

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

**Strategy for scaling up effective forest management practices in Southern Nations, Nationalities and Peoples Regional State with an emphasis on agroforestry**



Center for International Forestry Research  
Ethiopia Office  
Addis Ababa  
October 2015



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

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

**Strategy for scaling up effective forest management  
practices in Southern Nations, Nationalities and  
Peoples Regional State with an emphasis on agroforestry**

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October 2015

## FOREWORD

This regional strategy document for scaling up of effective forest management practices in Southern Nations, Nationalities and Peoples National Regional State (SNNPRS) with an emphasis on agroforestry was produced as one of the outputs of a project known as Enhancing the Role of Forestry in Ethiopia's Climate Resilient Green Economy that 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 up to enhance the role of forests in building a climate resilient green economy in Ethiopia. The five forest management practices studied were area enclosure establishment and management, smallholder plantation forest management, participatory forest management, agroforestry and the management of dry forests and woodlands. Each team focused on one of the five forest management practices and concentrated its study in one of the regional states of the country.

Accordingly, the team that studied agroforestry practices focused on SNNPRS. Others who were examining practices in PFM, smallholder plantations, enclosure, and management of dry forests and woodlands worked in Oromia, in Amhara, in Tigray and in Benishangul Gumuz regional states, respectively. The five teams regularly met and exchanged their findings. As a result, the findings of all teams were used in the preparation of this strategy although agroforestry was a focus area. The engagement of senior experts and researchers from the region ensured that the document was more relevant to the region as well as creating opportunities in building the capacity of all staff involved in the process. The draft document was presented and discussed at various workshops and was assessed and endorsed by the respective regional authorities.

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

## Enhancing the role of the forestry sector in Ethiopia

On behalf of the Ministry of Environment and Forest, I would like to thank all of the team members and their respective institutions for their contribution. I am particularly grateful to CIFOR for initiating and implementing this joint project that played an important role not only in filling in information gaps but also in building capacity at different levels. I would also like to thank the Strategic Climate Institutions Program (SCIP) for funding the project. As SCIP is financed by the Governments of UK, Norway and Denmark, I would like to extend my appreciation to the peoples and governments of the three countries for their support.

Ato Kebede Yimam

State Minister of the Forest Sector, Ministry of Environment, Forest and climate Change,  
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Addis Ababa

15 October 2015

## FOREWORD

The Southern Nations, Nationalities and Peoples Regional State (SNNPRS) is endowed with natural resources among which natural and plantation forests and agroforests constitute the major proportion. Forests and agroforests with their multiple values are becoming critical to the well-being of the environment, the national economy and society at large. They contribute significantly to household economy and food security and thereby to poverty reduction, economic growth and social transformation.

The regional government, in collaboration with communities and other relevant stakeholders including development partners has been working hard to increase the tree and forest cover through different mechanisms such as Participatory Forest Management, afforestation, reforestation, exclosure, watershed development and annual tree planting campaigns. These initiatives are helping in conserving the remaining high forests and other woody vegetation of the region and in restoring degraded lands and forests and enhancing their economic and ecosystems contributions to local communities and society at large.

However, the current situation of forest development, management and utilisation is not satisfactory and improvements are needed. Deforestation and degradation rates remain high around the natural forests and woodlands of the region. Still, the regulatory wings of the forest administration and the respective law enforcement agencies need to do more to reduce deforestation and degradation and illegal movement of forest and tree products.

Deforestation is resulting in bare hills and mountain slopes that are suffering from high rates of soil erosion and land degradation, indicating the need for large-scale rehabilitation works. The overall situation calls for additional and concerted effort to identify and address the causes of land and forest degradation and explore opportunities for forest sector development. In doing so, it is important that we identify effective forest management practices and scale them up to enable the region in particular and the country in general to achieve the targets of the forestry sector set in the CRGE strategy document. Thus there was a great need to formulate a regional strategy to select effective forest management practices and to scale them up.

The Center for International Forestry Research (CIFOR) in collaboration with relevant federal and regional institutions initiated and implemented the project that aimed at identifying effective forest management practices and enabling conditions for scaling them up. The study in the SNNPRS focused on agroforestry practices. The findings of the study were used as inputs in the write-up of this strategy.

Our regional bureau has been actively engaged in the process of its write-up and review. Thus, we will do our best to implement the proposed strategy and to use it in

## Enhancing the role of the forestry sector in Ethiopia

developing plans, programmes and projects that will foster the development of the forest sector in general and the wider use of selected forest management practices in particular. Finally, I would like to thank the authors of this strategy for producing such an important document and CIFOR and MEF for initiating and implementing the project by involving experts from our Bureau and other institutions in the region.

Ato Sani Redi,  
Vice-president of SNNPRS and Head of Bureau of Agriculture  
Hawassa  
10 September 2015

## PREFACE

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

Unless the growing demands for wood products and other forest products and services are met, the rapidly growing demand for food and wood will aggravate the rate of deforestation and degradation. Unless backed by sustainable intensification options, horizontal expansion of agriculture will result in the conversion of forests, woodlands and bushland to agricultural fields. Therefore, deforestation and degradation are major environmental challenges that Ethiopia is faced with and effective management of forests and agroforests is critical.

Identifying and scaling up effective forest management practices will significantly enhance the contribution of the forestry sector to local livelihoods, the national economy as well as to the environment. Wider adoption of good forest management practices will enhance the contribution of the forestry sector in building a climate resilient green economy. CIFOR, in collaboration with federal ministries and regional and federal research and higher learning institutions, implemented a project that focused on identifying effective forest management practices and enabling conditions for scaling them up. The project examined enclosure management (in Tigray region), smallholder plantations (in Amhara region), agroforestry (in SNNPRS), participatory forest management (in Oromia region) and management of dry forests and woodlands (in Benishangul Gumuz region). Our team worked in SNNPRS and critically assessed experiences in agroforestry practices in Dega, Woina dega and Kola agro-ecological zones of the region in order to identify effective practices that can be scaled up to other parts of the region and the country at large. It also looked at limitations and weaknesses of the selected practices and proposed improvement measures in view of enhancing their livelihood and environmental benefits. The team examined other forest management practices based on the findings of other teams that had worked in the other four regional states. In selecting and proposing effective forest management practices for scaling up, our team benefited from a series of discussions conducted with communities, senior experts from the region and national project progress review and planning meetings. The findings of our field research and



desk work, the results of graduate students' thesis researches as well as the comments and suggestions gathered at different levels were used as inputs in writing this strategy.

