benefits, its socio-economic value regionally and nationally seems to be increasing. However, there are challenges facing this resource at the moment in the region. One of the problems is mass flowering and subsequent conversion of bamboo areas to other land-use types. The resource is also more vulnerable to fire hazards following flowering and massive dieback of culms. Clearing bamboo vegetation for conversion into other land uses such as agriculture is easier as compared to other vegetation types in the region also makes bamboo forests susceptible to agricultural investment. The private sectors that are engaged in the bamboo trade complain that there are no specific regulations that guide the trade of bamboo and it is treated as a timber product. The nature of growth and management need of the resource is different from other woody species. Given its huge ecological and economic importance to the region, there is a need to govern the management and trade of bamboo with specific regulations that address the unique nature of the resource. Research should also guide its regeneration, growth, yield maximisation, market chains and value addition options. The fact that there are better experiences in the region with communities managing bamboo forests in a better way is a sign that by engaging communities the region could manage its bamboo resources sustainably and be in a position to reduce the dangers of land-use changes when mass flowering of bamboo happens.

The region is also rich in gum and resin bearing species. One of these is *Boswellia papyrifera*, which is well known nationally and internationally for its frankincense. It was understood that over 20 concessioners are currently involved in the production and marketing of frankincense in the woodlands of BGRS. However, the concessions lack any management plan and the tapping is dangerous and is carried out in injurious way. The target is the extraction of frankincense without due emphasis on the sustainability of the resource. Hence, there is an urgent need to put in place clear guidelines on the extraction of frankincense and sustainable management of the resource at large. On top of that, research in enhancing regeneration of the species and improving tapping technology is required. During the discussions, other potential species that have economic uses were identified. These include *Tamarindus indica* (local) and Baobab (local). Hence, there is a need to study their potential to generate income and study the extraction and marketing niches of potential products from these species.

This draft scaling-up strategy focuses mainly on the candidate practices that are operational in recent years. Nevertheless, there are new initiatives, such as enclosure, which are being undertaken at different parts of the region. Such practices are some of the options to be tested widely in BGRS, which has large area of dry forests and woodlands. This management practice is already largely being tested in the northern part of the country. Hence, it would be advisable to also examine the scaling up of such practices for sustainable management of dry forests and woodlands of the region. In so doing, we should learn from the experience of such practices in the north and adapt it to local conditions. Moreover, dryland agroforestry is also an important practice that needs to be

scaled up in dry forests and woodlands of the region. One of the candidate practices was an agroforestry-based management initiative that integrates bamboo into the cropping system of the area. Hence, it would be good to build on this experience and integrate other valuable tree species such as gum and resin producing species into the cropping system. The nursery activities identified in Assossa area can also be linked to plantation activities in the region.

6.3. The need for a national strategy to scale up effective forest management practices

This project-based initiative to identify and scale up effective forest management practices at national level is important for the sustainable management of the remnant vegetation resources of the country. The criteria and indicators used to identify such practices include ecological, socio-economic and policy and institutional framework components. Such national level strategies should also include short- and long-term plans suited to different agro-ecologies, resource bases and socio-economic settings. Based on the observation of the team, the following are important issues that should be considered for scaling up of practices for managing dry forests and woodlands at national level.

Information gap – Though this is common across all forest types, dry forests and woodlands were neglected so far. Hence, information regarding resource base, product potentials, silviculture, ecosystem services and market opportunities with regards to dry forests and woodlands of the country needs to be collated.

Invasive species – Currently, dry forests and woodlands of the country are being affected by invasive species such as *Acacia drepanolobium* (Borana), *Prosopis juliflora* (Afar) and others. These invasive species have negative impacts on native biodiversity, rangelands and agricultural lands. Hence, management of dry forests and woodlands should also take into consideration the management of invasive species.

Dry forest-livestock link – The livelihood of the majority of the communities living in the dry forest areas of Ethiopia depend on livestock. These livestock resources are also equally important for the economy of the country at large. Hence, dry forest management that ignores integration with this major livelihood source of the communities and one of the major sources of income for the national economy will not be fruitful.

Fire – In some cases, fire is thought to be part of the ecology of dry forests and woodlands (e.g. Cochrane and Laurance, 2002). However, fire frequency is increasing due to various anthropogenic activities in the dry forest areas of the country. This is hampering successful establishment of seedlings and increasing adult mortality rate (e.g. Tolera et al., 2013).

Frequent fires coupled with overgrazing and trampling can result in recruitment failures (Auld and Keith, 2009; Haubensak et al., 2009) and as a result will change the species composition of the dry forests. Fire frequency in tropical dry forest areas will probably continue to increase due to climate change with the scenario of increased warming and drying (Timberlake et al., 2010). Therefore, it is advisable to focus on the problems of fire and the potential increase of its frequency in scaling up dry forests and woodland management practices at national level.

Regeneration problems – The population of some important dry forest and woodland species such as *Boswellia papyrifera* is declining at an alarming rate. This specific species forms one of the major species in the Combretum-Terminalia woodland and it is the source of frankincense. The economic contribution of frankincense to the local community and the country at large is high. Hence, its sustainable management is important and this has to be addressed in the scaling up of dry forest and woodland management practices.

Overexploitation – Dry forests and woodlands of the country are endowed with various NTFPs such as gum and resins and lowland bamboo. This is one of the areas that the private sector is engaged in and will also be engaged in in the future. There is a need to guide the exploitation of these resources so that they can sustainably deliver the benefits. Equally, there is a need to diversify product types and improve technologies in areas where there is sub-optimal utilisation of resources (e.g. frankincense under PFM).

Charcoal – It is evident that charcoaling is more prevalent in the areas of dry forests and woodlands as most dry forest and woodland species are preferred as a source of charcoal. Hence, charcoal-making has been one of the major drivers of forest degradation in dry forests and woodland areas of Ethiopia. Hence, scaling up of dry forests and woodland management practices should consider that there is huge economic dependence on this resource for charcoaling, among others.

Socio-economic differences – The dry forests and woodland areas of the country are diverse in their resource base, climate and socio-economic settings. Hence, a blanket scaling up of practices throughout the country may not yield positive results. Scaling up needs to be guided by good knowledge of the resource base and other biophysical characteristics as well as socio-economic settings to scale up selected management practices. Research should play a pivotal role in this process.

Growth corridor – A number of major development interventions are being carried out in the dry forests and woodland areas of the country. Some of these include large-scale agricultural investments, sugarcane plantations and sugar factories, big dams and the past resettlement activities. Hence, there is a need to harmonise and integrate these initiatives with scaling up of dry forest management activities since they generally compete for the same resource (i.e. land).

Potential areas to implement CRGE goals and international pledges – Sustainable management and rehabilitation activities are planned in CRGE and international pledges. Because most of the areas around the high forests of the country are surrounded by settlements and agriculture, it is likely that most of the rehabilitation plans will be carried out in the dry forests and woodland areas of the country. Hence, it is also good to align scaling-up activities that are to be carried out in the dry forests and woodlands of the country with those development plans.

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