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

Strategy for Scaling up Effective Forest Management Practices

Center for International Forestry Research
Ethiopia Office
Addis Ababa

CIFOR

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

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

Strategy for scaling up effective forest management practices

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October 2015

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FOREWORD

This strategy document for scaling up effective forest management practices in Ethiopia was produced as one of the outputs of a project entitled "Enhancing the Role of Forestry in Ethiopia's Climate Resilient Green Economy", which was implemented between September 2013 and August 2015. CIFOR and our ministry actively collaborated in the planning and implementation of the project that 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, each of which was engaged in identifying effective forest management practices and enabling conditions for scaling them up, in view of significantly enhancing the role of forests in building a climate resilient green economy in Ethiopia. The forest management practices studied were the establishment and management of area exclosures, plantation forest management, participatory forest management, agroforestry, and the management of dry forests and woodlands. Each of the five teams focused on only one of these and concentrated its study in one regional state of the country. The study was conducted in the following regional states: Tigray, Amhara, Oromia, Benishangul Gumuz, and Southern Nations, Nationalities and Peoples Regional States.

The five teams met regularly to exchange their findings, which were used in the write-up of this strategy. All five teams engaged with senior experts and researchers from the regions, in order to ensure that the document was relevant, not only nationally, but also to the respective regions. The draft document was presented and discussed at a national workshop and was reviewed and commented on by senior experts from the Ministry of Environment, Forest and Climate Change (MEFCC).

The MEFCC will continue to be actively involved in similar processes. I take this opportunity to encourage regional governments to make best use of the document. The MEFCC plans to further improve its content and scope by building on experiences to be gained during the implementation of the strategy, through systematic documentation of the process, and by drawing lessons from the outcomes of the scaling up process. Implementing this strategy will further build the capacity of the MEFCC and its regional partners, to plan and implement tasks related to the identification and scaling up of good forest management practices. The selection and scaling up of effective practices in the forestry sector at large supports national efforts to develop the sector and significantly enhance its contribution to building a Climate Resilient Green Economy in Ethiopia, as has been envisaged by our government.

On behalf of the MEFCC, I would like to thank all those who were involved in the project and their respective institutions for their contributions. I am particularly grateful to CIFOR for initiating, coordinating actors, and implementing this joint project, which played an important role, not only in filling information gaps, but also in building

capacity at different levels. I also thank the Strategic Climate Institutions Program (SCIP) for funding the project. As SCIP is financed by 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,
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FDRE
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15 October 2015

PREFACE

Besides their direct contributions to the national and household economy in the form of wood and non-wood products, 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 at household level; the earning of foreign currency through exports; and savings through import substitutions at the national level. The sector's ecosystem services for agriculture are also well known, though difficult to quantify in terms of their monetary value. Forests are, and will continue to be, important in sequestrating carbon and in regulating the hydrological cycle.

Unless growing demands for wood and other forest products and services are met, the rate of deforestation and degradation will continue to rise. Horizontal expansion of agriculture will result in the conversion of forests, woodlands, and bushlands to agricultural fields, if techniques to promote sustainable intensification are not used. This is particularly true for commercial farming, which is expanding rapidly in dry forest and woodland areas. Therefore, deforestation and degradation are major environmental challenges for Ethiopia. Thus, effective management of its forests is critical.

Identifying and scaling up effective forest management practices is key to significantly enhancing the forest sector's contributions to local livelihoods, the national economy and the environment. Wider adoption of good forest management practices enhances the contributions of the forestry sector by building a climate resilient green economy. CIFOR, in collaboration with federal ministries and regional and federal research and higher education institutions, implemented a project that focused on identifying effective forest management practices for scaling up.

The identification of effective forest management practices was carried out in the following fields: area exclosures, plantations, agroforestry, Participatory Forest Management, and management of dry forests and woodlands. The studies were undertaken respectively in: Tigray, Amhara, SNNPRS, Oromia and Benishangul Gumuz. Each of the teams developed selection criteria and indicators, and critically assessed existing practices with the aim of identifying effective ones. They also examined the limitations and weaknesses of the selected practices and proposed improvement measures. In selecting and proposing effective forest management practices for scaling up, the teams benefitted from a series of discussions with communities and senior experts from relevant bureaus and NGOs in each of the regions, and from national progress reviews and planning meetings. The national project advisory committee provided not only support, but also ensured the relevance of the work to national and regional needs. The findings of each team were used as inputs in the development of regional strategy documents for the respective regions, on scaling up selected forest management practices. In turn, the five regional strategy documents were used as inputs in producing this national strategy document.

The authors would like to thank several people 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. It is our hope that this strategy will be implemented, and will serve as a basis to further develop Ethiopia's forestry sector.

The authors

ACKNOWLEDGEMENTS

This publication is the result of a project entitled "Enhancing the Role of Forestry in Ethiopia's Climate Resilient Green Economy: A Knowledge, Action Research and Innovation Project", implemented between September 2013 and August 2015. The project was designed and implemented by CIFOR, in collaboration with its national partners, primarily the Ministry of Environment, Forest and Climate Change (MEFCC), the Ministry of Agriculture, the Ethiopian Environment and Forest 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 these organizations were engaged in the project. The intended outcome of the project was to identify effective forest management practices for scaling up, focusing on exclosure in Tigray, Participatory Forest Management in Oromia, smallholder plantations in Amhara, agroforestry in SNNPRS, and the management of dry forests and woodlands in Benishangul Gumuz. The major project outputs are strategies for scaling up selected practices for each of the five regions, and one national strategy that will serve as a road map for the MEFCC, in view of supporting national efforts to achieve the forestry sector targets the country has set in its strategy document to build a climate resilient green economy.

This strategy was based on the five regional strategy documents prepared by the technical teams. The contributions of all team members in gratefully recognized eventhough only the names of team leaders are shown as co-authors. Our thanks also go to all individuals and institutions to the write-up of those strategy documents. The draft was improved by feedback from experts and senior officials.

The CIFOR Ethiopia office is grateful to members of the National Project Advisory Committee that oversaw the project to ensure its relevance and timely completion. We are particularly thankful to His Excellency Ato Kebede Yimam, State Minister of Forest, Ministry of Environment and Forest, for chairing the Project Advisory Committee for nearly 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, 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 the Amhara Forest Enterprise, Natural Resources Management Process Owners in the respective regional bureaus of agriculture, and Heads of the Natural Resources Research wings of regional agricultural research institutes operating in the five regions. Our sincere thanks go to the authors and their respective institutions. We are also grateful to the MEFCC for taking the tasks seriously, and for being actively engaged in thereview and approval of this national road map document to guide national efforts in selecting and scaling up good forest management prcatices. Our thanks also go to the Strengthening Climate Institutions in Ethiopia Program (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 planning, implementation, 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, which the project funders were particularly keen to achieve.

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October 20, 2015

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ACRONYMS AND ABBREVIATIONS

AF	Agroforestry
CBOs	Community based organizations
CDM	Clean Development Mechanism
CIFOR	Center for International Forestry Research
CRGE	Climate Resilient Green Economy
EEFRI	Ethiopian Environment and Forest Research Institute
GHGs	Greenhouse gases
GTP	Growth and Transformation Plan
NGOs	Non-Governmental Organizations
NTFPs	Non-timber Forest Products
PFM	Participatory Forest Management
REDD	Reducing Emissions from Deforestation and Forest Degradation
SCIP	Strategic Climate Institutions Program
SNNPRS	Southern Nations, Nationalities and Peoples Regional State

1 BACKGROUND

1.1 Introduction

Deforestation and degradation of forests and woodlands are major problems facing the forestry sector in Ethiopia. Hence, protecting and properly utilizing existing natural forests and woodlands, and strengthening afforestation and reforestation efforts, are priorities of the Government of Ethiopia. This is reflected in the forestry sector's second Growth Transformation Plan (GTP), which includes concrete targets to be achieved by 2020. These targets take into account the sector's potential economic contribution to the national economy, the forest sector targets in the Climate Resilient Green Economy (CRGE) strategy document, and the pledge that the country made at the 2014 Climate Summit in New York.

Participatory Forest Management (PFM) has been recognized as an important mechanism for engaging communities in the responsible management and use of natural forests and woodlands. The government is also engaged in the rehabilitation of large areas of degraded lands through area exclosures. Smallholder farmers continue to plant trees for subsistence and trade, resulting in rapid expansion of smallholder plantations in the central and western highlands. In southern Ethiopia, traditional agroforestry practices enable communities to intensify and diversify production, while also maintaining high vegetation cover of the landscape. Some NGOs are working towards improving the use and management of dry forests and woodlands. However, systematic national studies have yet to be conducted on these initiatives to identify good practice, and document enabling conditions for scaling them up.

A joint project by CIFOR and Ethiopia's Ministry of Environment, Forest and Climate Change (MEFCC) was implemented between September 2013 and August 2015 to help fill this gap in knowledge. In November 2013, five national technical teams were established to identify effective practices in area exclosure, PFM, agroforestry, management of plantations, and the management of dry forests, as well as enabling conditions for scaling them up. Over the course of one and half years, team members conducted a series of field and desk-based studies and consultative meetings. Based on their findings, the teams produced scaling up strategy documents for Tigray, Amhara, Oromia, SNNPRS and Benishangul Gumuz Regional States, on the topics of area exclosure, management of plantations, PFM, agroforestry and management of dry forests and woodlands, respectively. These strategy documents also highlighted the key issues that need to be considered as the country attempts to scale up selected forest management practices at the national level. This national road map to scale up selected forest management practices is largely based on the findings of the regional strategy documents, and proposes good forest management practices in area exclosure, smallholder plantations, PFM, agroforestry and management of dry forests and woodlands with the potential to be scaled up, and highlights important issues that need to be addressed while implementing the scaling up strategy.

1.2. Country Profile

Ethiopia's population is largely dependent on agriculture, and has a long history of farming on hillsides. Ethiopia faces high rates of deforestation and land degradation. Commonly cited causes are: forest clearing for agricultural use, overgrazing, and overexploitation of existing forests for fuel and wood for construction (Bishaw 2001). Deforestation and land degradation are more pronounced in central and northern Ethiopia, where land degradation has been accelerated by long-standing human impacts through changing land-use and deforestation (Hurni 1988; Nyssen et al 2009) and the growing human and livestock populations' significant demands for biomass (Tekle 1999). The most important countermeasures taken to halt this process have included: the mobilization of communities in the conservation of soil and water and tree planting (CRGE 2011); engaging communities in the management of protected forests through PFM (Bekele 2003); and assisting natural regeneration by excluding human and animal interference in the form of exclosures (Mengistu 2001; Tekle 2001; Birhane 2002). Dry forests and woodlands constitute the largest proportion of Ethiopia's vegetation cover, and contain the country's highest above-ground carbon stock. Hence, the proper management of the nation's plantations, natural forests and woodlands is critical to meeting the forestry sector targets set in Ethiopia's CRGE strategy.

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 composed of diverse fauna and flora. Ethiopia's vegetation comprises over 7000 species, out of which, over 475 are endemic to the country (Awas 2007). It also harbors diverse fauna including 240 species of mammals and 845 species of birds, of which, 22 species of mammals and 24 species birds are endemic (Teketay et al. 2010). The varied landscapes, which range from low altitudes in the northeastern lowlands to chains of mountains in the northern, central and eastern highlands, form the basis of Ethiopia's diverse ecosystems. The southwestern part of Ethiopia supports a high forest ecosystem. The central highlands also support dry montane forests. The forest ecosystems in Ethiopia's southwestern and central highlands are useful not only for the supply of wood, feed, energy and environmental goods and services, but also serve as habitats for rich biodiversity including endemic birds and wild animals.

Many Ethiopians are heavily dependent on goods and services obtained from forests. Forests provide firewood, which is the primary source of energy for most rural and urban households. The national demand for wood for fuel and construction is much higher than the supply, which largely comes from natural forests. Farming implements are also made of wood that is extracted from the surrounding natural vegetation. Most household furniture is locally processed from indigenous tree species growing in the natural forest. Several edible and medicinal plants are collected from forests. A considerable number of poor people earn their income by collecting and selling fuelwood and making and trading charcoal.

Despite the significant roles of Ethiopia's forests, woodlands and other vegetation resources, reliable information on their spatial coverage, distribution, changes over time

(e.g. deforestation or re-growth), growing stock in the standing vegetation, regeneration and recruitment status, is scattered and inconsistent (Teketay et al. 2010). According to the Woody Biomass Inventory and Strategic Planning Project's census (WBISPP 2004), 59.7 million ha of Ethiopia is covered by woody vegetation. Of the total woody vegetation, 6.8% is high forest (about 4.07 million ha), 49% constitutes woodland (29.24 million ha), 44.2% is shrubland or bushland (26.4 million ha), and plantations cover an estimated area of 955,705 ha. In terms of regional distribution, Oromia; Southern Nations, Nationalities and Peoples Regional State (SNNPRS); and Gambella respectively account for 62.5%, 19% and 9% of the area covered by high forests, while Somali, Oromia and Amhara respectively account for 33%, 32% and 10% of Ethiopia's woodlands and shrublands/ bushlands (WBISPP 2004).

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

Ethiopia's forest resources significantly contribute to rural livelihoods and the national economy. Their direct contributions include: energy, construction poles, and timber and non-timber forest products (NTFPs) that are highly valued for their food, medicinal and commercial values. The harvesting of semi-processed wood products, charcoal, bamboo, natural gum, spices and forest coffee, as well as ecotourism, represent endeavors that could potentially operate under a sustainable management plan. The lack of a reliable and consistent database, as well as a proper forest accounting system, constrains the valuation of the direct and indirect values of forest resources. Therefore, estimations of the contributions of forest resources are based on case studies and site-specific assessments. There are several case studies that indicate the significance of forest resources. For example, according to Forum for Environment, 90% of households in Bench Maji, Kaffa and Sheka zones, and the southwestern part of the country harvest NTFPs, including forest coffee, forest honey, wild forest spices (e.g. Ethiopian cardamom, long pepper and turmeric) and bamboo (FFE 2009). The same study showed that these households earn 73% of their annual cash income from the sale of NTFPs, and the estimated value of NTFPs, including forest coffee, was USD 249,638,556 per annum. According to FAO (2010), the sum of the values of firewood, industrial wood and NTFPs in Ethiopia amounts to USD 752,869,000 per year (with fuelwood representing 85% of this amount). This represents the wood and non-wood contribution to be approximately 6% to Ethiopia's. This figure increases when the indirect values of the different ecosystems are taken into account. Regardless of the accuracy and the accounting system, these figures suggest that the forest sector has significant actual and potential value. If forest resources are managed as per the specifications of REDD+, forests could generate income from carbon trade.

1.3.3. Sectoral policies and strategies

Over the past twenty years, the Ethiopian government has put in place several sectoral and cross-sectoral policies, strategies and programs, with the aim of enhancing the socioeconomic and environmental contributions of the sector. These include the Rural Development Policy and Strategies, the Forest Conservation and Utilization Policy and Strategy, the Federal Forest Law, the Environmental Policy of Ethiopia, the three successive five-year national development plans, the CRGE Strategy, and Ethiopia's REDD+ readiness program. These important policy and planning documents are briefly summarized below.

Environmental policy (1997). This is one of many policies that directly relate to forest evelopment and conservation. Ethiopia's environmental policy was approved in 1997, and aims to improve quality of life through sustainable development and utilization of natural resources. It also aspires to conserve traditional resource management practices. The policy includes provisions for: soil management and sustainable agriculture; forests and tree resource management; and genetic, species and ecosystem diversity conservation and management. These provisions play important roles in guiding efforts to promote afforestation and re-afforestation.

The Rural Development Policy and Strategy (2001). The rural development policy and strategy document was issued in November 2001. This document underlines the need to rehabilitate and restore the country's degraded natural resources. It advocates for having clearly defined objectives for tree planting initiatives. Specifically, it emphasizes the integration of tree planting in agricultural landscapes. This policy led to a number of encouraging achievements related to exclosures, sustainable land management initiatives, and watershed management programs. However, achievements related to afforestation and re-afforestation remain limited, despite large-scale, government-led annual tree planting campaigns on communal lands. A lack of implementation instruments (e.g. appropriate institutions with sufficient resources, regulations, and directives), may have undermined the policy's success in these areas.

Forest Conservation and Utilization Policy and Strategy (2007). Though there were forest laws there was no clearly articulated forets policy and strategy in the country prior to 2007. The formulation and enactment of this policy reflected the government's commitment to enhancing the nation's forest resource base. The main objective of this policy is to improve the economic contribution of the forest sector, and satisfy the nation's demand for forest products, by promoting sustainable forest management and utilization practices. The policy also encourages the engagement of the private sector and local communities in managing production and protection forests. To promote the establishment and development of private and community-owned forests, the policy introduces an incentive mechanism in the form of reduced land taxes. The policy recognizes the need to certify forest use rights, which is important to enhancing afforestation and re-afforestation programs. Furthermore, the policy supports the management of dry forests and woodlands to promote sustainable utilization, conservation and natural regeneration of native trees and shrubs. 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.

Forest Development, Conservation and Utilization Proclamation (2007). The forest Development Conservation and Utilization Proclamation number 542/ 2007 is the most recent national forest law. It provides legal grounds to the Forest Conservation and Utilization Policy and Strategy of 2007. The proclamation recognizes two types of forest ownership, i.e. state and private, which pertains to both communal and individual ownership. The legislation was criticized for placing greater emphasis on punishment than incentives, and for failing to fully recognize communal rights. Furthermore, a lack of regulation to ensure the effective implementation

of the proclamation has been described as a significant bottleneck. In light of its limitations, the is amending the law, and it is expected that the government will enact a revised version soon.