The authors of the document would like to thank several persons and institutions that in various ways contributed to the write-up of this strategy. 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 this document. We are grateful to the staff of the regional bureaus, zonal and district offices, the regional research institute and to the farming communities in the studied areas for taking part in the series of discussion sessions held. Their contributions have improved the content of the strategy and its relevance. It is our hope that this strategy will be implemented and serves as basis to plan and implement further work to develop the forestry sector in SNNPRS.

### **The authors**



## ACKNOWLEDGEMENTS

This publication is an outcome of a project entitled Enhancing the Role of Forestry in Ethiopia's Climate Resilient Green Economy: A Knowledge, Action Research and Innovation Project implemented between September 2013 and August 2015. The project was designed and implemented by CIFOR in collaboration with its national partners: the Ministry of Environment and Forest, the Ministry of Agriculture, the Ethiopian Environment and Forestry Research Institute, Wondo Genet College of Forestry and Natural Resources and other higher learning institutions and federal and regional research institutes. Over 25 senior experts from these organisations were engaged in the project. Its intended outcome was to identify effective forest management practices for scaling up, focusing on area enclosure in Tigray, participatory forest management in Oromia, smallholder plantations in Amhara, agroforestry in SNNPRS and management of dry forests and woodlands in Benishangul Gumuz National Regional States of Ethiopia. The major project outputs are strategies for scaling up selected forest management practices for the five regions and a national road map for the Ministry of Environment and Forest to support national efforts to achieve the forestry sector targets the country has set in its strategic document to build a climate resilient green economy. This document was prepared for SNNPRS. The write-up of this regional strategy document was undertaken by senior experts from: Wondo Genet College of Forestry and Natural Resources, the Ministry of Agriculture, Hawassa University, Ethiopian Environment and Forest Research Institute, and the Regional Bureau of Agriculture of SNNPRS. The contributions made by the individuals and institutions are gratefully acknowledged. The draft strategy document was commented and improved by inputs gathered from experts and senior officials particularly from the region. The contributions of Ato Mohammednur Faris, Deputy Head of Natural Resources and Environmental Protection Authority of SNNPRS, in reviewing the strategy to ensure its relevance to the region and in getting official endorsement by the region is gratefully acknowledged.

CIFOR is grateful to members of the National Project Advisory Committee that were overseeing the project to ensure its relevance and timely completion. I am particularly thankful to His Excellency Ato Kebede Yimam, State Minister of Forest, Ministry of Environment and Forest, for chairing the Project Advisory Committee over the past 2 years. He attended all of the important meetings and provided guidance to the project. He also took note of project findings and encouraged researchers to generate policy and practice relevant findings and better inform the activities of the Ministry and relevant regional bureaus. Members of the Project Advisory Committee were the dean of Wondo Genet College of Forestry and Natural Resources, the director general of Oromia Forest and Wildlife Enterprise, the natural resources management process owners in the regional bureaus of agriculture of the five

regions and heads of the natural resources research wings of regional agricultural research institutes operating in the five regions. Our sincere thanks also go to the authors and their respective institutions as well as to the respective regional bureaux for taking the tasks seriously and for reviewing and approving the strategy document. Our thanks also go to the Strengthening Climate Institutions in Ethiopia Programme (SCIP) Fund for financing the project. The SCIP Fund was financed by the Governments of the UK, Norway and Denmark. As we were attempting to meet the emerging needs of our national partners, we had to revise the project activities twice in 2 years. I would like to recognise the support we got from the SCIP Fund Management Team in doing so. The project managed to plan and implement additional activities without increasing its allocated budget. This document will assist regional and national efforts in developing the forestry sector in general and in planning and implementing the selection and wider adoption of effective forest management practices in particular. It is also our hope that the process has helped in building human and institutional capacity that funders of the project were particularly keen to achieve.

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31 August 2015

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## **1. BACKGROUND**

### **1.1 Introduction**

Deforestation and forest and land degradation are major problems of natural resources management in Ethiopia that have undermined landscape productivity. Hence, protecting existing natural forest and woodlands through participatory forest management (PFM), promoting agroforestry systems and rehabilitation of degraded forest and agricultural lands through area exclosures are priorities in the current natural resource management agenda of the government. Smallholder farmers are expanding their woodlot plantations. Farmers in central and southern Ethiopia are intensifying their traditional agroforestry systems. Yet systematic studies of agroforestry systems and identification of effective practices to facilitate scaling up are limited. It is useful to guide future promotion of agroforestry practices in SNNPRS and in other regions of the country through a scaling-up strategy formulated on the basis of lessons learned from studying existing agroforestry practices. This regional strategy document to facilitate scaling up of selected forest management practices with particular emphasis on agroforestry is an outcome of a joint project planned and implemented by CIFOR and its national partners in general and MEF in particular. This strategy document was prepared by a team composed of members from different federal and regional institutions.

Between early 2014 and mid-2015, five national technical teams studied impacts of selected forest management practices (PFM, agroforestry, smallholder plantations and management of dry forests) in five regions of the country with the aim of identifying best practices for scaling up. One of these teams worked on identifying effective practices in agroforestry systems prevailing in the various agro-ecological zones of SNNRS. The information generated by the team was used to develop a scaling-up strategy and a national road map to scale up effective practices in agroforestry. Research reports of the other four research teams were also consulted in proposing other effective forest management practices to be tested and scaled up in the region. This strategy is aimed at guiding efforts for scaling up effective forest management practices in general and agroforestry systems in particular in SNNPRS and thereby enhancing the role of forestry in building a climate resilient green economy.