The 2011-2015 Growth and Transformation Plan and the 2011 CRGE Strategy. The Ethiopian Government launched the 2011-2015 GTP with the intention of making Ethiopia a middle income country by 2025. The GTP envisages that the country's GDP per capita will grow from 378 USD in 2010 to 1271 USD in 2025. The GTP stresses the need to strengthen natural resources conservation and management. In line with this, the major forestry sector activities proposed by the 2010-2015 GTP include: the rehabilitation and restoration of degraded lands through exclosures; multipurpose tree planting; and the development of management plans for priority forests and tree seed collection and distribution. The CRGE is Ethiopia's recent green growth development strategy. The plan has identified four pillars, one of which is forestry, and emphasizes the protection and re-establishment of forests, in recognition of their economic and ecosystem services, including as carbon stocks. The CRGE has set a target to sequester more than 40 million tons of CO2e, through the afforestation and reforestation of 3 million ha of land, and the sustainable management of 4 million ha of forests and woodlands by 2030. Moreover, at the New York Climate Summit, Ethiopia made a pledge to restore 15 million ha of degraded forests and land by 2030, which is evidence of the government's determination to restore degraded lands. All of these commitments represent opportunities to scale up successful exclosures, tree planting and forest management practices. Promoting sustainable management of dry forests and woodlands contributes to meeting these national targets and international pledges.

The National REDD+ Program. REDD+ provides 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+ will be embedded in the national CRGE implementation strategy. Ethiopia aspires to reduce deforestation and forest degradation by addressing their underlying drivers and immediate causes. Strategic interventions include the sustainable management of existing forests and the creation of new forests. Ethiopia considers REDD+ to be a promising opportunity, and a viable source of sustainable finance for investment in forest management, conservation, and restoration. This represents a way of enhancing the multiple benefits of forests, including carbon sequestration and biodiversity conservation, watershed management, increased resilience to climate change, improved livelihoods and reduced poverty. Therefore, REDD+ is expected to create opportunities for the forest sector to further contribute to economic development, while sequestering more carbon to mitigate climate change.

1.3.4 Links between forestry and other sectors

Several sectoral policies and functions may directly or indirectly link with the forest sector. Sectors with interacting functions must be managed well to ensure sustainable development. Successful integration ensures the complementarity of the various sectors' activities, and facilitates the achievement of the nation's development goals. Sectors that are

closely linked with the forest sector are briefly discussed below.

Agriculture. Agriculture is closely linked to the forest sector. Successful afforestation and re-afforestation programs 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 ground water. Moreover, if firewood is widely available, crop residue can be used to fertilize farmlands rather than for cooking and heating. On the other hand, a desire to increase grain production may trigger the expansion of agricultural lands, and the conversion of forests and forest lands to crop fields. The livestock sector is also closely linked to the forest sector. Free grazing is a practice that hinders the natural regeneration and survival of seedlings. In countries with high livestock populations, such as Ethiopia, free grazing creates a considerable problem for the forest sector. This is problematic, as forests are a significant source of 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. Thus, proper management of forests and livestock is needed to maintain a healthy relationship between the two sectors.

Water and Energy. Both the quality and quantity of a catchment's water supply is largely dependent on vegetation cover. Afforestation and re-afforestation of upper catchments, using appropriate tree species, guarantees a regular flow of clean water. However, tree species with high transpiration rates may deplete the water resources of a catchment. Thus, the tree species that cover catchment areas must be managed in order to maintain a positive water budget. The energy sector is also closely linked with forestry. Trees planted in the upper catchments are vital to safeguarding hydroelectric power projects. The forest cover in the upper catchment ensures downward infiltration of water, and minimizes downstream runoff and silt. Moreover, a continuous flow of tributary rivers within the catchment area of hydroelectric mega projects, ensures a sustainable water supply and uninterrupted power generation.

Tourism. Forests have positive impacts on tourism, as they serve as habitats for wildlife and create attractive green landscapes. Opportunities to use income from tourism to fund the management and development of forests require greater exploration. However, tourism can also negatively affect forests. Felling trees for the development and construction of hotels and restaurants reduces forest cover. Moreover, camping tourists may cause forest fires. Therefore, ways of managing forests and maintaining forest cover in parks while also increasing income from tourism should be identified.

Roads. Road expansion often requires the felling of trees, and may trigger further degradation and deforestation as loggers will have easier access to the forest. Easier access can also facilitate the marketing of forest products by forest managers as well. Remedial measures need to be designed to mitigate such negative impacts. On the other hand, roads also facilitate access for those responsible for managing, monitoring and protecting forests. Roads may stimulate the engagement of private investors, which could contribute to the overall development of the forest sector.

1.3.5 Challenges of forestry development

The major challenges affecting the development of the forestry sector in Ethiopia include the following:

Wide ranging diversity in agro-ecological and socioeconomic settings. The complexity and diversity of Ethiopia's agro-ecological and socioeconomic systems makes the development of adoptable technologies much more challenging. This is particularly true for the management of forests and the cultivation of trees and shrubs.

Weak capacity of the sector. The development and promotion of forest technologies requires a national plan and supporting programs, skilled human resources, physical facilities and sufficient financial resources. However, these capacities are currently very limited, both at regional and national levels. There are significant gaps in knowledge in the fields of forest management, technology, and forest product market development. Moreover, the limited innovations in the field of forestry that do exist, are not well documented, and are poorly communicated to smallholder farmers. The medium and long-term benefits of forestry technologies for individuals and the public have not been well communicated to various stakeholders. Ethiopia's extension system, both at federal and regional levels, has very limited experience in the field of forestry extension. A lack of appropriate and locally adopted forest extension messages, as well as inadequate training for extension workers, are some of the key problems limiting forestry extension efforts.

Weak coordination of key stakeholders working in the forest sector and inadequate attention to objective-setting and long-term planning. Though many organizations have been working on different aspects of the forestry sector (e.g. on conservation, on research, on education, on product processing and marketing, etc.), links between them remain weak. Although national tree planting initiatives are currently underway, these schemes have hardly benefitted from existing forest and tree knowledge in the country. As a result, the focus has simply been on planting trees, with little regard for community needs or market demands.

Weak inter-sectoral links. Policies related to agriculture, industrial development, energy, transport and other related sectors, may have a direct or indirect influence on the way forest resources are managed, and in some cases may promote deforestation and forest degradation. On the other hand, forest policies also have an impact on many related areas, including rural development, management of the natural environment, and the livelihoods of rural and urban people. These relationships must be balanced through a policy of integration and coordination, to ensure synergy within and across sectors.

Challenges in implementing relevant laws, policies and strategies. Though the Federal government enacted the national forest law and issued forest policy and strategy document in 2007, their implementation on the ground remained limited, one major reason being lack of national forest act and a dedicated institutions at regional and lower levels to implement the forest laws and strategy. Soon after its establishment in 2013, began revising the federal forest law so that it better reflects and supports the national CRGE strategy, and a national

forest act is being prepared to facilitate the implementation of the federal forest law by the regions. A revised forest law is now in the process of review and approval by the Ministry and the national parliament. Once the revised law is approved, the preparation of national forest act and guidelines will be finalized. In the meantime, the Ministry of Agriculture and Natural Resources is working on the national land use plan where lands for forestry and agriculture and other land uses will be better defined. The approval of the revised forest law and having a national land use plan are expected to help in better informing the allocation of lands for investment, be it agriculture or forestry. CC will further strengthen its support to relevant regional institutions so that national forest laws and programs are properly implemented and the developments of the forestry sector and other sectors will be complementary and not competitive.

Lack of proper institutional organization at regional and lower levels. Ethiopia's forest administration must be organized effectively in order to perform its functions properly and achieve its stated goals. The government has made some progress towards this by establishing the and the Ethiopian Environment and Forest Research Institute (EEFRI). However, as the federal structure has not been matched with equivalent structures at the regional level, this structure is limited in its capacity. Therefore, the government must establish bureaus/agencies to lead the forest sector at regional, zonal and woreda levels.

Peculiarity of the sector – environmental objectives and long gestation periods. While agricultural crops destined for export or domestic markets generate immediate returns, income from forestry investments takes years to materialize, due to long gestation periods. Also, unlike most agricultural crops, the management of trees and forests for commercial purposes must also meet certain ecological objectives. Furthermore, although some regional states offer land tax exemption, those investing in forestry get no specific support or incentives. This factor, combined with a lack of well-developed markets for forest products, may reduce the attractiveness of the forest sector to private investors.

Poor access to tree seeds and germplasm. One of the greatest barriers to forestry development in Ethiopia is the limited availability of good quality seeds and planting materials. There is a lack of well-managed seed orchards that can guarantee sustainable forest seed supply. Additionally, there are very few specialized nurseries for cultivating vegetatively propagating materials and endangered tree species.

Under-development of products and markets. Market information systems often exclude tree products. As such, markets for tree products are both less efficient and less developed than those for crop and livestock commodities, and value chains related to forestry systems receive little support. Small-scale farmers and entrepreneurs usually lack business management and marketing skills and have limited access to market information on forest products (e.g. volume and quality demanded, price levels, etc.). Therefore, it is not surprising that retailers face high marketing risks and costs.

Under-development of value addition, certification and weak market linkages. Ethiopia has limited experience in harvesting and post-harvest handling techniques,

and opportunities for value addition of forest products remain underexploited. The availability of adoptable technologies is limited and infrastructure (roads, communication, etc.) are still under-developed in forested areas, which results in high transaction costs. Market links for forest products are poorly organized. Certification practices for forest products are extremely under-developed, quality assurance schemes for forest products and services are absent, and no meaningful support is provided to enhance production and facilitate marketing of most forest and tree products. In addition, trade of some products is over-regulated (e.g. on-farm timber), while in other cases, it is under-regulated (e.g. herbal medicines).

Land-use related challenges. An absence of rural land-use planning, classification, and demarcation, continues to exert significant pressure on forest lands. There has been a general tendency to earmark marginal lands for forestry, except in recent cases where crop fields have been converted to smallholder plantations following a sharp rise in the price of wood. The clearing of forests for crop production, both by small scale farmers and large scale investors, has been the primary cause of deforestation. Tenure security and use rights alone cannot bring about significant change, unless complemented with improved land-use practices. Integrated land-use planning at the national level, and the participation of communities at the local level, are therefore very important.

Lack of experiences in Payment for Environmental Services (PES). Forested ecosystems provide significant ecosystem services, such as watershed protection, soil and biodiversity conservation, and carbon sequestration. However, these environmental and economic services are not valued by the market, meaning that the state and farmers have to assume the costs of managing these ecosystems that benefit the nation, and humanity at large. PES, including carbon financing, could provide additional income for forest landowners and managers, support forest development and conservation, and add value to existing forests. A lack of incentive mechanisms may hinder forest development efforts.

Unsettled property rights over forests. Property rights institutions determine not only who owns what and how he manages and uses it, but also how he can exclude or allow others from accessing and using the resource. Therefore, clearly defined property rights are imperative for the sustainable management and use of environmental resources, notably forests. Except for certified agricultural lands, property rights pertaining to forests remain loosely defined and poorly enforced. De-jure claims of property ownership over many forests, particularly in cases of expansive woodlands, are pushed aside by the de-facto claims of the communities that use them. The latter use resources they do not own and manage. An absence of tenure clearance also represents a challenge to defining and implementing carbon benefit sharing arrangements.

Conflicts of interest. Some resources are contested resources as many actors have claim over these resources. Conflicts of interest over contested resources, could create fierce that may lead to irrational use by and subsequent resource degradation. Therefore, it will be challenging to ensure sustainable forest management over contested

resources. Such circumstances are apparent in Ethiopia's dry forests and woodlands, where modern investment, small scale encroachment and individualization of the commons by community members continue to present challenges to planned forestry initiatives.

Biotic and abiotic stresses. Climate change is expected to exacerbate moisture stress in dry land areas, and thus reduce the productivity of forests and farmlands. Increased air temperature dries up biomass (e.g. grass, dead leaves and small trees) quickly, thereby increasing the frequency and intensity of forest fires. Consequently, economically important tree species could become more susceptible to draught stress, insect pests and pathogens. Climate change may also increase the damage caused by insects, or may lead to the emergence of new pests and pathogens in a given agro ecological Zones where the environment had not been favorable in the past. In recent years, widespread infestations insect pests have been reported on Eucalyptus seedlings. New insect pests are inadvertently introduced through international and domestic trade. Therefore, the incidence and severity of fire, and damage caused by insect pests are two of the most significant threats to the sustainable management of Ethiopia's dry forests and woodland resources. There are no clear rules and regulations that stipulate how best to protect forests from pests, diseases, animals and fires. These problems must be addressed systematically.

A lack of dependable forest data. Ethiopia's forestry sector has been marginalized for many years, and as a result, accurate and up-to-date data on forests is lacking. Policies and programs built on unreliable data are likely to face major challenges in their implementation. A nationwide forest inventory is currently being carried out. Until this is finalized and made available, a lack of data will continue to be a challenge.

Gaps in the research–extension–farmer continuum. There are weak links between researchers, extension service providers and farmers.

High population growth rate and poverty. The underlying causes of increasing fuelwood consumption and illegal expansion of small scale agriculture are associated with rapid population growth. The national population is predicted to grow to 134 million in 2030, which represents a growth rate of 2.6% per annum. If the population income level increases and if most people are not dependent on natural resources for their livelihoods, population growth will not be a major cocern. But the majority of Ethiopians will continue to be rural and dependent on natural resources. But if the population is growing rapidly and heavily is heavily dependent on land and forests for livelihoods, it is likely that forests could be over exploited due to high rates of deforestation and forest degradation.

1.3.6 Opportunities for forestry development

The following points represent opportunities that could support the development of the forest sector:

- The Government has demonstrated that the sector is a priority, as evidenced by the establishment of the CC and EEFRI.

- There has been some devolution of power to regional states, enabling lower levels of government to make decisions on local affairs and administer resources, including those related to forests, more effectively.
- Existing institutions, policy and legal frameworks are conducive to promoting sustainable forest management (e.g. rural land proclamation, forest proclamation, etc.).
- Increasingly, policymakers in general, and the CC in particular, are working with national and international research organizations, and are now using research evidence to revise forest laws and inform their decisions when developing national plans.
- The CRGE strategy has identified forestry as a key pillar, and has defined a number of targets.
- The country has made an international pledge to rehabilitate 15 million ha of degraded forests and lands.
- The government's GTP II plan has set well-defined targets to enhance the development of the sector.
- Ethiopia's agricultural land registration and certification scheme, which accords land-use rights to farmers, encourages investment in land management, including tree planting by smallholders.
- Growing international demands for timber, national population growth, and a rise in income levels will result in increased demand for wood and non-wood products, which creates opportunities for investment in the forestry sector.
- Rapid infrastructure development in Ethiopia is reducing the transaction costs of marketing forest products
- There are substantial tracts of degraded communal lands and hillsides that could be redistributed to potential developers (e.g. youth, women, landless peoples). With technical and logistical support, these groups could play a significant role in developing plantation forests.
- A new government initiative aims to mobilize the farming community to allocate up to 40 days of free labor per year to the rehabilitation and management of degraded lands and other community initiatives.
- National tree planting campaigns and initiatives are becoming increasingly important. If some of the limitations (e.g. selection of tree species, matching site and species, improving pre-and post-planting care) and tenure related uncertainties are addressed, this could significantly increase tree cover.
- Ethiopia is gaining experience in rehabilitating degraded lands through exclosures and in PFM to actively engage communities in the management and use of natural forests could be used to achieve its stated goal of bringing some 22 million ha of degraded lands and forests under improved management practices in the coming two decades.
- Policymakers and the public are gaining awareness of the role of trees and forests in watershed management, land rehabilitation and climate change mitigation and adaptation.
- The government is gaining experience in engaging communities in forest management and in establishing and enforcing community bylaws related to forests

and other natural resources.

- There are several local and international NGOs working in the fields of land rehabilitation, exclosures and forest conservation. Improved coordination and support could enhance the effectiveness and efficiency of their programs and projects.
- The growing global interest in reducing deforestation and forest degradation through an incentive system represents a significant opportunity for Ethiopia. REDD+ offers new opportunities to support sustainable forest management, primarily through the carbon market.
- The country is training a large number of college and technical school graduates in natural resource management, forestry and agroforestry. There are also tens of thousands of development agents trained in natural resources management stationed at each kebele.

The scaling up strategy must address the challenges discussed above and attempt to exploit these opportunities.

2. STRATGEY FOR SCALING UP EFFECTIVE FOREST MANAGEMENT PRACTICES

2.1 Rationale and objectives of the National Strategy

The CRGE Strategy, issued in 2011, aims to: make Ethiopia a middle income country by 2025, and ensure that its economic growth becomes carbon neutral by 2030. The strategy document emphasizes the belief that without the green development path, development could lead to the unsustainable use of natural resources. The strategy is based on three complementary objectives: fostering economic development and growth, ensuring mitigation of greenhouse gases (GHGs), and supporting adaptation to climate change. It follows a sectoral approach and plans to limit emission of GHGs to the 2010 level, estimated at 150 Mt CO2e (CRGE 2011). The CRGE is based on four pillars: agriculture; forest; energy and transport; and industry and construction. Forests play a 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 forestry sector's contributions to building a greener economy are mainly related to GHG sequestration, through the protection and re-establishment of forests. Forests are particularly valuable due to their economic and ecosystem services, including their role as carbon stocks. Accordingly, a number of activities have been planned, including: the reduction of deforestation and forest degradation through intensified agricultural productivity; the provision of a wide range of efficient stoves and alternative energy sources; afforestation; and the establishment and sustainable management of forests and woodlands (CRGE 2011). Although such projects have been initiated, deforestation and degradation of forest resources is still widespread. One important challenge is the lack of a management plan for the responsible use of forest resources when there are multiple, and sometimes competing, objectives. Sustainability should be central to the management and conservation of forest resources. If the goals and targets of Ethiopia's CRGE and GTP are to be achieved, effective forest management practices must be scaled up.

The general objective of this national road map is to support the efforts of the Government of Ethiopia in scaling up effective forest management practices. This should be achieved over a wide geographical area, and bring about more equitable and lasting livelihood and ecological benefits, through the effective management of forests. The specific objectives are:

- to guide the efforts of federal and regional governments in selecting and upscaling effective practices in the management of agroforests, plantations, area exclosures, natural forests and woodlands
- to support the role of agroforests, natural and planted forests, woodlands and area exclosures in boosting local livelihoods and the national economy, and thereby contribute to poverty reduction
- to contribute to achieving major forestry targets set out in national development plans and in the CRGE strategy by: reducing deforestation and forest degradation; increasing afforestation and reforestation in order to enhance carbon sequestration;

and sustaining and improving the flow of environmental services

- to improve the coordination of actors and increase the participation of key stakeholders in the responsible management of agroforests, plantations, area exclosures, natural forests and woodlands, to achieve both socioeconomic and environmental outcomes.