### **1.2 Country profile**

Given its large rural population dependent on agriculture and on wood for energy,

Ethiopia is faced with high rates of deforestation and land degradation. Commonly cited causes are extensive forest clearing for agricultural use, overgrazing and exploitation of existing forest for fuel, fodder and construction materials (Bishaw, 2001). The condition is particularly pronounced in northern Ethiopia, where land degradation has been accelerated by long-standing human impact through changing land use and deforestation (Hurni 1988; Nyssen et al., 2009) and strong biomass demand for household energy and livestock feed demand (Tekle, 1999). The most important measures taken to halt this process have been planting trees and assisting natural regeneration by excluding human and animal interference in the form of exclosures (Pohjonen and Pukkala 1990; Tekle 2001). In Oromia and southern regions where most of Ethiopia's high forests are found, deforestation and degradation remain high. In view of reducing deforestation and forests and woodlands degradation, PFM has been promoted. In predominantly agricultural landscapes, the government has set plans in its GTP I to increase tree cover significantly. But achievements were less than expected. Thus, closely examining agroforestry systems developed by farmers in the different eco-zones of the region will help identify practices that might be scaled up to other areas of the region and elsewhere in the country.

### **1.3 Overview of the forestry sector in Ethiopia**

#### **1.3.1 The forest resource base and management**

Ethiopia is endowed with various ecosystems that are formed by diverse fauna and flora. The vegetation of Ethiopia comprises over 7,000 species out of which significant number are endemic to the country. It also harbours diverse fauna including 240 species of mammals and 845 species of birds, of which 22 species of mammals and 24 species of birds are endemic (Teketay et al., 2010). The landscape that ranges from the lowest altitudes in the north-eastern Danakil lowlands to the top of Mount Ras Dashen in the north-western highlands divided by the Great Rift Valley from north-east to south are the basis for the diverse ecosystems of Ethiopia. The southern and south-eastern parts of Ethiopia support the high forest ecosystems while the western, southern and south-eastern lowlands are where dry forests and woodlands of the country are found. Forests and woodlands provide not only wood, livestock feed, other non-timber products and environmental goods and services but also serve as a habitat of biodiversity including endemic birds and wild animals. Ethiopians have always been dependent on goods and services obtained from forests. Forests provide fuelwood which is serving as the major source of energy for rural

and urban households. The national fuelwood demand was estimated as 20% higher than the combined demand of all other forest products that was estimated at 109 million m<sup>3</sup>yr<sup>-1</sup> (EFAP 1994; Teketay et al., 2010). Most farm implements are made of wood extracted from the surrounding natural vegetation. Commonly, household furniture is locally produced from indigenous tree species that grow in the natural forest. Also, rural people earn income from selling fuelwood and charcoal. Despite the importance of forests, reliable information on their spatial coverage, distribution, changes over time (deforestation or regrowth), growing stock in the standing vegetation, regeneration and recruitment are lacking and the available information is scattered and inconsistent (Teketay et al., 2010). According to the findings of the Woody Biomass Inventory and Strategic Planning Project (WBISPP, 2004), Ethiopia owns a total of 59.7 million ha of land covered by woody vegetation. Of the total woody vegetation, 6.8% are high forest (about 4.07 million ha), 49% consist of woodland (29.24 million ha) and 44.2% are shrubland or bushland (26.4 million ha). Plantations cover an estimated area of 0.96 m ha. In terms of regional distribution, Oromia, SNNPRS and Gambella account for 62.5%, 19% and 9%, respectively of high forest areas of the country while Somali, Oromia and Amhara regions contribute 33%, 32% and 10%, respectively of the area of woodlands and shrublands/bushlands (WBISPP, 2004).

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

The forest resources of Ethiopia play significant roles in the livelihoods of the community and the national economy at large. Their direct roles include provisions of energy, construction wood, poles, timber and non-timber forest products (NTFPs) that are highly prized for their food, medicinal and commercial values. Lack of a reliable and consistent database and proper forest accounting system constrains the valuation of the direct and indirect values of forest resources. Therefore, estimations of contributions of forests and woodlands are commonly reported using only case studies and site-specific assessments. There are several case studies that show the importance of forest resources.

It has been reported that 90% of the households in Bench Maji, Kaffa and Sheka zones, south-western Ethiopia harvest significant volumes of NTFPs including forest coffee, forest honey, wild forest spices (Ethiopian cardamom, long pepper and turmeric) and bamboo (FFE, 2009). The same study showed that some of the households earn up to 73% of their annual cash income from sale of NTFPs. A conservative estimate of the

values of NTFPs produced in the country that include forest coffee reported by FFE (2009) showed that these products have annual value of USD 249,638,556. Semi-processed wood products, charcoal, bamboo, natural gum, ecotourism, spices and forest coffee are some of potential forest products that can be used through a sustainable management plan. According to FAO (2010) the sum of the values of fuelwood, industrial wood and NTFPs of the country was estimated at USD 752,869,000, the share of fuelwood was 85%. Compared with the total gross domestic product (GDP) of USD 12.7 billion, the contribution of the forest sector was about 6%. Nevertheless, this figure increases when the indirect values of the different ecosystems were taken into account. For instance, FFE (2009), based on an assumption of 4 million ha of high forest and global environmental values of forests, estimated that the Ethiopian high forest provides ecosystem services of USD 6,276,000,000. Regardless of the accuracy and the accounting system, the presented figures indicate the significant contribution and huge potential of the forest sector to the national economy and society at large.

### 1.3.3. Sectorial policies and strategies

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

**The Environmental Policy (1997).** This has direct relevance to the forest sector. It was approved in 1997. The policy aims at improving the quality of life of the people through sustainable development and utilisation of natural resources. It also aspires to conserve traditional resource management practices. The policy included soil management and sustainable agriculture, forest and tree resource management, genetic, species and ecosystem biodiversity conservation and management. These policy provisions could play substantial roles in the promotion of afforestation and re-afforestation programmes.

The Rural Development Policy and Strategy (2001). Ethiopia issued its national rural development policy and strategy document in November 2001. This document underlines the need to rehabilitate and restore degraded forests



and lands. It advocates objectively designed tree planting initiatives. Specifically it emphasises integrating more trees into agricultural production landscapes. The achievements made in area exclosures, PFM and sustainable land management through watershed development programmes emanate from this policy direction. Yet, achievements in afforestation and re-afforestation remain limited due to various constraints. For example, Lemenih and Woldemariam (2010) reported that forestry received less than 10% of the overall budget allocated to the Ministry of Agriculture both at the federal and regional levels during the last decade.