2.2 Strategy development process

A national strategy to scale up effective forest management should promote: sustainable forest management practices for improved livelihood and conservation outcomes, and the active participation of key stakeholders (i.e. local government officials, experts, non-government actors, communities). Participation builds ownership, and facilitates the implementation and assessment of the strategy's outcomes. In developing this strategy, five teams of senior experts were drawn from: federal ministries; higher education and research institutions; and regional bureaus of agriculture. Each of the teams conducted their study in one of five key regions, and focused on a single thematic area, namely, the establishment and management of: area exclosures (based in Tigray), PFM (based in Oromia), agroforestry (based in SNNPRS), management of plantations (based in Amhara), and the management of dry forests and woodlands (based in Benishangul Gumuz). The teams began by developing procedures and identifying criteria and indicators to select effective practices for scaling up, both in their respective regions and in the country at large. To do so, the teams conducted a review of international and national experiences, using the available literature. This information was compiled and a book of abstracts waspublished for reference and further use by researchers, graduate students and extension service providers. The major selection criteria agreed upon by the team members, focused on two significant impact areas – livelihoods and landscapes. Sub-criteria were developed for each major criterion as needed. The criteria and indicators developed by each of the teams were commented on and further enriched by the comments and suggestions of members of all five teams, as well as by regional experts during consultative meetings in the regional capitals. The findings of the regional consultations were also presented and discussed by all teams at thenational level, to develop and refine the criteria and indicators to be used in the selection process.

The research sites and key management practices were selected by the team members and regional experts. The team members, regional experts, district and local administration officials, and selected community members collaborated to define the criteria and indicators, and evaluate the chosen management practices. Group discussions with selected community members were conducted, using a checklist for evaluating management practices. The data collected was then summarised and results were used to rank practices against the set criteria. The results of the analyses were also presented and discussed with regional level senior officers, to validate findings and share the process and outcomes of the study with them. Finally, the processes and outcomes of the selection process were presented at a national level workshop. Each of the teams then produced a report that was evaluated by external reviewers, whose comments were then incorporated. The input received from a range of stakeholders strengthened the selection process. After these consultations, each of the teams produced a 'scaling up strategy document'. The teams' findings and the regional strategy documents were used to develop this national strategy

document. The process is illustrated in Figure 1.

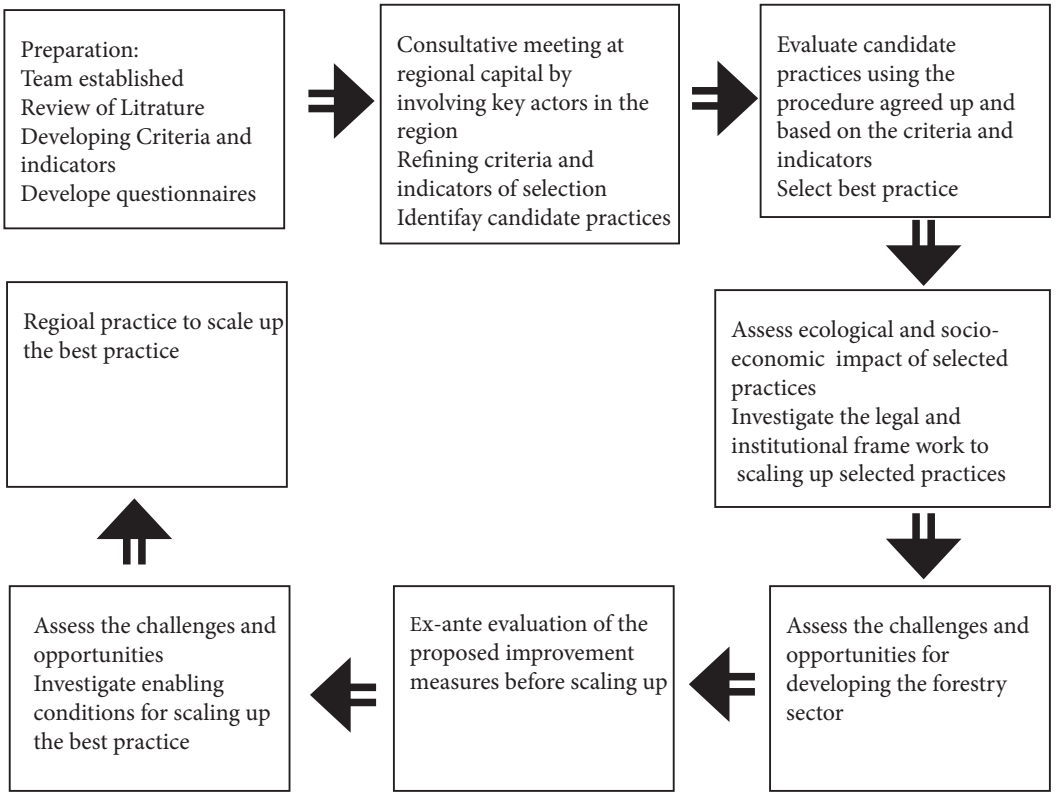

Figure 1. Schematic diagram of the processes involved in developing the national road map for scaling up effective forest management practices (Adapted from Tolera et al 2015).

2.3 Scaling up effective practices: working definition, modalities, and key elements

2.3.1 Working definition and scope

Scaling up expands, replicates, adapts, and sustains successful policies, programs, or projects to reach a greater number of people. It is defined as bringing more quality benefits to more people over a wider geographical area more quickly, more equitably and more lastingly (IIRR 2000). Thus the focus is on expanding, replicating, adapting and sustaining successful policies, programs or projects in geographic space over time, to reach a greater number of people (Hartmann and Linn 2008). In this document we use the term 'Scaling up to refer to both the process and the mechanism, and also includes the process of how successful development interventions can be expanded, replicated, and adapted to new and different contexts, for greater and more sustained impact. In the context of this document, scaling up is understood as both a process and a mechanism to adopt, and further expand, the use of good forest and woodland management practices, to bring about greater, more positive and more sustained impacts on livelihoods and the environment. Gündel et al. (2001) distinguish between 'horizontal' and 'vertical' scaling up. However, increasingly, three

'scaling up pathways' are recognized. A 'scaling up pathway' is the sequence of steps that must be taken to ensure that a successful pilot project or practice is taken from its experimental stage, through subsequent stages, to the scale ultimately judged to be appropriate. Scaling up pathways can follow different dimensions: (i) 'horizontal' replication refers to simple expansion to more clients in a given geographical area, or could also involve horizontal replication from one geographical area to another; (ii) 'vertical' scaling up refers to creating the required organizational and political/policy framework to deepen and further expand horizontal scaling up (e.g. in our case, moving from kebele or woreda to zonal and regional levels, and if possible, to the national level). This could involve moving from a local or provincial scale to a national scale; and (iii) 'functional' scaling up refers to building the innovation into a bigger program, by adding additional programmatic areas of engagement or involving other sectors. Tasks become more complex as we move from horizontal to vertical and from vertical to functional.

2.3.2. Scaling up modalities

Scaling up of forest management practices may require different modalities for scaling up. For instance, managing forests and woodlands using PFM can be scaled up through cooperatives, while small-scale plantations and agroforestry can be scaled up by involving individual households. There are also cases where both options (individual households and cooperatives) can be combined. One such example is exclosure management, which can be done both individually and through cooperatives. Thus when scaling up an innovation in this case good forest management practice we can approach users individually, as a group of interested individuals, or work with community based organizations or formal cooperatives. However, the current business-oriented mode of operation of cooperatives may need to be adapted to the specifics and challenges of the sustainable management of forest resources.

2.3.3 Key elements in planning scaling up

The key elements for scaling up effective forest management practices are:

i. **Identifying and defining innovations to be scaled up:** Identification is about clearly articulating what is to be scaled up, but defining innovation refers to the need to generate scientific evidence that the practice/innovation to be scaled up actually works (for people and the environment). This needs to be followed up with a realistic assessment of the capacity and prospects for scaling up, and the development of a plan for getting the practice to scale.

ii. **Flexibility and pilot testing:** Implementation of the scaling up strategy should be flexible, in order to account for changes in socioeconomic, environmental and political factors. A phased and flexible approach enables the improvement of selected practices, based on the recommendations of participating communities. As effective practices are scaled up, there should be an initial stage to pilot these practices in a participatory, action research mode, to facilitate: their adoption by local communities, and the adaptation of practices/innovations to the local context. In some cases, piloting might be necessary to validate appropriateness, and to identify the challenges that might appear when scaled up. Furthermore, a pilot phase can also be used to identify whether scaling up can be managed using same structural arrangements or if institutional and policy readjustments or additional

capacity are required. When scaling up practices in new areas, even if it is likely that these practices will be adopted, it is best if the process is supported by, and preceded with, sufficient research. Building on the experiences gained and lessons learnt, wider dissemination of these practices by the extension system can then be planned.

iii. **Defining the areas/domains where the innovation will be scaled up (the scaling up domain):** Scaling up requires making decisions on the optimal size of the intervention area based on: economies or diseconomies of scale; tradeoffs between quality and scale; and institutional/organizational constraints. Domains (areas and/or people) must be identified, to which the practice or innovation could easily be adopted or adapted. We can then assess whether the anticipated socioeconomic and ecological benefits can be attained with the resources available. Although defining the domain is not an easy task, this process can be supported by technology (e.g. GIS and other georeferenced information available to describe the areas) and the local knowledge of communities and experts in the areas. Piloting also helps generate information on organizational capacity, the efficiency of the process, and technical and resource related requirements, which can help to make the scaling up process successful.

iv. **Defining the scope/pathways for scaling up:** Here, 'pathway' refers to the sequence of steps that need to be taken in the scaling up process, to ensure that a successful pilot is taken from its experimental stage through subsequent stages, to the scale ultimately judged to be appropriate for the intervention pursued. Given the difficulties in scaling up effective forest management practices in Ethiopia, horizontal followed by vertical expansion (to address institutional support needs) and then wider horizontal scaling up is probably the most realistic pathway to be followed in planning scaling up in Ethiopia.

v. **Planning the scaling up process:** Detailed long and short-term plans for scaling up should be communicated with key stakeholders. Proper documentation of the process, and the outcomes of the pilot scheme, form the basis for this step, as this provides an opportunity for the implementing institution to learn from experience, and effectively scale up the process to a wider area. Furthermore, the process helps the implementing institution to determine the technical, logistical, financial and administrative requirements to implement the process, and identify the appropriate monitoring and evaluation (M&E) tools to evaluate both the process and outcomes of the scaling up process. The outcome and improvement measures and tools can be summarized in an operational manual, to be used as guidelines for further scaling up. The tested program can then be rolled out, and further adapted for a wider scaling up process at the regional level.

vi. **Resource mobilization and allocation:** Scaling up requires significant human and financial resources and the country's available resources, institutions and infrastructure should be taken into account. The oragnisations and their department responsible for scaling up should be staffed with experts in the fields of forestry and forest extension. Federal and regional governments should also allocate an adequate budget. Other financing sources should also be explored, to support the expansion of activities and build human and organizational capacity as scaling up progresses.

The , in particular, should mobilize financial resources to build its own capacity and support regions in the planning and implementation of effective scaling up programs and projects.

vii. **Identifying key actors and defining and negotiating their roles:** Once the pathways are determined, plans drafted, and resources mobilized, the next step in the scaling up process is to identify key stakeholders and define and negotiate their respective roles. This should be based on their mandates, as well as their capacities, and should aim to build on their comparative advantages to increase synergy. This requires the active participation of communities either individually or as organized groups, as well as NGOs and governmental institutions with mandates to managing forests. Actors need to negotiate their respective roles, rights and responsibilities.

viii. **Developing partnerships and forging strategic links:** It is important to establish and strengthen strategic links and partnerships with public institutions, the private sector, NGOs and civil society. Partnerships and networks that provide the infrastructure, support and leadership for scaling up should be built into the program design. In order to secure the support of policymakers, the scaling up strategy must also link these practices to the objectives of effective environmental management and improving livelihoods and landscapes.

ix. **Building capacity:** Scaling up relies on enhancing human capital and empowering communities through training that is tailored to meet the needs, aspirations and circumstances of the experts and communities (Altieri et al. 2012). It is important to undertake site/area and topic specific capacity assessment to better articulate capacity building needs. Experts should be trained and federal and regional offices should prepare manuals and training materials. This should be preceded by the development of comprehensive extension packages on innovations that are to be scaled up. This mainly involves: (i) further refining the list of districts, kebeles and villages within each district where the specific practice can be scaled up; ii) developing a detailed operational/business plan to scale up selected practices; and (iii) developing networks and learning platforms to facilitate learning by reviewing experiences.

x. **Scaling up effective practices on a wider scale (at the regional or national level):** At this phase: full packages of effective forest management practices will be well elaborated and the process of scaling up clearly documented; the necessary institutional settings are put in place; there is sufficient organizational and technical capacity for planning, implementation, and evaluation; and technical and logistical requirements are made available.

xi. **Putting a rigorous M&E scheme in place:** Scaling up is a challenging task that requires careful planning. Both the process and outcomes must be carefully thought through, monitored and evaluated to improve subsequent planning and implementation. This requires a rigorous M&E scheme to maximize learning from plans, programs and projects. It is critical to establish national and regionally relevant M&E mechanisms that build accountability but also facilitate learning from the process and outcomes of scaling up initiatives. What does and doesn't work in scaling up must be critically evaluated using appropriate M&E tools that involve key

stakeholders, notably, communities and the authorities in charge of managing forests.

xii. **Establishing learning platforms:** An appropriate platform should be established that facilitates the selection of innovations and also supports coordination and collaboration amongst institutions, both within and across federal and regional forestry institutions. A dedicated team from the should be responsible for coordinating scaling-up activities. This team should work closely with regional bureaus and research institutes, both at the federal and regional levels, to identify innovations to be scaled up. To support this process, and learn from the scaling up process itself, regional bureaus and the federal ministry should define the research topics to be addressed by the research and higher education institutes. In other words, the scaling up process should be implemented with the active participation of researchers. During the scaling-up process, the private sector can also play an important role in technology procurement and multiplication; supporting the development of forest product value chains and markets.

To conclude, scaling up effective forest management practices requires a number of steps. These steps (see Figure 2) are not necessarily linear, nor is it obligatory to go through all of the steps, as the nature and type of practice to be scaled up, and the heterogeneity of the areas/people, affect the steps that must be followed.

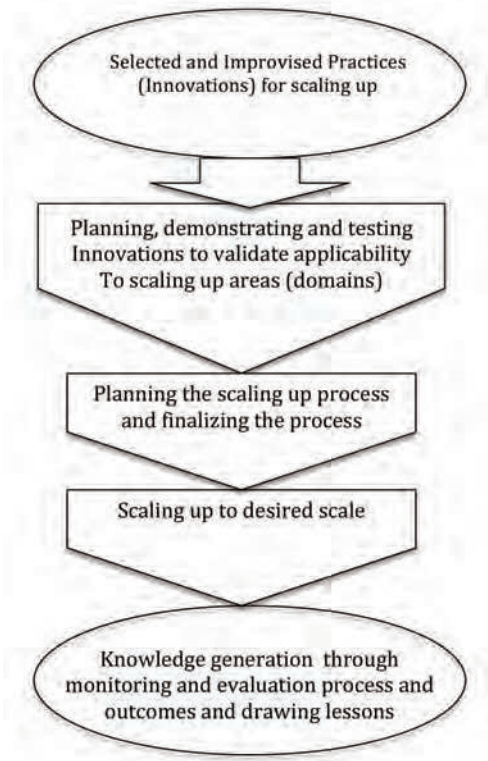

Figure 2. Schematic illustration of the stepwise approach for scaling up effective practices (adapted from Tesfaye et al 2015).

2.4 Enabling conditions for scaling up

According to Hartmann and Linn (2008), the successful scaling up of an intervention often requires the creation of a conducive space in seven areas: (1) policy space; (2) political space; (3) fiscal space; (4) organizational/capacity space; (5) cultural space; (6) partnership space; and (7) learning space. At the federal level, there are policy, legal, organizational, and institutional frameworks that enable the introduction, and wider use, of effective forest management practices. The national forest law is also under revision to create an even more enabling legal framework.

Other enabling conditions include:

- Ensuring regional ownership. The national strategy should be owned and implemented by all regions. The regions should recognize it as a document to guide the scaling up of sustainable forest management practices, in order to develop Ethiopia's forestry sector. Dedicated and well-resourced forestry institutions that work in close collaboration with the federal CC are required in each region, in order to promote local ownership and facilitate the implementation of this strategy. Each regional institution should be vertically linked to institutions at woreda and kebele levels, as these are key players in managing relationships between communities and forests. Teams responsible for scaling up effective forest management practices should be established at all levels (region, zone and woreda).
- Strengthening cross-regional and regional-federal collaboration in forestry. Greater collaboration is required between regional states, so that parties might learn from each other's experiences. There are also a number of forestry activities that require joint planning, implementation and evaluation, such as: product and market development; the assessment and improvement of ecosystem services, such as hydrological outcomes and the management of trans-regional forests and woodland resources; the protection of forests (from fires, pests and diseases, etc.); and the management of conflicts over the use of resources.
- Cross sectoral links. Attempts should be made to strengthen cross-sectoral links. Mutually supportive links should be established with other sectors, such as: agriculture, energy, water, transport and tourism.
- Improving legal frameworks and governance of the forestry sector at different levels. An appropriate governance system must be implemented at the grassroots level to facilitate the scaling up of effective forest management practices. Given that the federal government is responsible for formulating national laws and acts, it is important that each region institutionalizes relevant regulations and directives that facilitate the enforcement of national laws and ensure sustainable management of forests. The impacts of these laws on forests and people should be documented, to support their refinement over time.
- Tenure security. Improved tenure security is also important for encouraging farmers to invest in: forest management, land rehabilitation, tree planting and other activities with long-term payoffs.
- Development of markets and infrastructure. Scaling-up of effective practices should be supported by the expansion of infrastructure (e.g. roads, information and communication technologies, irrigation systems), and by improving access to: forest

research and extension services; credit; insurance against weather-related risks; and local and regional markets (McKay 2012).