**Forest Conservation and Utilization Policy (2007).** The formulation and enactment of this policy, which is the first in the history of the country, reflects the government's commitment to developing the national forest resource base. The main objective of this document is to improve the economic contribution of the forestry sector and to satisfy the forest product demands of the country by promoting sustainable forest management and utilisation practices. The policy also encourages the engagement of the private sector and the local community in commercial and protective forest development. To promote the establishment and development of private and community-owned forests, the policy provided an incentive mechanism in the form of reduced land taxes. The policy recognised the need for certifying forest use rights that is an important provision to enhance afforestation and re-afforestation programmes. However, key provisions in the Forest Conservation and Utilisation Policy and Strategy were not clearly translated into binding legal articles nor were there concrete implementation directives.

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

**The 2011–2015 Growth and Transformation Plan and the 2011 CRGE Strategy.** The Ethiopian Government launched the 2011–2015 Growth and Transformation Plan (GTP) with the vision to make Ethiopia a middle-income country by 2025. The GTP envisages that the country's GDP per capita would grow from USD 378 in 2010 to USD 1271 in 2025. The GTP stresses the need to strengthen natural resources conservation and management. In line with the rehabilitation and restoration of degraded lands through exclosures, multipurpose tree planting, developing management plans for priority forests and tree seed collection and distribution and expansion of industrial plantations were the major proposed activities of the forestry sector in GTP-1. The Climate Resilient Green Economy (CRGE) of Ethiopia launched by the end of 2011 defined the development path of the country. The plan has identified four pillars, one of which is forestry where protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks, is emphasised. The CRGE targets sequestration of more than 40 million tonnes (t) of CO<sub>2</sub>e through afforestation and reforestation of 3 million ha of land and sustainable management of 4 million ha of forests and woodlands by 2030. Moreover, Ethiopia's pledge at the 2014 New York Climate Summit to restore 15 million ha of degraded forest and agricultural lands by 2025 is evidence of the government's determination to restore degraded landscapes.

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

### 1.3.4 Linkages of forestry with other sectors

Several sectorial policies and functions may directly or indirectly link with the forest sector. These sectors plans and that of the forestry need to be coordinated to ensure complementarity. Coordination and integration helps to better achieve the overall socio-economic development and environmental conservation goals of the country. Sectors that are closely linked with the forest sector are briefly discussed below.

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

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

**Tourism:** Forests support the tourism sector by serving as habitats for wildlife and

by creating attracting green landscapes. A portion of the revenue from tourism need to be ploughed back to fund the conservation and expansion of forests. Some activities such as hotel building and campfires may negatively affect forests if they are not properly controlled.

**Road:** Road infrastructure development goes through forests and results in clearing of certain segments of forests. The development of roads could bring opportunities by creating access for forest management and forest product marketing. Moreover, roads may stimulate the engagement of private investors in the forest sector that contributes to the overall development of the sector; in areas where forest protection is weak, it may encourage illegal deforestation and degradation.

## **2. FORESTRY IN SNNPRS**

### **2.1 Forest resource base of the region**

SNNPRS is endowed with forests, agroforests and woodlands, ranging from dense, tropical forests in the humid and mountainous areas to dry forest, woodlands and savannahs in the lowland areas of the State. Forests, woodlands and trees in the region have played an important role in providing the people with a variety of goods and services. These resources also contribute to the social and psychological well-being and cultural assets of the local people. However, forested areas and woodlands have been shrinking rapidly over the last few decades due to a combination of many factors including agricultural expansion, fire, overgrazing and excessive wood harvesting to satisfy the needs a rapidly growing population. Weak law enforcement and inability to fully implement the forest policy and strategy issued in 2007 contributed to high rates of deforestation and forest degradation; although reliable data on forest cover changes over time, past and current rates of deforestation and degradation and agroforestry resources of the region are lacking.

In SNNPRS, there are seven national forest priority areas covering 617,506 ha. There is also 1 million ha of natural forests under PFM. For some of the forest, efforts have been made to evaluate the economic contributions of natural forests. For example, Assefa (2007) estimated the direct value of Sheka natural forests for house construction, furniture, utensils, farm equipment and for fencing purposes at ETB 89 per ha per year. The value of NTFPs (e.g. honey, forest coffee, spices, bamboo, charcoal and fuelwood, palm and wild fruits) were estimated to vary from

ETB 1,192 per ha based on current extraction levels to ETB 8,142 per ha under exploitation of the potential of the natural forests with zero management. Also total non-use value of the studied natural forest was found to be about ETB 1,519 per ha.

### **2.2 Major drivers of deforestation and forest degradation (D&D) and mitigation measures in use**

Estimations of deforestation rates in Ethiopia vary between 150,000 and 200,000 ha per annum (EFAP, 1994). When defined narrowly, deforestation refers to the removal of forest cover that allows for an alternative land use. Deforestation rates are functions of environmental, social, economic, cultural and political factors at work in

any given region. In most cases, deforestation is a process that involves a competition amongst different land users for scarce resources, a process exacerbated by counter productive policies and weak institutions. The importance of factors varies from time to time and from place to place. The commonly cited drivers of deforestation and forest degradation (D&D) are: population growth, agricultural expansion, overgrazing, wood collection for energy and for construction, logging, and expansion of infrastructures and plantations (e.g. coffee, tea, rubber tree palm oil, etc.). In the last four decades, the national population increased from 30 million to over 90 million. About 85% live in rural areas and are dependent on agriculture and natural resources to meet their basic wood and food needs. Fuelwood collection, while not completely destroying the forests and woodlands, significantly impoverishes forests and woodlands and alters the habitat through removal of preferred species (Dessie and Kleman, 2007). In most cases, a rising population pressure and a prevailing climate of rural poverty are important conditions that facilitate deforestation (Bedru, 2007). Subsistence farming is thought to be by far the most important agent of deforestation throughout the country.

In contrast to subsistence farming, commercial or plantation agriculture and agribusiness are practiced by companies. Deforestation mechanisms and the extent and the impact of plantation crops such as coffee and tea on Sheka forest were assessed by various studies (Assefa, 2007; Bedru, 2007; Zewdie, 2007). Similarly, the impact of *Chatha edulis* in previously forested or agroforested landscapes is also becoming serious (Dessie and Kleman, 2007). Commercial farms are expanding in south-western high forests and in the southern dry forests and woodlands of the region. In addition to the negative environmental impacts (such as loss of biodiversity and impacts on soil

and water) that are common to all forms of deforestation, commercial agriculture often brings with it a series of problems related to the use of agrochemicals including deterioration of workers' health and the contamination of crops, soils and groundwater.