- Aligning scaling up programs with ongoing plans and initiatives. This scaling up strategy could address a number of the CRGE's key targets (CRGE 2011), including the afforestation, reforestation and sustainable management of four million ha of forests and woodlands through sustainable forest management techniques, and afforestation and reforestation of 3 million ha of land in order to sequester more than 40 million tons of CO2e. The strategy also addresses Ethiopia's pledge at the UN Climate Summit in September 2014, to restore 15 million hectare of degraded forests and landscapes by 2025, in response to the Bonn Challenge.Ethiopia's scaling up strategy is in line with government goals and targets both at the federal and regional level.
- Building the capacity of communities and CBOs. Building the capacity of communities and CBOs is key to the effective and efficient implementation of the strategy. Capacity building and training programs should be based on gaps identified by involving beneficiaries in the needs assessment process. Training modules, with an emphasis on practical training, should be delivered to systematically build organizational and human capacity.
- Enhancing the role of the private sector and other non-state actors. Though scaling up is effectively the responsibility of the government, the role of non-state actors, such as CBOs, NGOs, and the private sector, could also be important. The private sector's contributions could include: creating links with markets; product development; sharing experiences related to the processing and marketing of tree and forest products; and providing extension and other support services to growers (e.g. credit, inputs, etc.). NGOs and CBOs can support scaling up processes by providing technical or financial support to government structures through projects, or through their direct involvement in the planning and implementation of the scaling up program. For example, they could support the scaling up process by sponsoring training sessions, or providing logistical and budgetary support. Likewise, donors could support the scaling up projects of governments and NGOs. Regional bureaus/offices should play more proactive roles in mobilizing and engaging non-state actors in scaling up plans and programs. To facilitate their engagement, and better coordinate their activities, a regional forum of non-state actors working in the forestry sector should be established. The forum should serve as a means to exchange experiences, avoid duplication and encourage learning and complementarity.
- Linking with the livelihood strategies of communities. Projects to scale up effective forest management strategies should take into account, and if possible support, the livelihood strategies of the local community. For those members of the community engaged in trade, scaling up should support the marketing of their forest products.
- Ensuring the active participation of communities and increasing their benefits. Community participation at all levels represents a key means of ensuring good practice in scaling-up projects. The participation of all members of the community (i.e. people of all ethnic groups, socioeconomic statuses, genders, ages, etc.) should be encouraged to participate from the project's inception, and their

feedback should be considered during all phases of decision making (e.g. demarcation, membership determination, objective setting, management plan preparation, bylaw formulation, defining responsibility and benefit sharing arrangements, etc.). Decision making processes should be transparent and inclusive.

3 EFFECTIVE FOREST MANAGEMENT PRACTICES FOR SCALING UP

3.1 Area exclosures

3.1.1 Introduction

The rehabilitation of degraded lands is been practiced in most rural societies around the world. Rotational grazing and deferred pasturing, which allow vegetation to regenerate during the rainy season, have been practiced in Tunisia, Algeria, Niger, and Somalia for many centuries (FAO 1979; Birhane 2002). Exclosure is practiced in Ethiopia to allow crop or grazing lands to rejuvenate, and increase productivity (Mengistu 2001; Birhane 2002). In the 1980s, Government institutions began promoting exclosure as a means of managing degraded land, and the practice became an integral part of soil and water conservation work. Exclosure allows degraded lands to rest for several years to encourage the regeneration of natural vegetation (Bendz 1986). Area exclosure has become the most important counter-measure to natural resource degradation, and has expanded to include exclusion of human and animal interference, the planting of trees, and assisting natural regeneration (Pohjonen and Pukkala 1990; Tekle 2001) to achieve social, environmental and economic benefits.

3.1.2 Identifying effective practices for scaling up

To restore degraded lands, designated and demarcated areas will be closed off and massive soil and water conservation works were carried out. The major challenge of the natural process is that reclamation takes a long time, particularly in dry climates where moisture is scarce. Many of the exclosures in Tigray support pioneer shrubs like Acacia etbaica, Euclea schimpri, Dodonea viscosa, and a lot of grass and herb species that provide some foliage to otherwise degraded hillsides, and protect the soils from accelerated erosion. Many developers of degraded lands consider the presence of pioneer species to be a good indicator of land reclamation. However, although pioneer species colonize degraded lands quickly, their growth rate is very slow, and it takes many decades for them to be replaced by climax plant communities. Thus, the slow rate of productivity improvement of the landscape under exclosure needs to recive adequate attention. As a result, the contribution of even some of the oldest exclosures in terms of soil fertility, hydrological cycles, biodiversity and socio-economic objectives are believed to be lower than expectation. Therefore, it is important not only to identify effective practices, but also to propose improvements, so that the scaling up of exclosure packages might produce more successful results. Scaling up of effective exclosure management practices may represent a means of rehabilitating degraded lands and enhancing ecological and socioeconomic benefits.

Nine sites, demonstrating successful exclosure management, were selected from the highlands, midlands and lowlands of Tigray, from which lessons could be drawn to inform scaling up projects. The nine sites were visited and evaluated using a pre-defined set of criteria and indicators, and one site from each region was selected. Positive ecological, social and economic impacts of these selected exclosures were identified by a team of farmers and experts. Further evaluation of the ecological and socioeconomic impacts of these sites was conducted. Limitations were identified and improvement

measures were proposed to inform the scaling up of effective practices (Seyoum et al, 2015).

3.1.3 Suggested improvement measures

Improvement measures were identified and screened using ex-ante evaluation. Accordingly, specific measures were proposed to improve the outcomes of exclosures when scaled up. These improvement measures are categorized as ecological, management and socioeconomic measures (Seyoum et al 2015).

3.1.3.1 Measures to sustain and enhance ecological services

The main challenge to exclosures is the slow rate of rehabilitation across agro-ecologies. It took a long time for impacts to emerge after exclosing, and measures to enhance rehabilitation are required. Broadcasting with native flora that have undergone seed treatment, is likely to enhance species richness and growth in exclosures. If the objective is to increase biomass, enrichment planting of suitable species may be the most effective measure. Another challenge to exclosures is moisture deficiency, which affects the survival and enhanced growth of regenerated or planted seedlings. In arid areas, where survival of seedlings is limited by water scarcity, water conservation is an important factor. Constructing in situ water harvesting structures has been identified as the best option to enhance water availability, and thereby improve the seedlings' chances of survival. Low survival rates of seedlings is another challenge to the establishment of more productive exclosures. Seedling survival rate is determined by a number of factors, including: seedling quality, nursery life span, and species selection. Implementing site-specific pre and post-planting care is vital to enhancing the likelihood of survival and growth of planted seedlings.

3.1.3.2 Measures to improve the establishment and management of area exclosures

Most exclosures meet their rehabilitation objective. However, other objectives, notably enhancing economic gains, are rarely articulated and agreed upon. Management related challenges in most exclosures relate to a lack of well-articulated objectives and corresponding management plans during the establishment phase. The short and long-term objectives of exclosures should be defined at their establishment, and these objectives should be negotiated and agreed up on by all major stakeholders. Rehabilitation, production, protection, or a combination of these, are objectives associated with the establishment and management of area exclosures. The objective of the exclosure is dependent on the level of degradation of the site to be exclosed. The construction of exclosures can be motivated by production, protection or both. Protection-focused management is useful in improving species richness and ecosystem stability, whereas production-focused management aims to increase economic gains. Therefore, the long and short-term objectives of establishing exclosures should be clearly defined using a participatory approach. A landscape can also be categorized and subdivided into compartments, where exclosures with different objectives could be established, based on the physical condition of the site and the needs of the community. The second management-related challenge is a lack of on-site and off-site monitoring systems. Time series data is essential for an effective monitoring system. To improve the monitoring system for exclosures, and generate reliable data, time series data should be collected every five years to facilitate periodic monitoring.

Fragmentation represents another challenge in the management of exclosures. Corridors should be established to link fragmented patches of exclosures, and enhance species richness. The corridors should link different exclosures with other types of forests, such as remnant natural forests and plantations. The corridors connect different systems, which facilitates the easy movement of genetic material, minimizes inbreeding and broadens the gene pool (Seyoum et al 2015).

3.1.3.3 Measures to increase socio-economic benefits

Farmers and other stakeholders complain that the benefits of exclosing a site for many years are minimal. This is a major challenge that must be addressed urgently if the interest and cooperation of communities is to be maintained.

The inability of exclosures to provide attractive economic returns is a significant challenge. Ideally, exclosures should offer benefits that can be shared among community members. Diversifying products and increasing income from exclosures is vital. Scaling up of exclosures should aim to diversify products, and increase their volume and quality. Exclosures should grow high-value species that are appropriate for the site and meet subsistence and market needs, to provide greater income to the local community. However, it is not to sufficient to simply diversify products and services; an appropriate value chain must also be established. Value chains should be strengthened for products and services obtained from exclosures at local, regional, national, and international levels.

Opportunities to promote tourism could also be explored at certain sites. Exclosures could also be planned and managed with the aim of pursuing carbon finance opportunities such as REDD+ and the CDM (Clean Development Mechanism). This would ensure that exclosures are an economically attractive land-use option. Income diversification can be ensured through the proactive and flexible management of exclosures.

3.1.3.4 Addressing uncertainties in ownership

Exclosures are usually communal. Dwellers contribute to the establishment and protection of exclosures, but their ownership rights are not well defined or agreed upon. The scaling up of exclosures should take the need for defined ownership into account. Exclosures could be owned by cooperatives/unions, or distributed to individuals (working with, or without, the assistance of a cooperative). The best model is one that suits the existing situation, and meets targets related to: community expectations; sustainability; and economic and ecological benefits. Ensuring the use rights of individuals working within cooperatives is becoming more commonplace in some parts of Tigray.

3.1.3.5 Support for the development, refinement and endorsement of community by laws

Communities need to be supported to produce and enforce appropriate bylaws to help them efficiently manage area exclosures. Current bylaws related to exclosures mainly focus on penalizing wrongdoers, and do little to reward achievements. During consultations, farmers suggested that these bylaws should be more balanced, to achieve not only conservation but also economic objectives by facilitating effective and

sustainable utilization. The bylaws for a particular exclosure should be closely aligned with the objectives defined at the outset. Bylaws must be aligned with the objectives of the exclosure, and should be reviewed and approved, to facilitate legalization and ensure their enforcement.

3.1.3.6. Support in managing conflicts

Managing conflicts is an important aspect of managing area exclosures. Unclear benefit sharing mechanisms that are applied to the products and services obtained from exclosures, are common sources of conflict. Lack of a clear benefit sharing mechanism limits adoption and scaling up of exclosures. A fair benefit sharing mechanism, based on contribution, should be implemented. Sharing benefits among all beneficiaries, on an equitable basis, increases participants' sense of ownership over the exclosure, and encourages the community's participation in its management. Performance based benefit sharing triggers competition which enhances the productivity of the exclosure.

3.2. Participatory Forest Management (PFM)

3.2.1 Introduction

PFM is an arrangement by which government and local communities negotiate and agree to manage and use a particular forest or area of forest. PFM encourages community participation in every domain of forest policy and its realization, to achieve sustainable forest management. The literature often applies PFM as an umbrella term to refer to various systems developed in different countries, including community forest management, collaborative forest management, and joint forest management. As an approach to sustainable forest management, PFM is commonly believed to have arisen in response to challenges related to the social characteristics of managing forest resources (i.e. the issues of 'who manages the forest' and 'how'). The underlying purpose of PFM can generally be described as solving problems arising from the conflicting interests and concerns of different social actors within forest resources management, in an effective and equitable way. PFM approaches recognize and reconcile livelihoods and conservation objectives. Thus, this approach promotes sustainable management and conservation of forest ecosystems, while improving the livelihoods of people living in, or around, these resources.

The introduction of PFM was catalyzed by several factors at the international level. The Tropical Forest Action Plan (TFAP), an outgrowth of the Agenda 21 framework initiated in Rio de Janeiro in 1992, sought to reverse deforestation by involving local stakeholders, especially communities living in and adjacent to forest areas. The 1992 Convention on Biological Diversity (CBD 1992) underscores the value of the sustainable use of biodiversity, and equitable sharing of associated benefits, that arise from the effective conservation of biodiversity resources. Attempts to promote effective and meaningful involvement of local communities in managing forests were made in the Asia-Pacific region. This was achieved through various, community-based forest management initiatives, including: the devolution of management responsibilities for some forestry activities to local government units in the Philippines; land and forest allocation programs in China, Laos and Vietnam; transfer of use rights to forest user groups in Nepal; Joint Forest Management programs plantations in New Zealand (Paul and Chakrabarti 2011). Similarly, in implemented in India; and privatization of forest Bangladesh, Pakistan and

Nepal, social forestry programs promoted the involvement of local people living in and adjacent to forest areas. South Asian countries such as India and Nepal are considered pioneers in introducing and implementing PFM to promote sustainable forest management. Such collaborative management approaches were introduced because of the governments' inability to unilaterally protect public forest resources.

In Africa, PFM implementation started in the early 1980s, as part of a movement towards decentralization and devolution of state enterprise management, under structural adjustment programs. This became more widespread in 1990s (Amanor 2004). Therefore, PFM is still a relatively new concept in Africa, and is still evolving. However, PFM is already widespread, and has been successfully implemented in many African countries, to promote the sustainable management of forests (Wily 2002). PFM, in its different forms, has been practiced in diverse social and biophysical contexts. As a result, a considerably large volume of literature documents the principles, approaches, contextual factors and impacts of PFM. The literature asserts that PFM can potentially contribute towards achieving improved forest conditions and enhanced rural livelihoods, as long as local communities are recognized as important stakeholders in forest management and encouraged to participate actively.

3.2.2 Selected practices in PFM

The selection of effective PFM practices was mainly focused on high forests in different parts of Oromia region. This is because there were no successful PFM sites in the lowlands (woodlands); one endevor in Borana did not continue after Farm Africa terminated its project there. All of the observed forest areas had undergone considerable deforestation and degradation before the introduction of PFM. The PFM approaches were mainly initiated by NGOs, and received substantial external support in their early stages. Using criteria and indicators to identify effective PFM practices, different PFM sites were visited, and the process and outcomes of PFM were evaluated. Each of the PFM sites had their own strengths and shortcomings, which provided lessons for scaling up PFM. The following have been identified as effective examples of PFM that should be considered as PFM is scaled up nationally (Tesfaye et al. 2015).

1. Ensuring proper validation at initial stage, by allocating sufficient time, and making the process as transparent as possible, is beneficial. The Dodola PFM establishment process provides positive lessons in this respect. Among earlier user groups, there was a gap of five years between the first and last formed groups, as hesitant members of the community required adequate time to consider and commit to PFM. The PFM establishment process in Dodola has evolved through a long process, in order to seek solutions to real and practical problems. These issues are particular to the conditions of the implementation site. A forest management intervention, which was initially designed as an Integrated Forest Management project, has gradually transformed into a more participatory forest conservation and development approach that considers the peculiarities of the forest in a given area and potential challenges to its management. After evaluating the actual impacts of the preceding interventions, the project evolved into a PFM project, with enhanced participation. The participation of communities

should:

- enable direct or indirect representation of important interest groups (e.g. gender, age, forest dependence, and other social divisions that might influence relationships with forest resources) at the initiation stage
- ensure proper consideration of local stakeholders' views on forests in the planning of PFM. PFM planning should be undertaken to identify aspects of the resource valued by the local community, and incorporate this feedback into the forest management plan
- promote the equitable sharing of power in decision-making between communities and the government (experts). The full consent of member households should obtained prior to the establishment of forest user groups. The participatory process should allow sufficient interaction to address local expectations, concerns, views, and solutions.
- empower local communities to influence the PFM process and its outcomes related to sustainable forest resource management
- ensure empowerment and the building of social capital (interactions) as essential aftereffects of participation in PFM.

2. The overall impact of PFM on all local stakeholders, both in the short and long-term, should be understood and measured, and due attention should be given to mitigating any undesirable impacts on people and forests. A narrow focus on the concerns of the forest user group alone, at the expense of the interests of non-members in the local community, could have serious negative repercussions on the sustainability of PFM. For example, in the case of the Dodola PFM project, non-members were: given special access to the forest, involved in demarcation, and also given replacement agricultural lands where appropriate. Therefore:
   - Efforts should be made to compensate those who are negatively affected by the PFM arrangement, and provisions should be made to take into account the needs of non-member households. Non-member households should be involved at the early stages of the PFM establishment process so that they can voice their concerns.
   - The forest management agreement should make provisions to mitigate negative impacts on non-members, and where appropriate, they should receive certain forest-based benefits.
   - Forest demarcation activities should involve as many community members as possible.

3. Organization of forest user groups should consider the manageability of the group, and the degree of trust and familiarity among members when determining the size of the group. Therefore, identification of members of forest user groups, and demarcation of respective forest blocks, should take into account existing patterns of settlements and other social interactions, as well as the practicality of planning, implementing, and controlling collective forest management activities. At the Dodola PFM site, the size of user group was limited to a maximum of 30 households. Moreover, existing patterns of settlement were considered in forming user groups and

in the demarcation of forest blocks. This has enabled members to modify rules on management responsibility, cost and benefit sharing, in view of the capacity and role of individual members.

4. Forest User Groups could be organized into nested organizations that assume appropriate functions and responsibilities in collective forest management at different levels (e.g. forest management/users association, forest cooperatives and union, etc.). This helps to create economies of scale in the management and use of large tracts of forest resources and builds capacity for collective action and bargaining power. Higher level organizations, such as unions, can gradually assume important facilitation and development roles, commonly taken on by external actors. These include strengthening market linkages, setting up tree nurseries/ distributing seedlings, and building infrastructure. This could eventually represent an important means of ensuring community empowerment. In this regard, the Dodola PFM project has a functional and promising union, which has assumed the role of external supporter by undertaking: development activities, the distribution of seedlings, the provision of credits; and income generation activities that represent a significant stride towards the genuine empowerment of the community. User groups within a kebele were also formed into separate cooperatives, and a union was formed at the woreda level.

5. Incentive mechanisms should be put in place, following the approval of local communities, to ensure the sustainable management of forest resources. Such incentive mechanisms should target important forest management outcomes (e.g. increase in area of forest cover, reduction of forest degradation, extent of forest regeneration or rehabilitation), rather than forest management activities. The community should have a clear understanding of the mechanism, and adequate capacity to follow up and demand its enforcement. In the case of the Dodola PFM project, for example, simplified approaches to forest resource assessment were developed, and members of forest user groups were trained to regularly undertake such assessments.

6. Accord due importance to livelihood outcomes in setting PFM objectives. Thus far, the focus has mainly been on conservation outcomes. Therefore, allocation and determination of forest use rights should be based on the needs of the local community, in light of forest potential and the opportunity cost to be borne by the local community. Therefore, forest management and utilization plans should make comparative assessments of the livelihoods of member households with and without PFM, and of members and non-member households. The Dodola PFM project has identified the needs of households for various forest-based products, and compared this with the forest's productive capacity. The findings were then used to determine the minimum forest area required per member household (starting with 12 ha per household, and later changed to 8 ha) to support a standard of living that is comparable with that of non-member households.

7. The institutional set-up should be tailored to promote the sustainable use of different types of forest resources in Ethiopia. Where appropriate, this should also be aligned with the existing customary institutions dealing with access to forest resources, rather than applying ready-made, prescribed arrangements. Depending on the forest type and livelihood strategies, local communities should be engaged in various forest-based activities. Unlike the organization of groups for collective management and protection, group formation processes for economic objectives (such as cooperatives) should have modality and principles that reflect the nature of the resource in this case forest that needs to be managed as per the management plan. In this regard, some PFMs have successfully established separate organizations/ CBOs to perform different functions within the same PFM, including: forest user/ management groups; forest associations; or commodity based (e.g. coffee, spices, etc.) and gender-based (e.g. saving and credit) cooperatives. The experiences of several PFM projects in southwest Ethiopia offer positive examples of how this can be achieved.

8. To maximize PFM impacts on livelihoods, we must integrate forest management and utilization activities with other important household income sources,to increase the value of forests and their benefits to people. For instance, livestock farming was successfully integrated with forest management using a cut and carry system at the Gemechis PFM project in the Hararghe highlands. Eco-tourism activities were also introduced to increase the value of forest resources at Dodola and Bale PFM sites. These are all good practices that should be piloted in new areas, and consolidated in areas where PFM has already been initiated, as PFM is scaled up nationally.

3.2.3 Suggested improvement measures for enhancing the effectiveness of PFM practices

Assessments of existing PFM practices have revealed some gaps that should be addressed before PFM is scaled up. Suggested measures, related to each of the criteria/indicators used in selecting effective PFM practices, are listed in Table 1 (Tesfaye et al 2015).

Table 1. Suggested improvement measures for enhancing the effectiveness of PFM practices.

Criteria/ Indicators	Suggested Innovative ideas
Empowerment	• Greater and all-inclusive participation (e.g. women, minorities, youth) in all aspects of PFM (including: objective setting; economic and ecological evaluations; benefit and responsibility sharing, etc.) • Balance conservation and economic objectives of PFM while setting objectives and developing management plans • Enhance access to information (e.g. market, technology, etc.) and build capacity (e.g. technical, managerial, etc.) • Enhance community empowerment in decision making • Discourage elite capture of benefits, by creating an enabling environment to allow for active participation of ordinary members (e.g. democratization of decision making) and transparency in benefit sharing mechanisms • Secure forest tenure and use rights as per the Forest Management Agreement (FMA) (e.g. issuance of certification of PFM holdings, making higher offices [e.g. regional bureaus] counter-signatories of FMA)
Criteria/Indicators	**Suggested Innovative ideas**
Institutional and organizational settings	• Put in place community institutions appropriate to PFM and legal recognition of relevant customary institutions • Establishment, legalization and empowerment of CBOs, both for forest management and forest product marketing, and devolve more decision making power to CBOs for effective forest protection and management • Provide legal provision, specific to PFM arrangements (i.e. by adapting current co-op and association arrangements to fit to the needs of forest management under PFM) • Setting provisions and taking progressive actions to support the evolution of PFM to community forest ownership • Raise awareness of PFM among law enforcement bodies and related offices (e.g. police) Facilitate the inclusion of REDD+ issues into CBO bylaws and plans • Include Payment for Environmental Services (PES) provisions in the national forest law and the FMA • Organize all PFM user groups at union and/or regional level
Equity: Engagement of disadvantaged groups	• Introduce/increase quotas to ensure the participation of women in leadership positions • Facilitate and capacitate women to effectively participate in PFM (e.g. provide tailored training to enhance capacity; arrange suitable working times/conditions for women in bylaws) • Benefit sharing and management responsibility should take into account the economic heterogeneity of community members (e.g. degree of forest dependence, livelihood strategies, level of poverty, etc.) • Recognize different types/levels of PFM membership, combined with corresponding roles/responsibilities in collective management arrangements, as appropriate to the social and cultural practices of the community
Impact on livelihoods	• Ensure forest access rights to meet local needs, including for: timber and lumber; wildlife resources; carbon and environmental benefits • Strengthen support for forest-based livelihoods • Promote diversification, value addition of products and market linkages (e.g. introduce village-based, small-scale carpentry; honey processing; converting forest by-products into briquettes, trophy hunting, eco-tourism, etc.) • Support the integration and complementarity of forest-based engagements with other livelihood activities (e.g. with livestock production, apiculture, climate smart agriculture, etc.) • Ensure community benefits from PES, including from relevant national stakeholders (e.g. the Ethiopian Electric Power Corporation, potable water supply agencies, irrigation facility users, tourism organizations, etc.)

Impact on forest conditions	• Conduct periodic forest resource assessment and involve communities to support informed decision making • Build community capacity to act as responsible forest managers, and ensure that forest extraction is based on the management plan • Use PFM as an instrument for REDD+ implementation, and to tap other climate financing mechanisms • Encourage enrichment planting & provide support to establish forest plantations around PFM sites where appropriate
Conflict management or resolution	• Legally grant communities the power to address all PFM-related issues, including conflicts over forests between members • Revive customary practices for conflict management alongside formal institutions • Ensure the participation of all community groups (e.g. elders, women, youths, underserved) and all relevant stakeholders (distant users) during CBO bylaw development • Consider the needs and aspirations of non-members and alleviate negative impacts of PFM that affect them (e.g. through income diversification, greater employment opportunities, micro-finance, etc.) • Enforce and periodically update internal bylaws, taking emerging needs into account

In using PFM at the national level to improve the management and use of forests and woodlands, it is important to note that:

- The success of PFM is dependent on the overall legal and policy framework governing access to and use of forests. Thus, tenure security is an important element of PFM.
- Efforts to promote decentralization, community empowerment, and participation offer relevant lessons that might support the scaling up of PFM practices.
- Guiding principles should be developed to elaborate the 'why', 'where', and 'how' of PFM arrangements at the national level.
- Forests and woodlands should be identified at the national level, where PFM could bepracticed. The related literature suggests that the following four factors should be considered:
    - o Biophysical features of the resource: Whether it is forest proper (e.g. natural forests, woodlands vs plantations, forestlands) or non-forest (e.g. exclosures, watershed areas, rangelands, etc.)
    - o Local community/users of the resource: In terms of: the degree of forest-based vs non-forest based livelihood strategies; presence and composition of forest dwellers vs non-forest dwellers; the community's interests, etc.
    - o Institutional setting: Presence of customary institutions on accessing and using forests, and on collective action for the management of a common property resource.
    - o Forest-people relationships: The degree of mismanagement or over exploitation due to de facto open access or weak tenure; the level of conflicts due to multiple uses/interests; homogeneity in terms of levels of dependence on resource; the degree of resource degradation and potential for rehabilitation through PFM; and opportunities to enhance carbon/environmental benefits (Tesfaye et al 2015).

3.3 Management of dry forests and woodlands

3.3.1 Introduction

Dry forest and woodlands are vegetation types dominated by woody plants, primarily trees, whose canopy covers more than 10 per cent of the ground surface, which occur in climates with a dry season of three months or more. Dry lands account for 61 % of Africa's agricultural land, and 54% of agricultural land globally (UNDP 2005). It is estimated that nearly one billion people worldwide directly depend on dry land 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 the rainforests of the Congo basin, and the open woodlands of western and southern Africa.

Dry forests encompass 42% of all tropical forests (Murphy and Lugo 1986). They contain a wealth of unique biodiversity (Janzen 1988) but remain one of the least understood and protected ecosystems. The dry forests and woodlands of Africa have rich flora and significant endemism (White 1983; Linder et al 2005). The Zambezian 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, dry forests are found in 31 countries in western, eastern and southern Africa, and are the dominant vegetation type in most of these countries. They cover approximately 17.3 million km2 and are inhabited by nearly 505 million people (Chidumayo and Marunda, 2010).

Many NTFPs are found in dry forests and woodlands, and are important to local livelihoods (Belcher 2003). The most important NWFPs are fruits, seeds, exudates, leaves, bark, roots, fibers, Oleo- gum- resins, and honey, which can be used for subsistence or traded. The Acacia-Commiphora and Combretum-Terminalia woodlands, which cover large parts of the Horn of Africa and the Sahelian and Sudanian zone (White 1983; Friis 1986), contain various species of Acacia, Boswellia and Commiphora that produce Arabic gum, frankincense and myrrh (Lemenih and Teketay 2003). Dry forests and woodlands are sources of wood for construction, fuel and charcoal. Livestock production is the mainstay of people living around dry forests, where animal production is based on free grazing (FAO 2009). Besides being a source of NWFPs and biodiversity reservoirs, dry forests also support head water hydrology (Lemenih 2005), and the mitigation of climate change through carbon sequestration (Nair and Tieguhong 2004).

3.3.2 Dry forests and woodlands of Ethiopia

Dry forests and woodland resources of Ethiopia are among the nine broad vegetation types of Ethiopia which include: (1) dry evergreen Afromontane vegetation; (2) Combretum–Terminalia (broad-leaved) deciduous woodland; (3) Acacia–Commiphora (small-leaved) deciduous woodland; (4) lowland dry forests; (5) lowland semi-desert and desert vegetation; (6) evergreen scrub; (7) wetland (i.e. swamps, lakes, rivers and riparian) vegetation; (8) moist evergreen montane forest, and (9) Afro-alpine and sub-Afro-alpine vegetation (Demissew 1996). Access to reliable information on Ethiopia's vegetation resources is limited (Teketay et al. 2010). The Woody Biomass

Inventory and Strategic Planning Project (WBISPP 2004) was the first national inventory to provide reasonably reliable statistics on forest resources prior to the -FAO's on-going forest inventory. According to WBISPP (2004), Ethiopia is covered by a total of 59.7 million ha of woody vegetation, of which 6.8% is forest, 49% woodland and 44.2% shrubland or bushland.

3.3.3 Global experiences in selecting dry forest management practices

The concept of sustainable forest management addresses social, economic and ecological issues. These three cornerstones of sustainable forest management are known 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. The active involvement of local communities and other stakeholders is crucial to sustainable forest management. Local government structures and communities should agree on, and share responsibility for, managing forest resources, to support: the conservation of biodiversity; the production of timber and NTFPs; and the maintenance of regenerative capacity under varying land-tenure arrangements (Bray et al. 2003). As such, the identification and scaling up of good dry forest and woodland management practices is important.

3.3.4 Selected effective practices in managing dry forests and woodlands

The major selection criteria agreed upon by the team and experts focused on forest management (i.e. ecological and socioeconomic aspects, and adequacy of policy and legal framework), and each of the major criteria has sub-criteria and indicators. A total of 3 major criteria, 9 sub-criteria and 45 indicators were used in the selection of good dry forest and woodland management practices in Benishangul Gumuz Regional State (BGRS) (Tolera et al., 2015). The major criteria and sub criteria were weighted differently, but each of thindicators were given equal weight (Table 2). Based on the evaluation, gum and resin based and bamboo based dry forest management practices were selected as two examples of good practice.

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

Major criteria (weight in %)	Sub-criteria (weight in %)	Number of indicators used
Forest management (25)	1.Improvement of forest resource (40)	15
	2. Maintenance & enhancement of productive functions of forests (25)	19
	3. Maintenance and improvement of forest health (20)	6
	4. Maintenance and improvement of forest ecosystem services (10)	20
	5. Landscape planning (integration with other sectors) (5)	11
Socioeconomic benefits (35)	1. Maintenance and enhancement of economic benefits of forests (60)	14
	2. Maintenance and enhancement of cultural benefits of forests (40)	5
Legal and institutional framework (40)	1. Enabling legal framework (40)	10
	2. Enabling institutional framework (60)	10

Gum and resin based dry forest management in Kurmuk. Gum and resin based dry forest management observed in Kurmuk follows a detailed management plan, which was prepared using a participatory approach. The management prescription and planned activities were executed according to the plan. Growing stock is monitored and most respondents believed that the composition and diversity of plant species in areas under PFM has improved. The process was participatory, and community members participating in PFM receive more income. Vulnerable groups are included. The resource is well demarcated, community bylaws are well respected and enforced, and there are clear guidelines for benefit sharing. Weaknesses include inadequate efforts to diversify products. For example, fruit trees such as Adansonia digitata (Baobab, 'Agangulish'), and Tamarindus indica ('Mela') could be used to increase household incomes. Bamboo based dry forest management in Homosha. Dry forest management in this region has significantly contributed to the regeneration of bamboo. Seedlings are protected against fire, grazing and termites (through use of ash and digging trenches). Some of the economic benefits identified by farmers and experts include: increased income, improved market opportunities, and more employment opportunities. Other positive aspects of this project include: a clear benefit sharing mechanism; clear demarcation of resources; strong enforcement of bylaws; the existence of a monitoring system; the engagement of state agencies and NGOs community participation in all phases; and gender sensitivity (e.g. women's associations are involved in the process). Weaknesses identified include: a lack of enrichment planting using other valuable species; a lack of silvicultural practice to better manage bamboo (e.g. to control the spacing, harvesting frequency and intensity – i.e. how many calms to retain); reliance on only one product type (lack of product diversification – e.g. there is potential for apiculture); little or no value addition; inadequate extension and market support; and uncertainty regarding the future of the cooperative when all dead bamboo has been collected.

3.3.5 Suggested Improvement Measures

Options to further improve the selected practices, and enhance their positive impacts on landscapes and livelihoods were identified. Then, ex ante evaluations of the proposed measures were conducted. The five proposed measures that ranked highest in the evaluation were (Tolera et al 2015):

i. raising awareness of legal frameworks regarding the governance of forests and other sectors (clear rules and regulations) and law enforcement (implementing laws)
ii. active involvement and commitment of governmental institutions in supporting forest management initiatives
iii. clearly defined entry and exit strategies for non-state agencies such as NGOs engaged in PFM
iv. institutional complementarity and integration of plans (based on clear mandates and roles of the respective institutions to maximize synergy and reduce gaps and overlaps of activities)
v. concept of carbon trade integrated into dry forest and woodland management practices
vi. strengthen research and extension services to promote iproved management of dry forests and woodlands.

3.3.6. Issues requiring the attention of federal and regional governments related to the management of dry forests

Dry forests and woodlands account for the most widespread forms of vegetation cover in Ethiopia. The areas covered by these vegetation types are used by communities of various socioeconomic 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 SNNPRS value these resources mainly for their benefits to livestock production (i.e. resources are used as a source of fodder, shade, medicine, etc.). In the northern and northeastern part of the country, the same resources are highly valued for gum and resin production. There are also differences in the traditional management of resources (Woldeamanuel 2011). For instance, the management of resources is embedded in the Gada system of southern Ethiopia, whereas access is restricted by government authorities in northwestern Ethiopia (Gebru et al. 2014). As such, good dry forest and woodland management practices identified in one region (in this case, Benishangul Gumuz), cannot be directly applied to other regions with different resource endowment, livelihood strategies, access rights and cultural management practices. Hence, it is advisable to identify and scale up effective dry forest and woodland management practices that suit the resource conditions, livelihood strategies, traditional management regimes and area-specific context. Fire is often considered to be part of the ecology of dry forests and woodlands (e.g. Cochrane et al. 2002). However, fire frequency is increasing due to various anthropogenic activities. This is hampering the successful establishment of seedlings, and increasing the adult mortality rates of many tree species (Tolera et al. 2013). Frequent fires, combined with overgrazing and trampling, can result in recruitment failure (Auld and Keith 2009; Haubensak et al. 2009), which can change the species composition of dry forests (Zida et al. 2007). Fire frequency in tropical dry forest areas is likely to increase due to the effects of climate change (Timberlake et al. 2010). Therefore, it is advisable to address fire management when scaling up dry forest and woodland management practices at the national level.

The dry forests and woodlands of western Ethiopia are well known as a source of bamboo. This resource is used locally for food and construction. Bamboo is also marketed, and has become an important source of household income. Its national and regional economic contributions continue to increase. However, there are a number of challenges facing this resource. One of the problems is mass flowering, and the subsequent conversion of bamboo growing areas to other land uses. Once it has flowered, and following the dieback of culms, bamboo becomes much more vulnerable to fire hazards. Bamboo forests are susceptible to agricultural investment, because it is relatively easy to clear bamboo and convert the land for agricultural use. On the other hand, members of the private sector engaged in the bamboo trade complain that there are no specific regulations that guide the trade of bamboo, and that it is treated like other timber products. The growth and management of bamboo is very different from other woody species. The management and trade of bamboo requires specific regulations that address the unique nature of the resource. Research should also be used to improve: regeneration, growth, yield, market chains, and value addition. The example of Benishangul Gumuz, where communities effectively manage their bamboo forests, suggests that engaging communities could

promote sustainable management. Other species with economic potential are Tamarindus indica and Baobab, which have a variety of uses. The distribution of these resources and their potential for local livelihoods require further study.