The construction of new roads has a profound impact on forests. Highways that were built to connect different regions open up huge areas of previously inaccessible natural forests. All roads that are constructed with the purpose of providing better access to less developed regions within the country tend to push up real estate values for non-forest uses and encourage land speculation and deforestation. Dessie and Kleman (2007) reported that logging mainly for charcoal making was the major

cause of deforestation in the central and southern Rift Valley areas of Ethiopia. Except in few cases, logging in most forests does not follow proper forest management plan. Farmers move into logged area, including those logged for coffee and tea plantations. External factors also have a role. Government policies outside the forest sector have profound impacts on the forest resource, as do international policies on debt repayment, structural adjustment and trade. The expansion of agricultural cash crops means that either forests are cleared directly for these crops or subsistence farmers are displaced for them, forcing the farmers to relocate to nearby forests and woodlands and practice agriculture. Government policies that have been adopted to facilitate economic development in agricultural sectors (cash crop expansion) have in some cases resulted in deforestation of south-west forests, particularly Sheka forests (Bedru 2007). This is related to the fact that there is little understanding of the value of the goods and services provided by natural forests to society at large. As a consequence, forests are accorded a less significant role when planners make decisions in resource allocation and change of land use (Assefa, 2007). This continues to make the remaining forests more susceptible to conversion to other land uses that are perceived to be more beneficial.

High rates of D&D are having negative impacts on ecological services. Forests help to keep water clean. Soils under forests filter water and help to remove metals and chemicals. The water quality parameters principally affected by forestry operations are turbidity, nutrient levels and stream temperature and they vary depending on the management regime. Watersheds with good vegetation cover and with deep soils maintain aquifers and allow longer lasting flow throughout the year, with more balanced water yields between growing and dormant seasons. Clearing forests increases water flows during the rainy season and reduces the flow

of springs and streams during the critical dry season (Satterlund and Adams, 1992). The impact on soils is also high. Differences in vegetative cover are responsible for much of the variation in erosion rates in northern Ethiopia (Hurni, 1988). Clearing the forest cover increases the amount of run-off and exposes the soil to the intensity of the sun and torrential rains. This can negatively affect the soil by increasing its compaction, reducing its organic material, leaching out its few available nutrients, increasing its aluminium toxicity, and making it marginal for farming.

Probably the most serious consequence of deforestation is the loss of biodiversity. Forests are the reservoirs of biodiversity and clearing natural forests leads to loss



of habitats and habitat loss, which is one cause of biodiversity loss. Studies in some natural forests indicate that traditionally managed forests with diverse species provide local communities with diverse goods and services. The impact of deforestation has to be seen against loss of these diverse services and goods. For example in Sheka forests, Woldemariam (2007) recorded 190 and 180 species, equivalent to 32 and 27 species per plot (500m<sup>2</sup>) in Masha and Gemardo districts (woredas), respectively. These forests are known for maintaining threatened species e.g. *Prunus africana* and *Canarina abyssinica*. They provide diverse non-timber forest products (NTFPs) including *Aframomum corrorima*, *Piper capense*, *Coffea arabica*, tuber plants, honey and medicinal plants. Deforestation also leads to the loss of traditional knowledge that has been used for managing forest resources (Zewdie, 2007). Deforestation of natural habitats forces wildlife to invade human settlements. These invading species become crop pests, predators on livestock and a danger to humans. The loss of forests also undermines our capacity to adapt to and mitigate climate change as we lose forest ecosystems that sequester carbon and function as carbon sinks.

To reduce the effects of deforestation and forest and land degradation, SNNPRS has been implementing PFM to sustainably manage and use natural forests. Exclosures have been established on degraded lands and managed by the community. Some high forests of the region (such as Kefa and Sheka forests) are recognised as biosphere reserves of international heritage while other natural forests (such as Chebera Churchra) have been designated as national parks by the national REDD+ programme. Additionally, woodland forest in Gibe and Loka Abaya are designated as regional parks and are under good management. The Humbo and Soddo degraded lands have been reclaimed by one CDM project.

### **2.3. Governance of the forestry sector**

Improving governance of the forestry sector in the region requires, among others, ensuring transparency and building accountability in defining access to, use and management of forests; promoting public participation in planning and evaluation of processes and impacts; ensuring stability and building the capacity of forestry institutions; coherence of laws and regulations in implementing the forest legislation and guarantee of the rule of law. We need to ensure economic efficiency in the forest sector and incentives for respective forest management and plantation programmes. For this to happen, there need to be favourable government policies and strategies. Also, governmental structures have been set

up from the region up to ward (kebele) level. Non-governmental organisations (NGOs) are engaged in supporting PFM and the marketing of forest products. The regional forest proclamation (SNNPR, Forestry Proclamation, 2011) encourages promoting activities to support forest development, conservation and utilisation in a responsible way. It provides a legal framework to administer the forests of the region.

#### **2.4 Challenges and opportunities for developing the forestry sector**

The challenges hindering the development of the forestry sector are grouped under policy related, institutional, extension system related, market related, information system related and other challenges. The section below describes these challenges.

##### **Policy-related challenges**

There is weak enforcement of forest law and land-use policy in the region. The organisation mandated to issue investment licenses that will be undertaken on forestlands, such as tea and coffee plantations, operate without consulting the organisation that is mandated to manage, conserve and use forest resources. The investment issuing investment permit approves investment projects without an environmental impact assessment (EIA).

**Lack of adequate capacity:** Development and promotion of forest technologies requires national plans and programmes, skilled human resource, physical facilities and finance. However, currently, these capacities are very limited both at regional and national level especially in the research and extension areas. The extension system at regional level has very limited experience in forestry extension. Lack of appropriate and locally adopted forest extension messages and lack of training for extension workers are some of the key problems limiting forestry extension efforts of the region. Traditionally the focus has been on planting trees with little regard to demand and market values.

**Poor access to tree seed and germplasm:** One of the greatest constraints of forestry development in the country is the limitations in the availability of good quality seeds and planting materials in sufficient quantities. There are no sufficient and well-managed seed orchards that can guarantee sustainable forest seed supply. Additionally, specialised nurseries for vegetatively propagating materials and endangered tree species are few.