The following are issues that must be addressed when scaling up practices for managing dry forests and woodlands at the national level (Tolera et al. 2015).

- Limited information on forest resources and their status: Though this is common across all forest types, dry forests and woodlands in particular have been neglected. Hence, information regarding resource base, product potentials, silviculture, ecosystem services and market opportunities, related to Ethiopia's dry forests and woodlands, should be compiled.
- Invasive species: Currently, Ethiopia's dry forests and woodlands are being affected by invasive species such as Acacia drepanolobium (in Borana) and Prosopis juliflora (in Afar and Somali regions). These invasive species have negative impacts on native biodiversity, and on the productivity of rangelands and agricultural lands. Hence, the management of dry forests and woodlands must also address the management of invasive species.
- Dry forest-livestock link: The livelihoods of most communities living in the dry forest areas of Ethiopia depend on livestock. Hence, dry forest management approaches must recognize the links between forests and livestock.
- Regeneration problems: The populations of some important dry forest and woodland species like Boswellia papyrifera are declining at an alarming rate. The economic contributions of frankincense to local communities and the national economy are substantial. Hence, efforts should be made to secure the successful establishment of this species. This should be addressed in the scaling up of dry forest and woodland management practices.
- Over exploitation: Ethiopia's dry forests and woodlands are endowed with various NTFPs, such as gum, resins and lowland bamboo. The private sector is currently engaged in this area and will continue to support NTFP production. However, the concessions managed for frankincense production lack adequate management plans, and current tapping methods cause significant damage to the trees. Current practices focus purely on resource extraction rather than the sustainability of the resource. Hence, there is a need to implement, and enforce, clear guidelines on the sustainable extraction of frankincense. Further research is also required on enhancing the regeneration of the species and improving tapping technology. Equally, there is a need to diversify product types, and improve technologies in areas where there is sub-optimal utilization of resources (e.g. frankincense under PFM).
- Charcoal: Charcoaling is prevalent in areas with dry forests and woodlands. This is mainly because most dry forest and woodland species are suitable for charcoal production. As such, charcoal production has been one of the major drivers of forest degradation in dry forests and woodland areas of Ethiopia. Scaling up of dry forests and woodland management practices should recognize the significant contribution of charcoal production to local livelihoods.
- Socioeconomic differences: Ethiopia's dry forest and woodland areas are diverse

in terms of their resource base, climate and socioeconomic context. Hence, a blanket scaling up of practices throughout the country may not yield positive results. Scaling up must be guided by sufficient knowledge of the resource base's biophysical characteristics, and socioeconomic context. Research should play pivotal role in this regard.

- Growth corridor: A number of major development interventions are being carried out in the dry forests and woodland areas of the country. These include: large scale agricultural investments; sugarcane plantations; large dams; and resettlement activities. Hence, there is a need to harmonize and integrate these initiatives when scaling up dry forest management activities, as many of these activities compete for the same resources (i.e. land).
- Potential areas to implement CRGE goals and international pledges: Sustainable management of dry forests and woodlands is key to achieving the targets set in the CRGE. As most of the areas around Ethiopia's high forests are surrounded by settlements and agriculture, it is likely that most rehabilitation plans will be carried out in dry forests and woodland areas. Hence, the scaling up of activities in dry forests and woodlands should be aligned with these development plans.

3.4 Management of planation forests

3.4.1 Introduction

In 2000, plantation forests covered 187 million ha globally (FAO 2001), and this area continues to increase. Plantation forests in Asia account for approximately two-thirds of this area. The countries with the largest areas of plantation forest are: China, 24% of global plantations; India, 17%; Russia, 9%; USA, 9%; Japan, 6%; Indonesia, 5%; Brazil, 3%; Thailand, 3%; Ukraine, 2%; and Iran, 1%. The global new planting rate is estimated at 4.5 million ha/year. Plantations in Asia account for 79% of this number, and South America accounts for 11%. Other continents account for only 10%. In terms of genera composition, Pinus and Eucalyptus remain the two most important genera worldwide (FAO 2001)

Following high rates of deforestation in Ethiopia, attempts have been made to establish plantation forests to satisfy the growing wood demands of the population, and to rehabilitate degraded lands. These plantations are predominantly made up of exotic tree species, including Eucalyptus spp., Cupressus lusitanica, Acacia decurrens and Pinus spp.. These species have been chosen due to their fast growth, and attractive economic returns. Individual smallholders, in particular, prefer to plant fast-growing, exotic tree species. This is also true in most communal and state owned plantations. A culture of tree planting is growing rapidly in Ethiopia. Contrary to the growing interest in tree planting, the application of appropriate silvicultural practice before, during and after planting is limited. Therefore, in order to improve the growth performance, stand quality, and yield of plantation forests, it is essential to identify effective practices that can be scaled up.

3.4.2. Selected practices

An assessment carried out in the Amhara Region (Tadesse et al. 2015), identified the following smallholder plantations as examples of good practice: an Acacia decurrens

smallholder plantation in Fagita Lekoma Woreda in the Awi Zone; an E. globulus plantation in Lay Gayent Woreda in the South Gonder Zone; and an E. camaldulensis plantation in Mecha Woreda in the West Gojam Zone. A communal plantation located in Shabra Gott, Abchikli Keble, South Achefer woreda in the West Gojam Zone was also found to demonstrate better management practices than other plantations. With regard to silvicultural management, this plantation was better in terms of: site preparation; protection; species diversity; and soil and water harvesting structures. The major tree species in this plantation included: Grevillea robusta, Acacia saligna, Cordia africana, Jacaranda mimosifolia, Acacia abyssinica, Croton macrostachyus, Eucalyptus camaldulnesis, and Sesbania sesban. Out of the observed commercial plantations, a plantation forest located in Debre Tabor Eyesus Kebele, Farta Woreda in the South Gondar Zone, which was owned by group of individuals licensed to invest in plantation forests, demonstrated some of the best management practices. A group of individuals established this plantation in the form of a cluster divided into four blocks. The owners of three of the blocks are inhabitants of Debre Tabor town, and the fourth block is owned by a group of policemen. The total area of the cluster is 10.5 hectares, and the primary tree species is E. globulus. Silvicultural factors, such as site preparation, protection, and species-site-objective matching are well managed. Each of the plantation blocks has its own business plan, and each group has its own tree nursery.

Out of the observed smallholder plantations, an Acacia decurrens plantation in Fagita Lekoma Woreda was identified as an example of best practice. In choosing tree species, the plantation owners considered: adaptability, growth rate, profitability and compatibility to other land uses. Silvicultural management techniques (e.g. spacing, planting techniques and tending operations) were considered in the identification of effective plantation practices. The spacing between rows and trees was 1m x 1m and this produces the products that the market requires – wood for fuelwood and poles for scaffolding. The plantation owners had adopted a technique of planting trees together with crops such as wheat, teff, maize and green pepper during the first growing season. After harvesting the crops, the farmers left the trees to grow. Planted trees had a high rate of survival. According to farmers, plantations are ready for harvesting five or six years after planting. In this plantation, farmers uproot the tree at the time of harvest, so that cereal crops can be grown for one or two years before the area is replanted with A. decurrens. The major purpose of the A. decurrens plantation is to generate income by selling the stand to charcoal producers or wholesalers. Some owners have recently started producing charcoal independently. The farmers are well aware of the multiple socioeconomic advantages of A. decurrens, compared to E. globulus, another tree species commonly planted in the Awi Zone of Amhara National Regional State (ANRS). The economic benefits of growing trees are reportedly higher than cultivating annual crops. Farmers were encouraged to plant A. decurrens due to: its fast growth; its use as fuel and construction wood; its wood is considered as good for charcoal making its leaves are used as animal fodder; and it reportedly improves soil fertility maintenance. Smallholder tree planting has provided occasional employment opportunities for jobless youths and women.

3.4.3. Major plantation constraints and proposed improvement measures

Major constraints of plantation forests have been identified and appropriate measures are

proposed to effectively scale up the selected plantation practices (Table 3).

Table 3. Major gaps identified in smallholder plantations and proposed improvement measures.

Gaps/constraints	Proposed measures
1. Silvicultural	
Poor seed and seedling quality	Use selected seed sources and improved seedling production techniques
Delays in making seeds available	Improve the tree seed collection, quality control and distribution system
Inadequate site preparation	Conduct timely and adequate site preparation
Poor planting technique and spacing	Use standard planting procedures (time of planting, pit size, removing polythene bags during planting) and appropriate spacing suitable to the plantation's objective
Poor post planting management	Conduct weeding, hoeing, and protect seedlings from grazing, fire, etc.
High dependence on single tree species	Introduce alternate and high value indigenous timber spp. and multipurpose tree species
Gaps/constraints	**Proposed measures**
Inadequate coppice management	Adopt an appropriate harvesting technique and coppice management
2. Economic	
Inadequate value addition	Improve small scale wood processing and product diversification
Poor marketing system	Provide market information and strengthen market linkages
Limited expansion of forest industries	Promote expansion of different forest product based industries
3. Environmental	
Discourage undergrowth	Use of wider spacing, appropriate thinning, pruning, etc. to allow undergrowth
Competition and shading on crop land	Buffer planting and introduce minimum distance from crop field
Adverse effect on natural resources	Avoid collection of leaves and bark from plantations and use wider spacing
Lack of knowledge on mixed plantation	Introduce alternative species that als meet producers' objectives
4. Institutional	
Insufficient extension and land administration service	Install better extension service system and implement proper land-use plan at local level and explore options to certify plantation forests to imrove tenure security
Inadequate institutional and policy support	Set clear objectives and management plans for plantations and through appropriate institutions enforce and support proper use and responsible management
Lack of skills and knowledge of experts at various level	Provide consecutive training to enhance capacity in planning, monitoring and evaluating

3.4.4 Strategies to promote smallholder plantations in the country

The team that evaluated management of plantations in Amhara Region concluded that the level of management of both smallholder woodlots and industrial plantaions managed by state owned enterprises leaves much to be desired. Improved practices are required to improve productivity for the benefits of all. Programs and projects that aim to promote smallholder plantations need to address the following strategic issues (Tadesse et al. 2015). These relate to silvicultural, economic and institutional factors.

(i) Silvicultural issues

The following are important silvicultural issues that should be addressed.

Use of selected seed sources and improved seedling production technique: A seed source is the stand of trees where seed is collected. A seed source can be single trees, a natural stand, a plantation or a seed production area or seed orchard. A seed source should yield sufficient quantity of good quality seed that matches the plantation site and purpose. This source will influence not only the volume to be obtained, but also its adaptation to the plantation site, plant health, type and rate of growth, wood quality, etc. In selecting the seed source, its uniformity and volume must be kept in mind, and the trees must have well-shaped trunks, good growth habits, and be in good health. The following are some suggestions for successful seed source establishment and quality seed production:

- Map, select and better manage seed sources from existing forests
- In establishing a seed orchard:
  - select phenotypically superior trees (plus trees) from natural forest or plantations
  - collect open pollinated seeds (cuttings) from the selected trees
  - raise seedlings or produce grafts or cuttings
  - establish and evaluate progeny test or establish clonal bank
  - establish seedling (clonal) seed orchard
  - sow recalcitrant seeds as soon as possible to avoid the problem of viability.
- Put in place proper quality seed supply system (i.e. seed storage, testing, labeling, and certification).
- All packed tree seeds should have information regarding origin, collection, handling and quality.
- Dedicated institution/center should be assigned to ensure tree seed quality control and put in place mechanisms of quarantine.
- Prepare national tree seed supply strategy and establish and support seed supplier cooperatives
- Support research on tree seeds and support seed research, certification, production and distribution networks

These details should be elaborated and presented in the form of a training manual to be used by regions.

Accessibility: Normally, easily accessible stands should be selected, to reduce the cost of management, inspection, and seed collection.

Stand management: The following preparations are normally undertaken in a stand that is going to become a seed stand:

- removal of minus trees to improve the genetic quality of the seed
- thinning to allow adequate space for flowering, fruiting and seed collection
- clearance of the undergrowth to facilitate seed inspection and collection
- demarcation of the stand, particularly when there are contamination problems
- apply treatments to increase production, such as pruning or application of fertilizers, and other treatments as found appropriate to protect fruiting, such as application of

fungicides and insecticides.

A record of all activities and treatments applied, phenological information, and information on seed harvesting should be kept.

Quality seedling production: A nursery is a place where seedlings are propagated, managed and grown to a plantable size. To ensure strong planting material, good nursery stock is essential. Seedling quality is often overlooked in tree cultivation for a number of reasons, including the farmers' lack of knowledge of the characteristics of a high quality seedling. Measures to improve seedling quality include:

- upgrading and standardizing the management of existing central nurseries (project and state owned)
- establishment of standard forest nurseries on strategic sites
- determining the type of species to be produced based on site conditions and objective
- diversifying seedlings to be produced (choice of species)
- preparing a nursery establishment and management package for farmers.

Improve site selection and preparation: Identifying a suitable site for planting is one of the determining factors in the success of a plantation. Commonly, site selection is carried out by different actors, including policymakers, foresters, and the community. Species site matching should be carried out based on the objective of the plantation. Owners must also make sure that the site for a commercial plantation is not severely degraded. Trees must be selected carefully to suit the climate, soil, topography, and the objective of the plantation. Site preparation activities (e.g. clearing, leveling, soil conservation, and water harvesting structure construction), should be carried out well in advance, prior to commencing tree planting. It is essential to carefully consider the layout and the density of initial planting.

Improve tree planting and post planting operations: It is important to critically consider when to start tree planting. Usually, planting starts as soon as a specified quantity of rain has fallen. Planting can commence when the soil is wet to a specified depth (approximately 20cm). Appropriate seedling handling, planting and tending operations (i.e. weeding and cultivation, beating up, thinning, pruning and coppice management) are also essential. Depending on the site condition, it may be necessary to protect the plantation from damage caused by fire, insects, disease, and animals.

Introduce alternate and high value tree/shrub spp.: Many reforestation programs have focused on the promotion of a few, well-known, exotic species. In Ethiopia, Eucalyptus spp., Cupressus lusitanica, Pinus patula, Greviliea robusta are among the widely used exotic tree species. Most of these species have fast growth rates and enable rapid economic return on reforestation, but they have some limitations. It is important to minimize dependency on a single species, so as to reduce the risks posed by biotic and abiotic agents. Therefore, it is important to introduce and promote alternative, fast-growing species in smallholder, communal and commercial plantations. Mixed plantations using alternate species should be promoted.

Adopt appropriate harvesting and coppice management techniques: In forest

plantations that are established for wood production, trees and shrubs are harvested once they reach the 'optimum size' that suits the end product. From a biological standpoint, trees and shrubs should not be cut until they have at least grown to the minimum size required for production. Beyond attaining the minimum size, the question of when to harvest must still be addressed. Product diversification and assortment, appropriate harvesting time and techniques; and improved coppice management should be taken into consideration.

Promote planting trees with annual and leguminous crops (Taungya system): With the appropriate management practices in place (e.g. spacing, harvesting and tending operations), some tree species could be planted with annual and leguminous crops until the tree canopy closes in areas where land scarcity is limiting tree growing by framers. A manual on the Taungya management system should be prepared. Other relevant measures include:

- introduce and adapt plantation forest management practices (from inside the country and from abroad)
- promote urban forestry
- encourage involvement of the private sector, and support investment in plantation forests and forest industries in the country (e.g. though guidelines, incentive mechanisms, technical support, market information, etc.)
- protect plantations and natural forests (e.g. from pests, diseases, fire, invasive species, parasitic plants, etc.).

(ii) Economic aspects

Value addition and product diversification: In order to increase the economic returns of forests, it is important to consider various value addition options. Some of the opportunities include: planting diversified species for product diversification; exploring value addition options; devising mechanisms to strengthen forest industries; and improving the technical skill of existing wood processing and manufacturing institutions. Income from forests could be maximized by increasing forest product assortment, and introducing technologies that facilitate product diversification (e.g. technology to harvest/produce bark for tannin, essential oils, timber, charcoal, etc.). These activities could be linked with research institutes and universities. In addition to this, it is important to provide training and logistical support on ways to add value (e.g. on wood processing). Facilitating access to finance (credit provision) could also help to strengthen and promote value addition practices. Some options include:

- developing a system for the capture and re-use of royalty fees
- increasing the number of actors in forest product marketing
- establishing community based institutions (e.g. Forest users, cooperatives, Private limited company,)
- promoting outgrower arrangements, and
- promoting sustainable finance sources (e.g. REDD+, CDM, etc.).

Promote the expansion of different forest product based industries: Promote different forest product based industries in areas where resources are available (e.g. furniture, chip wood, particle board, plywood, etc.).

Provide market information and strengthen market linkages: Tree growers commonly sell products individually or through middlemen, and prices are set by bargaining. In many cases, businessmen benefit more from this system than tree growers. To improve this situation, growers could be organized into producer co-ops. Assistance with identifying market chains, and establishing links between tree growers and processors, could also be provided. This could help to improve bargaining power and access to financial assistance (e.g. obtaining a loan from a revolving fund). Adequate financial resources allow producers to expand their market range as they can collectively transport their products to wider markets.

Enhance environmental sustainability: Expansion of eucalypts often creates conflict between neighboring tree planters and non-planters, because of the significant amount of shade they produce. Therefore, land owners adjacent to eucalypt plantations are often forced to plant Eucalyptus as well. Therefore, the following strategies should be implemented to enhance environmental sustainability, and reduce the reported negative effects of Eucalyptus expansion:

- promote cluster plantation
- encourage buffer planting and introduce minimum distance of trees from crop fields
- promote mixed plantations
- encourage the use of wider spacing
- implement proper land-use plans
- integrate with soil and water conservation structures.

(iii) Institutional aspects

A successful forest management system requires strong forestry intuitions, with clearly defined responsibilities, at regional, zonal, woreda and kebele levels. These institutions must strengthen the extension system, and implement appropriate policies and strategies. The following actions represent ways to strengthen the institutional framework:

- implement a strong organizational setup with clearly defined responsibilities and implement a proper land-use plan
- establish forestry extension service provision (by government organizations and NGOs)
- strengthen and set up community based forest institutions.
- strengthen law enforcement (i.e. local bylaws, national proclamations, policies and strategies)
- increase collaboration and coordination of partner institutions
- formulate and endorse regional forest directives
- build robust and efficient M&E systems
- strengthen research on forestry (e.g. choice of species)
- encourage private sector involvement in commercial forestry (e.g. incentives, demarcation of land for forestry investment, etc.).

3.5 Agroforestry

3.5.1 Introduction

Agroforestry (AF) is a combined land and forest management practice, which has the

potential to support sustainable development, improve the quality of life of rural communities, and reverse the process of environmental degradation (Nair et al. 2009). The ecological, economic, and social benefits of AF are well documented (Kang and Akinnifesi 2000; Neupane and Thapa 2000). Due to its various positive contributions, AF has been promoted as a viable land-use system in different parts of the world, particularly in developing countries. The environmental services provided by AF include in-situm biodiversity conservation and circa situm conservation, which is an approach to natural resource management advocated by the Convention on Biological Diversity (Méndez et al. 2010). Past and present evidence clearly indicates that AF, in addition to enhancing livelihood diversification, offers a number of ecosystem services and environmental benefits (Nair 1993; Nair et al. 2009). Examples throughout the tropics indicate that AF contributes to food and wood security, and biophysical sustainability. The increased plant and animal diversity within AF systems represent greater diversity of food, fuel, fodder, medicinal plants and income for smallholder farmers (Méndez et al. 2010). AF systems allow for a high level of progressive adaptation, through increasing structural and temporal diversity of the production system (Montagnin and Nair 2004).

AF systems improve the resilience of smallholder production systems to climate variability by buffering crops from the effects of temperature and precipitation variation, as well as strong winds associated with storms. Diversity in AF systems can enhance soil conservation and nutrient cycling, reduce pest incidence and increase resistance to diseases (Beer et al. 1998). In addition, AF systems reduce the outward flux of CO2, N2O, and CH4, and thus represent a potential long term GHG sink (Verchot et al. 2007). For smallholder AF in the tropics, potential carbon sequestration rates range from 1.5 to 3.5 Mg C ha-1 yr-1 (Montagnini and Nair 2004). At prices of USD 100 per Mg C, AF systems have the potential to raise the incomes of farmers by up to 15% (Antle et al. 2007). For these reasons, AF systems may prove to be a valuable component of agricultural adaptation for smallholder farmers, and provide greenhouse gas sequestration opportunities at the national level. Studies in the SNNPRS support these findings (See: Tasfay 2011; Molla 2012; Mezgebo et al. 2013; Negash, 2013; Kebede et al. 2014).

3.5.2 Selected AF management practices

A detailed study was conducted to identify effective AF practices and assess their impacts on livelihoods and on the environment in the SNNPRS (Asfaw et al. 2015). Initially, candidate AF practices/sites were identified from the highlands, mid-altitude and lowland areas of the region. Each of the candidate practices were then evaluated and prioritized based on agreed criteria (i.e. economic sustainability, environmental sustainability, social acceptability and biodiversity conservation). Based on the outcomes of the evaluation using these criteria, the following practices were selected as effective practices to be scaled up:

(a) Apple-bamboo based AF system in Teticha Kebele, Hula Woreda in the Sidama Zone

For many years, farmers in this area have promoted plant diversity through the integration of woody species. The species richness of the AF on this plantation was high,

with 12 species of annual crops, 14 species of trees/shrubs, in addition to some species of livestock. The species richness of this apple and bamboo based AF initiative is a clear indication of the diversity of functions that this AF system provides for the household. Apples and vegetables were introduced recently. The apple component of the AF system reportedly contributes 60% of the household's annual cash income. This illustrates the significant contribution of fruit trees, not only to household food security, but also to the cash needs of households, to cover the costs of school, clothes, and medical bills, etc.

(b) Coffee-fruit tree-enset based AF system at Chichu Kebelle in Dila Zuria Woreda in the Gedeo Zone

This AF system was composed of multipurpose tree/shrub species, coffee, enset, fruits, grains, vegetables, medicinal plants and animals. A total of 48 plant species were recorded. On average, approximately four to six plant species are used for consumption or sale during a given season; these contribute to household income and dietary diversification. Fruit trees and coffee account for 47% and 45% of the household's annual cash income. Communities also produce all of their own wood for their energy needs.

(c) Moringa-based AF system in Gocha Kebele, Konso Woreda in the Segen Hizboch Zone

This moringa AF system included diverse crop species, including 13 species of annual crops, 19 tree species, and five species of livestock. Moringa stenopetala provides green leaves throughout the year that are rich in vitamins. The leaves are regularly consumed and marketed, generating regular income for farmers. As a source of food and cash, moringa plays an important role in sustaining the livelihoods of the Konso communities residing in dry areas of southern Ethiopia. Terminalia browenii is another key tree species that provides livestock fodder, and wood for construction and fuelwood. The wood also represents a source of income. The research team based in this region estimated that this moringa-based AF system generates approximately ETB 25,466 per year, per farm. This is more than three times higher than households practicing monoculture, which generate approximately ETB 7,895.

3.5.3. Suggested improvement measures

a. Apple-bamboo based AF system in Hula

The following improvement measures were identified by the team (Asfaw et al. 2015), and were positively evaluated by regional experts and the farmers managing these systems:

i. introduce improved varieties of bamboo, apple and other species of the AF system
ii. develop appropriate silvicultural management and harvesting methods for apple, bamboo and other components of the AF system, to enhance overall productivity. Build mechanisms to ensure the sustainable supply of improved planting materials, adjust culm age structure of bamboo stands, and use appropriate processing technologies
iii. manage spatial and temporal arrangement of AF components, to enhance complementarity and the overall productivity of the farm (i.e. land and labour)
iv. enhance product and market development with emphasis on market linkages and value chain development.

b. Coffee-fruit tree-enset based AF system in Dila Zuria (for moist, midland agro-ecology)
For this AF system, the following improvement mesures were proposed by the team and endorsed by farmers:

i. introduce improved germplasm of different species for greater quality and yield
ii. apply appropriate management and harvesting methods (including Integrated Pest Management; canopy management; planting patterns; and the incorporation of other shade-loving root crops, vegetables, and spices)
iii. improve market linkages through value addition and product and market development.

(c) Moringa-based AF system in Konso
Recommended improvement measures include:

i. introduce improved germplasm of different species of crops and tress
ii. introduce/promote suitable multipurpose trees/shrubs (e.g. Azadirachta indica),
iii. promote pigeon pea and cassava production and beekeeping
iv. apply appropriate management and optimum harvesting intensity for moringa leaves
v. increase the density of moringa to at least 10% of canopy cover
vi. apply optimum harvesting intensity of Terminalia, for optimum leaf and wood production
vii. improve market linkages through value addition and product and market development.

(d) Failherbia alibida based AF in the dry midlands
This AF practice was not evaluated by the research team. However, the SNNPRS is interested in scaling up AF systems in the dry midlands. The recommended improvement measure is to plant trees with spacing of 10m x 10m. Researchers should test and validate this.

4. IMPLEMENTING THE STRATGEY: SCALING UP SELECTED PRACTICES

4.1. Strategic directions

This strategy presents suggestions for scaling up recommended practices in Ethiopia. All of the proposed management practices for the sustainable management of area exclosures, plantations, AF systems, forests and woodlands, have been assessed to be economically viable and ecologically sustainable. Limitations of the selected practices have been identified and improvement measures have been suggested to further enhance their economic and environmental benefits. Scaling up is expected to be undertaken once these improvement measures have been incorporated. The selected practices should be scaled up in appropriate areas/domains. Each practice needs to have a clearly defined scaling up plan, including strategies for forest management, product harvesting and marketing.

Scaling up the proposed measures requires the identification of strategic directions that are specific to the types of practices proposed. Table 4 presents strategic directions that need to be considered in scaling up the proposed forest management practices.

Table 4. Strategic directions for scaling up the selected forest management practices.

Forest management	Suggested strategic directions
Exclosures	• Actively engage communities in setting short, medium and long-term objectives (socioeconomic and ecological) of establishing and managing area exclosures
	• Identify and demarcate areas for area exclosure with the active participation of local administration and communities and explore options to create connectivity of sites to better achieve conservation goals
	• Explore opportunities for maximizing overall productivity and economic returns of area exclosures for communities
	• Identify and carry out effective and economically efficient methods of speeding up the rehabilitation of area ex-closures (e.g. through constructing soil and water conservation structures to enhance natural regeneration; sowing of selected grass and other useful trees, shrubs and grass species, etc.) and make area exclosures better respond to community needs
	• Promote participatory approaches to the protection and implementation of rehabilitation activities in area exclosures
	• Explore options to better engage organized community groups (e.g. poor women, landless youth, marginalized groups, etc.) in the establishment, management and sustainable use of area exclosures.
PFM	• Use PFM to build fair partnerships between the state and local people/communities o Actively engage communities during the initiation and establishment of PFM, to ensure active and inclusive participation, so that people understand the consequences of their choices (risks and opportunities), and are willing to commit themselves and share the costs and benefits of their decisions o Ensure that social capital within communities is an essential aftereffect of the participation process o Improve the capacity of local people in the protection, M&E of forests.

Forest management	Suggested strategic directions
PFM	• Strengthen PFM as a strategy for local development and sustainable forest management o PFM should not only be about the protection of existing forests. Objectives should also include increasing forest based benefits to communities. Management plans should then be prepared jointly with communities. Discussions and negotiations should be transparent and inclusive and should focus on objectives, management plans as well as responsibility and benefit sharing arrangements. o Strengthen the capacity of local people to function as independent forest managers, and to operate forest production activities profitably, by incorporating traditional knowledge with scientific forest management o Support the development of forest-based, small-scale enterprises to diversify products, and link them with forest managers and domestic and international markets o Explore opportunities for forest custodians to benefit from payments for ecosystems services such as carbon payments, watershed services, eco-tourism, etc.
	• Improve communication between major stakeholders in PFM, to build mutual trust and transparency, by training both forest experts and community members in communication and social facilitation skills
	• Strengthen the capacities of women and marginalized groups by organizing them into appropriate CBOs for effective participation in PFM
	• Foster an environment of learning-by-doing, by designing and implementing PFM with action research, to build capacity in terms of institutions, organizational set up, conflict management, forest protection and management, and product marketing
	• Undertake research to identify appropriate institutional and organizational structures, to reconcile the goals of: biodiversity conservation; livelihood improvement; sustainable forest management under different biophysical and socioeconomic conditions; and more equitable responsibility and benefit sharing mechanisms
Managing dry forests and woodlands	• Strengthen research: o To improve natural regeneration and productivity of dryland forests and woodlands, o To document and validate traditional knowledge on the management and use of dry forests and woodlands o To assess the merits and limitations of current dry forests and woodlands management practices, and the extraction and marketing of products such as bamboo, gum and resin o To assess the status of woodland resources, problems related to tenure, the management and utilization of woodlands and their environmental and socioeconomic impacts, in order to devise options for responsible management and sustainable use
	• Devise economically efficient techniques for controlling the expansion of undesirable vegetation (e.g. bush expansion on wooded grasslands) and to control invasive species
	• Better coordinate and lead the efforts of national and international NGOs, as well as government owned and private enterprises engaged in managing these resources, or supporting communities using these resources
	• Build the capacity of CBOs to play more proactive roles in managing and using dry forests and woodland resources
	• Support the efforts of actors (communities, enterprises, etc.) in diversifying products and incomes from forests
	• Improve the productivity and value of dryland forests and woodlands through improved management practices, sustainable production and marketing of products and services, and where appropriate, introducing ecotourism and other livelihood options
Promoting plantation forests	• Identify and map areas suited for various types of plantation forests, and make this information available, to encourage the private sector to engage in plantation forestry
	• Identify areas suitable for different trees to support efforts to improve site-species matching
	• Strengthen and support tree planting initiatives by GOs and NGOs in appropriate places

Forest management	Suggested strategic directions
Promoting plantation forests	• Support afforestation and reforestation schemes on degraded lands, with clearly defined objectives and management and ownership rights, and a focus on organized groups (e.g. poor women, landless peoples and unemployed youth, etc.)
	• Promote joint ventures between state enterprises or private, large-scale plantation forest developers and local communities – e.g. by implementing outgrower schemes that could synergistically combine the comparative advantages of different actors, in terms of land, labour, capital, technology and access to markets
	• Encourage tree planting by smallholders (e.g. in woodlots, farm boundaries, and homesteads; along roadsides; on hillsides; as trees on-farm, etc.) to meet the subsistence needs of households and market demands
	• Encourage the formation of small-scale forest enterprises by trained youth, in the areas of seed and seedling production, logging, plantation management, forest protection, etc., so that some of the activities of plantation forests can be outsourced to: create employment opportunities; improve the quality of work accomplished; and ensure that inputs used and outputs produced meet expected forestry standards
	• Develop guidelines and standards for plantation forest operations and processing, and the handling and marketing of forest products
Promoting agro-forestry systems	• Build mechanisms to evaluate the resource base, so that changes in cover and quality, and major drivers and impacts might be detected
	• Regularly update criteria and indicators and continue to select examples of good practice for scaling up, in light of the forestry sector's developmental goals and the evolving needs of communities
	• develop a comprehensive plan for scaling up, and a detailed implementation manual for scaling up effective AF practices
	• Strengthen AF research on: the domestication of plants; the selection and introduction of high value tree and shrub species and varieties; component interaction management; value chain development of AF products; and opportunities to maximize the flow of agroecosystem services from AF systems
	• Ensure the sustainable supply of good quality germplasm by supporting the establishment of community nurseries
	• Build mechanisms to enhance quality control of AF products and marketing
	• Strengthen the animal feed component of AF by smallholders
	• Since AF increases food production whilst mitigating the effects of climate change, develop initiatives to recognize smallholders that develop more competitive AF systems with better livelihood and environmental outcomes

4.2 Preparing operational plans

In view of the strategic directions that should be followed, a long-term strategic plan for scaling up should be developed. This should be followed by the preparation of a detailed operational plan that sets goals, and describes in detail, the main activities to be undertaken in a given period. The operational plan should clearly identify activities to be performed for each of the selected practices to be scaled up, indicating where the activities will take place, how they will be carried out and the people or organizations responsible for each activity. The operational plan should be based on the national objectives of the forest sector, and must be consistent with national and regional development plans.

Though the lead and coordination role will be played by , the operational plan for each of the selected practices in the regional states should be developed by the bureau or agency responsible for the forest sector in each of the regions in consultation with

relevant stakeholders (i.e. local communities, NGOs, and the). Each bureau will define short and long-term objectives. The planning should start at the lowest level of the organizational structure, by actively engaging the community. There should be a M&E plan that serves as a learning and communication tool between actors at various levels. It should also ensure the engagement of key stakeholders and promote cross-sectoral links. Cross-sectoral collaboration should start with the establishment of an inter-sectoral steering committee, mandated to oversee regional scaling up processes and outcomes. Higher education institutions, research institutes and other sectors (e.g. agriculture, energy, water, cooperatives, tourism, and transport, etc.) should be invited to take part in the planning and evaluation stages of the scaling up program. A strong and direct link with the federal is important. This enables the region to benefit from technical and financial support from the Ministry, through its various partnerships with local and international partners.

4.3. Addressing organizational, financial and human resources requirements

The scaling up of effective forest management practices can be achieved if supported by an adequate institutional framework that: ensures monitoring and service provision down to the grassroots level; is staffed with capable experts; and has an adequate budget to accomplish planned tasks.

Institutional setting. An effective institutional framework is required to: promote sustainable forest management; curb deforestation; enhance the environmental role of forests; and improve the contribution of forests and forest resources to the local and national economy. Implementing a capable and well-resourced institutional setting is critically important to ensuring the effective implementation of this scaling-up strategy. The mandated regional bureau should form a committee of senior experts from the fields of forestry, soil and water conservation, marketing and environmental law, to address the issues of forest extension and technology dissemination. The regional forest extension and technology dissemination committee should coordinate and support all initiatives at different levels. In particular, this committee should establish strong links with federal and regional research centers, and higher education institutions working in the field of forestry. The link should also serve as a platform, where feedback on disseminated technologies can be evaluated and used to define future research agendas. Similarly, institutions should be established at zone and woreda levels. The function and size of these institutions should be determined according to the needs of the region, and should be appropriate to the type and quantity of the resource base. Structures at the woreda level should provide regular support to interventions in kebeles. They should also actively monitor and evaluate performances of lower bodies in the structure based on the M&E framework to be determined at the regional level. The structure at the zone level should mainly focus on supporting, coordinating and monitoring interventions spanning two or more woredas. Both the zone and woreda level experts should take an active role in long and short-term planning of this scaling up strategy.

Financial and logistical resources. Scaling up forest management practices takes many years. Therefore, a realistic assessment must be made to estimate the cost of scaling up,

potential for cost recovery, affordability, and willingness to pay (Hartmann and Linn 2008). The extent to which financial resources are available to sustain and scale up successful interventions tested at project level, needs to be examined from the outset. Financial resources must be mobilized to scale up effective forest management practices. The following strategies could minimize costs of scaling up:

- Mainstreaming and aligning the scaling up operations of selected forest management practices with already operational development activities with complementary goals, such as sustainable land management, soil and water conservation, food security, and biodiversity conservation.
- Training extension agents in facilitation skills to help them play meaningful role in engaging communities
- Cost sharing with major beneficiaries of forest resources
- Encouraging the private sector/businesses and forest related enterprises (e.g. wood-based factories, pulp mills, large furniture producers, etc.) to play roles in improving market linkages, and capacity building, etc.. Lessons might also be drawn from the experiences of countries such as India and South Africa
- Creating special funds to support national scaling up programs and projects (e.g. royalty fees, PES, etc.)