### **Limited knowledge on the multifaceted advantages of forestry**

The economic and ecological importance of forest resources is not well recognised at different levels. Thus the contribution of the forestry sector to GDP of the region and the country at large is undermined. This problem has led to overexploitation of forest resources through conversion of forest and woodland to other land uses.

### **Lack of market access and limited value addition**

There is lack of experience in harvesting and post-harvest handling techniques and value addition of forest products. Limited availability of adoptable technologies and underdevelopment of infrastructure (roads, communication, etc.) result in high transaction costs. The market linkage for the different forest products is weak and not organised. Weak coordination of key stakeholders working in the forest sector. Although many organisations have been working in the forestry sector, their linkages with each other is non-existent or weak.

**Weak inter-sectoral linkages:** Policies in agriculture, industrial development, energy, transport and other related sectors may have an influence on the way forest resources are managed and may, in some cases, foster deforestation and forest degradation. Forest policies also have an impact on many related areas including rural development, the natural environment and on livelihood options (e.g. food security and poverty) of rural and urban people. The question should be how a balanced relationship and effective and optimum policy of integration and coordination can be put into place among the sectors.

**Absence of proper institutional arrangement at regional level:** The forest administration needs to be properly organised and rationally designed structurally and procedurally to achieve its goals in an effective and efficient manner. The

establishment of the Ministry of Environment and Forests (MEF) and the Ethiopian Environment and Forest Research Institute (EEFRI) are important measures taken by the government. However, as the federal structure has not been replicated at regional level, the problem is still continuing. Therefore, mandated offices responsible for leading the forest sector need to be established at regional, zonal and district (woreda) levels.

**Biotic and abiotic stresses:** Climate change and its consequences such as drought, disease, etc. have negatively affected forest resources. In the last number of years, widespread infestation by pests has been observed, especially on different

introduced species and large tract of forests that exist across the country. There are no clear rules and regulations as to how forests could be protected from pests, diseases, animals, fire, etc. There is also no national Forest Act that outlines plans and facilitates the implementation of the national forestry related plans and programmes.

### **Opportunities**

Two major aspects of opportunities can be cited:

- Based on its Climate Resilient Green Economy Strategy, the government is committed to improving forest and tree cover on both communal and agricultural lands and to enhance food security and environmental resilience (Bishaw et al., 2013).
- In SNNPRS, NGOs are assisting communities to organise and successfully manage forests under PFM arrangements. The CBOs are involved in a number of economic activities including forest-based livelihood development such as honey collection, wild coffee and spices collection and marketing to create economic incentives to reduce deforestation and forest degradation.

### **3. EFFECTIVE FOREST MANAGEMENT PRACTICES FOR SCALING UP**

#### **3.1. Promoting Agroforestry systems**

##### **3.1.1 Global trend and relevant experiences**

Agroforestry (AF) is one of land and tree management practices for achieving sustainable development and improving the quality of life of rural communities and simultaneously reversing the process of environmental degradation (Nair et al., 2009). Ecological, economic and social benefits of agroforestry are well documented (Kang and Akinnifesi, 2000; Neupane and Thapa, 2000). Because of its various positive contributions, there has been emphasis on promoting AF as a viable land-use system in different parts of the world, particularly in developing countries. The environmental services of agroforestry include the in-situ biodiversity conservation, specifically *circa situm* conservation, which is an approach to natural resource management as advocated by the Convention on Biological Diversity (Méndez et al., 2010). Past and present evidence clearly indicates that agroforestry, in addition to enhancing livelihood diversification, offers a number of ecosystem services and environmental benefits (Kang and Akinnifesi, 2000; Neupane and Thapa, 2000). Globally, some selected evidence comes from the work of Nair (1993) and Nair et al. (2009). Evidence throughout the tropics indicates that AF contributes to sustain food and wood security and biophysical sustainability.

Agroforestry systems improve resilience of smallholder production systems to climate variability by buffering crops from the effects of temperature and precipitation variation and strong winds on crops. The increased plant and animal diversity within the agroforestry systems indicates greater diversity in food, fuel, fodder, medicinal plant and income for smallholder farmers (Méndez et al., 2010). Diversity in agroforestry 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 CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> as 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<sup>-1</sup> yr<sup>-1</sup> (Montagnini and Nair, 2004). At prices of USD 100 per mg C, carbon sequestration in AF systems has the potential to increase farmers' incomes by up to 15% (Antle et al., 2007). For these reasons, AF systems may prove to be a useful component of agricultural adaptation for smallholder farmers & contribute to greenhouse gas (GHG) sequestration opportunities at national level.

The increased plant and animal diversity within the agroforestry systems indicates greater diversity in food, fuel, fodder, medicinal plant and income for the smallholder farmer (Méndez et al., 2010). Hence, agroforestry systems allow for a high level of progressive adaptation through increasing structural and temporal diversity of the production system (Montagnin and Nair, 2004). Studies in SNNP region also support the above-mentioned evidence (see for e.g. Tasfay, 2011; Molla 2013; Mezgebo et al., 2013; Negash, 2013; Kebede et al., 2014).

### **3.1.2. Effective agroforestry management practices selected for scaling up**

A detailed study was conducted to identify effective AF practices and to assess their impacts on livelihoods of people managing the landscape and on the environment in SNNPRS. Initially, candidate AF practices/sites were identified from highlands, mid-altitude and lowland areas of the region. Each of the candidate practices was evaluated and prioritised based on agreed-upon criteria (i.e. economic sustainability, environmental sustainability, social acceptability and biodiversity conservation). Based on the outcomes of the evaluation against these criteria, the following practices were selected as ones that needed to be scaled up.

#### **(a) Apple–bamboo based agroforestry practice at Teticha ward, Hula district of Sidama zone**

This study revealed that farmers played significant role in promoting plant diversity through integration of woody species in agricultural landscapes. The species richness of AF was high, with 12 species of annual crops and 14 species of trees/shrubs as well as a few species of livestock (n=174). The species richness of the apple and bamboo-based AF is a clear indication of the diversity of functions the AF system provides for the household. Apple and vegetables were introduced to the site recently. The apple component of the agroforestry system reportedly contributes to 60% of annual income (n=94). This indicates the significant contribution of fruit trees not only to household food security but also to cash needs of households to cover costs of schools, clothing, medical bills, etc.