Capable staff. Forest institutions need to be adequately staffed with skilled professionals that are able to design and implement tasks related to the scaling up of good forest management practices. A training plan should be developed for employees of forest institutions, to better equip them with the knowledge and skills they need to carry out their responsibilities.

4.4 Implementation arrangements and coordination: identifying key actors and negotiating roles

The national strategy for scaling up effective forest management practices will involve a number of actors: national and regional governments, zonal and district administration offices, non-governmental organizations (NGOs), cooperatives, civil society, the private sector, donors, and most importantly, communities and their organizations. All have important roles to play. Therefore, to ensure that scaling-up plans and programs are successful, multi-stakeholder alliances and effective coordination are essential. The federal will coordinate and support the activities of all institutions that have a stake in the promotion and development of the forestry sector in Ethiopia, to ensure that all these actors work for the common good, and deliver services in a complementary manner and without duplication.

4.4.1. The role of the state

In scaling up effective forest management practices, state agencies at different levels (i.e. federal ministry, regional bureaus, zonal, district and kebele level offices) must perform the following roles:

- increase public awareness of the need for sustainable forest management
- locate, demarcate and administer access to, and use of, forests and forest lands
- ensure adequate legal and policy frameworks for the responsible management and sustainable use of all forms of forests (e.g. afromontane, rainforest, dry forest),

plantations, agroforests, woodlands and rehabilitated landscapes
- create incentives for, and ensure the active participation of, communities and the private sector in the establishment, management, use and protection of forests
- develop research to generate information that will inform decisions and improve policy and practice in: forest management and use; and product harvesting, processing, handling and marketing
- support market and product development, as well as the diversification of forest and tree products, to enhance the economic role of forests
- develop, coordinate and allocate a budget for extension package development.
- set up an effective M&E system for scaling up programs and projects
- build capacity (e.g. training, technical backstopping, and skills up grading) of all stakeholders to raise forest management to an international standard, through formal training and on-the-job tailored training.

There are a number of regional bureaus and offices that make decisions on access to, use and management of forests, as well as the marketing of tree and forest products. The following table lists the types of roles that governmental institutions could play in scaling up selected forest management practices. Please note that neither the list of stakeholders indicated below, nor their proposed responsibilities, are comprehensive. Thus, the list should be updated and refined accordingly.

Table 6. The role of actors for implementing the strategy in the different regional states.

Actor	Role in forest management practice
Bureaus of Agriculture or designated bureau in charge of the forestry sector	• Provide political support and oversee the implementation of the legal framework for responsible access to and use of forests, particularly those crossing the boundaries of zones and regions • Capacity building (e.g. technical, facility) of stakeholders • Awareness raising to promote AF practice and identify potential areas for scaling up • Technology procurement and introduction (from seeds and other inputs, to technologies related to value addition) • Technical support (e.g. management plan, project development, etc.) • Ensure that legal and institutional frameworks governing access to and use of forests (e.g. their development, protection and conservation) are implemented and reviewed as necessary • Monitor and evaluate the implementation and impacts of introduced or scaled up practices • Identify gaps and suggest improvement measures for the adoption and wider use of selected practices • Provide guidelines for the establishment and development of plantation forests • Provide guidelines for the selection, management use and ownership rights of exclosures • Provide legal support to ensure a smooth process in the transport and marketing of forest and tree products, while also introducing mechanisms to discourage the illegal trade of timber and other forests products • Ensure the active participation of communities, including in matters such as site selection, boundary demarcation, objective setting, mechanisms for responsibility and benefit sharing, and conflict management • Facilitate forest custodians' access to climate finance and forest product and services markets

Actor	Role in forest management practice
Bureau of Environmental Protection and Land Administration and Use	• Identify, locate and demarcate forests, woodlands and lands appropriate for plantation development • Provide forest land-use certificates for private and communal, natural and planted forests • Ensure that forests and forestlands are managed sustainability • Support monitoring and reporting to facilitate access to climate funds • Monitor and evaluate practice using criteria and indicators to assess sustainability
Bureau of Environmental Protection and Land Administration and Use	• Develop legal framework to adapt co-ops to responsibly use forests and market products • Establish and certify cooperatives involved in PFM and other forest management practices and in forest/tree product collection, value addition and marketing • Support cooperatives and recognize/incentivize successful ones • Build capacity in business and personnel management • Support co-op's access to credit and links with markets • Help with financial auditing and in setting up an effective benefit sharing mechanism
	• Provide political support and oversee the implementation of a legal framework ensuring responsible access to, and use of, forests, particularly those crossing district boundaries • Ensure that the relevant district offices and other interested stakeholders work closely with, and empower, communities in forest management and use, by identifying opportunities, setting objectives and management plans, and enforcing local bylaws • Provide a supportive role in managing and resolving conflicts timely and efficiently
	• Procure and adapt available technologies and management practices • Generate new innovations (e.g. technologies, institutional and management innovations) through research • Build capacity (through a training and advisory service) • Provide technical support in program/project planning, implementation, M&E and impact assessment
	• Raise awareness about the legal framework • Enforce legal framework • Provide adequate legal protection for cooperatives and forests
	• Establish and certify enterprises • Build capacity in business management, value addition and marketing • Facilitate access to credit and markets
	• Ensure that the proper consultations with relevant bureaus have been held, and that a thorough environmental impact assessment report has been completed before issuing an investment license • Issue investment licenses

4.4.2. The role of non-state actors

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

- Local communities and their organizations (e.g. CBOs, cooperatives, etc.) should:
  - actively participate in forest development plans and in making critical decisions (e.g. on boundaries, beneficiaries, long and short term objectives, use and management plans)
  - put in place and enforce bylaws
  - implement the forest management plan to achieve its conservation and economic objectives

- take part in Forest Resource Assessment to provide a baseline, and monitor changes over time
- organize themselves (e.g. into cooperatives) to increase bargaining power and better benefit from market opportunities
- resolve conflicts between members within forest management group/ cooperatives, and between members and non-members, etc.

- The private sector can play important role in:
  - creating a market for forest products
  - developing products and creating employment opportunities
  - transferring knowledge and skills, as well as market information.
- NGOs and civil societies can play significant roles in:
  - organizing local people into cooperatives
  - building local capacity (by providing technical training and infrastructural support – e.g. offices, stores, budget, etc., and by building human capital through training), further consolidating the strategy, and supporting its realization through funding certain activities
  - acting as a watchdog/whistleblower if: rules are not respected, community rights are not protected, or forests are poorly managed, etc.

4.5. Identifying potential risks and mitigation measures

There are specific risks related to each of the forest management practices proposed for scaling up. This section considers the risks that apply to most of the forests management practices recommended. These risks include:

- reluctance of government authorities to progressively devolve forest and woodland management rights, and associated decision making powers, to lower level government structures, and to the local communities using the resources
- inadequate participation of communities in the sustainable management of the forest resources
- low levels of income earned from forests that may not create economic incentives for resource managers to sustainably manage forest and woodlands
- resistance to change, in terms of the management of forest resources for multiple objectives, at all levels of government and local community
- the Forest Policy and regulations, and other relevant policies, may not be fully implemented
- government officials and experts undermine communities' ability to sustainably manage forest resources
- conflicts of interest between members and non-members of the cooperatives.

Table 7 lists these risks and the proposed measures to mitigate them

Table 7. Risks and proposed mitigation measures for scaling up effective forest management practices

Anticipated risks	Mitigation measures proposed
Lack of strong regional forestry institution	Engage with regional decision makers to establish dedicated and resourced regional institution
Land-use plan and enforcement related challenges	Relevant institutions need to be part of the planning and implementation of the scaling-up
Lack of skilled and motivated personnel	Organize training opportunities at different levels
Lack of capacity among enterprises to add value to products and establish market linkages	Non-state partners interested in this intervention will be encouraged to assist
Unmotivated private sector, communities and other stakeholders for sustainable forest management	Undertake systematic awareness raising mechanism. The development units at grassroots level started by the government, should be built on and used effectively for forest management
Little or no emphasis on assessing impacts of development interventions on the environment (e.g. on biodiversity)	Environmental impact assessments to be systematically conducted to minimize negative impacts
Lack of equitable responsibility and benefit sharing mechanisms	Transparent and participatory responsibility and benefit sharing mechanisms need to be developed, agreed upon, and implemented
Climate variability and change	Strengthen capacity for forecasting and improve the communication of these to users, to help them to plan and implement preventive measures ahead of time
Reluctance of government authorities to progressively devolve forest and woodlands use and management rights, and associated decision making powers, to lower level government structures and to local people/resource users	Provide evidence and conducive conditions to make communities interested in sustainable forest management Educate by building on successful experiences
Inadequate participation of communities in sustainable management of the forest resources	Put mechanism in place to ensure active community participation
Low level of income earned from forests that may not create economic incentives for resource managers to sustainably manage forests and woodlands	Diversify and improve quality and quantity of products
The Forest Policy and regulations, and other relevant policies, may not be fully implemented.	Follow up their implementation with all stakeholders
Resistance to change, in terms of the management of forest resources for multiple objectives, by all levels of government and local communities	Increase awareness and also enhance productivity of forests
Conflicts of interest between members and non-members of forest user cooperatives, and among various segments of rural communities	Put conflict resolution mechanism in place Build capacities of all actors in conflict resolution and encourage traditional conflict resolution mechanisms in the meantime
Limited political and international support for the forestry sector	Establish forest fund to self-finance the forestry sector, and encourage investment by implementing conducive policies and legal instruments.
Conflicts between representatives of CBOs and members regarding the enforcement of bylaws, and agreed responsibility and benefit sharing arrangements	Develop the negotiating power of community representatives and support the enforcement of agreed arrangements between parties
Weak inter-sectoral coordination in planning, implementation, monitoring and evaluation	Establish and strengthen inter-sectoral links in planning, implementation, monitoring and evaluation, by actively involving stakeholders from various sectors.

4.6. Monitoring, evaluation, reporting and improvement strategy

Identifying and scaling up effective forest management practices requires thorough planning, responsible implementation and balanced evaluation, by involving both government organizations and resource users, notably local communities. A detailed framework for the monitoring and evaluation of scaling-up interventions should be designed during the planning phase. M&E should be based on objectively verifiable variables and indicators to assess scaling up progress and impacts. Indicators showing changes in income, livelihoods and environmental wellbeing should be included. The M&E framework should indicate not only key activities and performance indicators, but also the means of verification, how often data is collected, and who is responsible for data collection, analysis, reporting and documentation. At the community level, CBOs such as forest user groups or cooperatives should play a role in planning, implementing and evaluating scaling up programs and projects.

At the government level, the mandated Bureau (of Agriculture or Forests), should be responsible for planning, implementation, monitoring and evaluation of the scaling up plan. It is the duty of both the (for national level M&E) and the mandated regional bureau (for regional level M&E) to continuously assess the progress of planned activities in the scaling up program/project, using monitoring indicators. The monitoring process requires the collection and analysis of data, which serve as a guide to decide whether the pace and direction of implementation are appropriate, or if corrective actions are needed. It is therefore necessary that relevant regional bureaus coordinate their activities to ensure that various departments share information, experiences and work towards a shared vision.

A dedicated unit composed of well trained professionals must be established to ensure independent M&E.The unit should develop a sound M&E plan. The details will vary depending on the type of forest management practice in place, and the scope and dimension of the scaling up program. As far as possible, M&E should be participatory, and should include field visits to assess impacts on livelihoods and forests. The outcome of the review should be used to develop improvement measures for forest management practices.

Reporting should focus on recording progress against initial plans, and documenting the lessons learnt in the scaling up of the proposed forest management practices. Reporting tasks should be periodic, with greater reporting frequencies at lower levels. The following reporting schedule is proposed:

- quarterly progress reports from community based organizations (e.g. cooperatives) and the respective district offices (e.g. of forest/agriculture, of cooperatives)
- quarterly review and progress reports from zonal offices to regional bureaus
- six-monthly review and progress report from regional bureaus to the
- annual national review and progress report by to higher levels of government and donors
- terminal report at the end of each scaling up project by woreda, zone and regional offices
- update of the regional and national databases on forests and the forestry sector every

five years.

Reporting should be managed by the lead implementing institution. If certain activities are implemented by stakeholders, they should also submit quarterly reports to the lead implementing institution for consolidation. The consolidated progress report will be submitted to the regional bureau/agency, which will objectively and critically evaluate performance and make recommendations. A reporting channel between all levels, from kebelles to regions and the , needs to be developed. Reporting will mainly focus on: major targets; achievements; challenges faced and measures taken; lessons learnt; and improvement measures and procedures suggested.

On receipt of these reports, the should review them and provide feedback and technical support for planning and evaluation. The may intervene in areas where a region is lacking in capacity. In addition to this, the will be responsible for: providing overall guidance and supervision; securing and channeling financial resources from donors and development partners; facilitating cross-regional, experience sharing events; and coordinating cross-regional matters. An independent team, composed of senior experts from relevant federal and regional institutions, should evaluate completed interventions, and submit a report to the and regional bureaus. Feedback will accordingly be communicated to lower level government structures involved in implementation.

5. THE NEXT STEPS: ISSUES REQUIRING ATTENTION AT THE NATIONAL LEVEL

Climate change has become a major global issue in recent years. Countries have to come up with different strategies to adapt to, and mitigate, climate change. Some of the viable approaches to mitigating and adapting to climate change in Ethiopia include managing existing natural forests and woodlands, and rehabilitating degraded lands. Selecting and scaling-up effective forest management practices represents a possible way of enhancing: forest development, local livelihoods, the national economy, and the resilience of socioecological systems and forests to climate variability and change. This strategy focuses on effective practices in: the management of ex-closures, PFM, smallholder plantations, AF, and the management of dry forests and woodlands. The strategy aims to support national efforts to improve the management of the forest sector, so as to meet the targets set out in CRGE, GTP II, REDD+, and other international pledges and agreements. The strategy is based on findings from Tigray, Amhara, Oromia, Benishangul Gumuz and SNNPRS. . Further research is required to examine and identify effective forest management practices in other regions. This report has laid down the methodological foundations required to do so. There are few key issues that require attention at the national level:

The need for a full-fledged forestry sector development strategy: A national forestry sector development strategy is required to enhance the forest sector's contributions to: livelihoods, GDP, climate change adaptation and mitigation, watershed management and hydrological systems. A full-fledged forest sector review should be undertaken, and the strategy should be informed by a national forest sector development plan. Likewise, regions should develop their own regional forest sector development plans, based on the national example, but tailored to fit regional contexts and meet regional needs. The following actions would support the implementation of a national forest sector development strategy:

- integrate and align forest development plan with country's development plan
- significantly increase forests' potential to promote poverty reduction by improving productivity and sustainable resource use
- decentralize resource administration by granting decision making powers to the lowest levels of government
- clarify ownership issues and make sure that each piece of forest and forest land is registered and certified with a particular owner
- implement and enforce legislation on the protection of critical biodiversity and environmental service areas
- scale up PFM practices, with the intention of empowering communities to become owners of forests that are best managed by communities knowing that certain forests such as protection forests will continue to be managed by the state
- based on scientific projections, predict the type and amount of wood required for at least the next 25 years
- work closely with relevant authorities on land-use planning and land administration, to improve the identification, demarcation and governance of forest and forest lands
- engage other sectors (e.g. agriculture), and agree on the proportion of farmland which

shall be under permanent forest/tree cover, particularly on commercial farms
- encourage the use of improved technologies (e.g. in logging, charcoal making, honey processing, spice extraction, gum and resin collection and value addition)
- conduct periodic evaluation of forest and other sector policies and legal frameworks to: reflect changes, avoid a disconnect between policy and practice, and identify inadequacies and contradictions
- diversify and develop funding sources for the forestry sector, including from forest industries
- establish a national forest database center and equivalent structure/unit at the regional level
- provide policy guidance to determine the directions, type and quality of forestry research and education
- provide incentives for those engaged in managing forests and adding value to forest products (e.g. land grants, loan, technical and administrative support, etc.);

Institutional arrangement: A national strategy to scale up effective practices can only be successful with the establishment of full-fledged, regional forestry institutions. Thus, the should lobby for, and support, regional governments in the establishment and financing of such institutions, from regional to district levels.

Work with research institutions: Forest management practices should only be scaled up in areas where the ecological, social and economic context is similar to the areas where the practice was proven to work. Scaling up in new areas must be supported with research. Before implementing the proposed practice in a new area, the existing resource base, socioeconomic context, agro-ecological zone, and location of the area should be reviewed. Proposed locations also require institutions with sufficient financial and human capacity, and a market for any new products should be identified. Variations in the enforcement of existing policies and legal frameworks may affect the effectiveness of scaled up interventions. National level selection of practices for scaling-up should take these factors into account. Depending on the outcome of the assessment, appropriate amendments may be required before the selected practices are scaled up.

Build on experiences: National level schemes should make provisions for the exchange of experiences and lessons between regions on the scaling up of effective practices. Practices from other countries should also be identified, tested/adapted, verified at local levels, and if effective, disseminated. The should lead efforts to continuously select, test and promote effective innovations, and review and refine its scaling-up strategy. Selected practices should be customized to suit to the socioeconomic, environmental and political contexts of the areas where the innovations will be introduced. The should strengthen its capacity to actively support regional forestry institutions (e.g. research, extension, industry). In this regard, developing regions should be given priority. In addition, the should work to establish global partnerships, in order to mobilize financial and technical support. More importantly, the should work closely with, and support, industries that create market opportunities for forest products. This, in turn, will encourage communities and the private sector to take an active involvement in forestry.
Address the protection of forests: The protection of forests should be given

priority, and strong surveillance is required to detect incidences of pests, diseases, alien species, and fire, all of which pose significant challenges to Ethiopia's forestry sector. This is particularly true in areas where dry forests are important and plantations are expanding.

Supporting forest/tree product and market development: Tree and forest products, as well as their markets, are underdeveloped. The state needs to play a more proactive and supportive role in forest/tree product and market development until there is greater private sector involvement.

Supporting forest enterprises and industries: Though small and medium, wood based enterprises are growing in importance, they need to expand further. Studies should be conducted to: identify their limitations; develop measures to support their growth; and identify links with producers.

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