#### **(b) Coffee–fruit tree–enset agroforestry system of Dila Zuria district of Gedeo zone**

Multipurpose tree/shrub species, coffee, enset, fruits, annual crops, vegetables, medicinal plants and animal species are components of the AF system. A total of 48 plant species were recorded from coffee–fruit tree–

enset based AF at Chichu. On average, about four to six plant species were used during a given season in a year and contributed to income and dietary diversification. Fruit trees and coffee accounted for 47% and 45% of the household annual income (N=150). Communities were also self-sufficient in wood for energy.

### **(c) Moringa-based agroforestry system at Gocha ward of Konso district in Segen Hizboch zone**

The Moringa agroforestry system also accommodates diverse crop species, including 13 species of annual crops, 19 tree species and five livestock species.

*Moringa stenopetala* provides green leaves throughout the year that are rich in vitamins. They are consumed and sold, generating much needed income to farmers. By being a source of food and cash, Moringa plays important role in sustaining livelihoods of the Konso community. *Terminalia brownii* is another key tree species that provides livestock fodder and wood for construction and fuelwood, both for consumption and sale. In terms of income, the team studying effective practice in SNNPRS estimated that Moringa-based agroforestry system generates ETB 25,466.01, three times higher than the monoculture nearby (farmers who do not have trees on farm) that generated ETB 7,895.93. It should be however noted that as we scale up agroforestry systems, care should be taken to ensure that planting arrangement maximizes gains and minimize competition among different species by carefully considering horizontal and vertical interactions in AF systems (e.g. interaction with apple trees). Fruit trees at maturity cast shade that suppresses the growth of lower storey crops. Thus the planting arrangement of key species (here apple and bamboo) need to be carefully considered. For instance, Apple based agroforestry with vegetable combination can stand alone as bamboo based agroforestry on crop border lines.

#### **3.1.3. Suggested improvement measures**

##### **a. Apple and bamboo-based agroforestry of Hula**

The following three improvement measures were identified by the team and positively evaluated both by team members and farmers (n=30):

- i. Introduce improved varieties of bamboo, apple and other components 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 of the system. These include: propagation techniques, sustainable supply systems of planting materials, appropriate harvesting methods and adjustment of culm age structure of bamboo stands and processing technologies
- iii. Manage spatial & temporal arrangement of components to enhance complementarity & efficient use of available land
  - iv. Product and market development with emphasis on market links and value chain development.

#### **b. Coffee-fruit-enset based agroforestry practice for moist midland agro-ecology**

For this AF system, the following improvement measures were proposed by the team and endorsed by farmers (n=30):

- i. Introduce improved germplasm of different components for quality and yield
- ii. Apply appropriate management and harvesting methods (including IPM, canopy management, planting patterns and incorporating additionally other shade-loving root crops, vegetables and spices)
- iii. Improve market linkages through value addition and product and market development.

#### **(c) Moringa-based agroforestry practice**

Recommended improvement measures by the team are:

- i. Introduce improved germplasm of different components
- 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 harvesting methods for Moringa and other components including (a) increasing density of Moringa to at least 10% of canopy cover; (b) applying optimum harvesting intensity of Moringa leaves, (c) applying optimum harvesting intensity of *Terminalia* for optimum leaf and wood production
- v. Improve market linkages through value addition and product and market development.

**(d) *Failherbia alibida*-based agroforestry in dry midland areas**

This AF practice was not evaluated by the research team. However the region is interested in scaling it up in dry midland areas. The recommended improvement measure is to plant the trees at a spacing of 10m X 10m. This needs to be proceeded with research to identify sites and test its technical and economic feasibility.

**3.1.4. Potential scaling-up areas**

**a) Apple-based AF practice.** During a consultative meeting in Hawassa, regional experts identified 51 districts (woredas) where the AF system could be scaled up.

These are: Arbegona, Bursa, Aroresa, Bona Zuria, Dara, Bule, Gedeb, Chench, Hulla, Boreda, Ditta, Angecha, Kindod Didaye, Sodo, Damote Gale, Boloso Sori, Doyogena, Sorro, Dunna, Misha, Mierab Azernet, Misraq Azernet, Alichu Wirro, Gommer, Geta, Essa, Muhur, Gedebano/Wolene, Sodo-Buei, Anlemo, Endegagna, Tocha, Lomma, Essara, Yem, Demboya, Kacha Bira, Bulki, Semen Arri, Amaro, Burji and Derashie highland, Enebor, Cheha, Sayilem, Masha, Adracha, Adeyo, Telo, Chena, Semen Bench, Shebench, Bitu, Gowata.

**b. Coffee-fruit-enset based AF practice for moist midland agro-ecology:**

The regional experts identified 45 districts for scaling up of this AF practice in the region. These are: Wenago, Yergacheffee, Dara, Wonsho, Konta, Sodo Zuria, Bitu, Chena, Enemor, Cheha, Kochorie, Gedeb, Bensa, Chiri, Gibe, Gombera, Yem Essara, Essea, Muhur, Gegebano-welenie, Shebedino, Bona, Aleta Wondo, Aleta Chuko. Dale, Wondo Genet, Amaro, Offa, Boloso Sorie, Damot Sorie, Kindo kosha, Damot Gale, Kindo Didae, Damot Fulasa, Damot Woyede, Humbo, Bombie, Tembaro, Kachabira,, Angecha, Kedida Kamle, Hadero Tunto Zuria, Damboya, Debub Bench, Gura Ferda, Shabench, Semen Bench and Mintshasha, Sheko.

**(c) *Failherbia alibida*-based agroforestry in dry midland areas:**

The regional experts selected 29 districts in the region where parkland AF could be scaled up but is being assisted by research. These districts are: Sodo Buei, Meskan, Mareqo, Lamfro, Dalocha, Silti, Hulbareg, Halaba, Anlemmo, Misrak Badewacho, Mierab Abaya, Borch, Lok Abaya, Hawassa Zuria, Dugna Fango, Humbo and Shoshogo, sankura, Amaro, Derashie, Offa, Arbaminchi Zuria, Mierab Badawacho, Abshige, Kabena, Kindo Kosha, Mierab Abaya, and Lemo.

**(d) Moringa-based agroforestry practice:**

Similarly, 36 districts identified by the regional experts for scaling up of Moringa-based agroforestry in the region are: Derashie lowland, Alie, Arbaminch Zuria, Mierab Abaya, Boreda lowland, Kucha, Demba Goffa, Zala, Wuba Debre-Tsehay, Oida, Humbo, Offa, Dugna Fango, Boricha, Lokabaya, Kindo Kosha, Bena-Tsemay, Mali, South Ari, Wulbareg, Mareko, Meskan, Shashogo, Dalocha, Lamforo, Soddo, Abeshgie, Kabena, Cheha, Enemore, Yem, Gibie, Amaro and Burji and Lemo.

**3.2. Other forest management practices for scaling up**

**3.2.1 Participatory forest management**

**3.2.1.1. Global trend and relevant experiences**

Participatory forest management (PFM), joint forest management (JFM), community-based forest management (CBFM) and collaborative forest management (CFM) are some of the terms used to denote forest management and use arrangements between communities and the State. Globally, PFM is considered to be one option for sustainable forest management through active involvement of the community. In Ethiopia, PFM is used to describe systems that enable community members living in and around forests to take part in the management and use of forest resources by making formal agreements with an authorised government agency (forest department) through developing an agreed-upon forest management plan and negotiated responsibility and benefit-sharing mechanisms. PFM could be based on traditional systems of community-based natural resource management institutions or it may be developed as a new system of resource management. If PFM is to build on traditional NRM systems, the traditional system must be democratic and capable of addressing issues of inclusiveness, gender equality and equity.

In Ethiopia, PFM began in the mid-1990s through pilot projects implemented primarily by the NGOs FARM-Africa and SOS Sahel Ethiopia, in close collaboration with the regional governments of Oromia and SNNPRS. Lessons learned from pilot PFM initiatives have proven that the communities in and around forested areas can be part of the plan for reducing deforestation and enhancing regeneration of forest resources. These practical experiences gained within Ethiopia and elsewhere have shown that the participation of communities in the negotiation and drafting of forest management, conservation and use plans strongly contributes to building ownership and ensures active involvement of community members at all stages of forest resource management.

### **3.2.1.2. Participatory forest management in SNNPRS**

PFM is not new to SNNPRS. One of the pioneer PFM site, Bonga, is located in the region. A total of 1,059,184 ha of natural forest have been put under PFM with approval from the Natural Resources Conservation and Environmental Protection Bureau of SNNPR. PFM in the region is promoted by NGOs, notably SoS-Sahel and Ethio-wetlands.

### **3.2.1.3. Suggested improvement measures in PFM**

PFM experiences from various countries show that participation of members depends on the amount of benefits people get from the forest. People who depend on the forest more show more interest in the forest, which is reflected in their relatively high level of participation in its management, provided they get the right incentives. What is thought as the “right incentive” in the context of PFM arrangements is the inclusion of wood among the forest products extracted for marketing (Bekele and Tesfaye, 2013).

### **3.2.1.4. Identifying potential area and scaling up PFM in the region**

A number of measures were proposed by a team of experts to improve the effectiveness of PFM. These measures were presented to senior forestry experts of the SNNPRS for comments and suggestions so that they could be adopted to fit to the peculiarities of the region. Almost all of the improvement measures suggested by the team were accepted by the regional experts (Table 1). One of the improvement measures suggested by the national team that stressed the need to allow PFM members to use timber products as per the management plan was discussed. The experts felt that natural forests in the region have large NTFP potential that can support the livelihoods of households in a significant way and felt that this would open up avenues for illegal logging and rapid deforestation. Currently, the SNNPRS has PFM projects in five natural forest sites (Kaffa, Sheka Forest, the Kafa Biosphere Reserve and the Sheka Biosphere Reserve with a total area of 1,059,184 ha). The regional experts accepted all other improvement measures and proposed their application even to existing PFM sites. It was also suggested that PFM be scaled up to forests in South Bench, Sheko, She Bench, Semen Bench, Gura Ferda, Konta, Basketo, Tocha and Eissarra, Chirri, Arroessa, Melokoza and Arbegona districts of the region.

## **3.2.2. Managing dry forests and woodlands**

### **3.2.2.1 Global trend and relevant experiences**

The concept of sustainable dry forest and woodland management accommodates social, economic and ecological issues. It requires the involvement of local

communities in the conservation and utilisation of forest resources. Governments and local communities are expected to share responsibility for a given forest resource for the conservation of its biodiversity, production of timber and NTFPs and maintenance of its regeneration capacity. In this regard, identifying and scaling up good dry forests and woodlands management practices is important. To track progress toward the goal of sustainability, there is a need to establish mutually agreed upon criteria and indicators which would provide a framework for data collection and evaluation (e.g. FAO, 2010).

**Table 1.** Proposed improvement measures to enhance effectiveness of selected PFM practices for scaling up in SNNP regional state.

<b>Criteria</b>	<b>Suggested improvement measures</b>
Participation and empowerment	Greater and all-inclusive participation of women, minorities and youth in all aspects of PFM (economic, social and ecological), in decision making (membership, objective setting, developing management plans, defining benefits and responsibility sharing) and in improving access to information (market, technology, etc.) and to building capacity (technical, managerial, bookkeeping, etc.) Avoid a conservationist mind set in defining objectives and developing management plans and pay due attention to the economic contribution of forests to communities Discourage elite capture of resources by creating an enabling environment to ordinary members (e.g. democratisation of decision making)
Institutional and organisational settings	Secure forest tenure and use rights as per the forest management agreement (FMA) (e.g. issuance of certification of PFM holdings) Ensure higher level engagement in the process (the counter signatory of FMA should be at a higher level of government, e.g. region) Put in place community institutions appropriate to PFM establishment, legalisation and empowerment of CBOs both for forest management and forest product marketing Devolve decision-making power to CBOs for effective forest protection and management coupled with effective forest use Provide legal provisions specifically relevant to PFM arrangements (e.g. by adapting current coops and associatiocommunities and gender for example) Es) n arrangements to fit to the needs of forest management under PFM and provide legal recognition of relevant customary institutions that meet certain standards (equity among Setting provisions and taking progressive actions to make PFM an effective vehicle to promote community forest ownership Enhance awareness of law enforcement agencies (notably police and judiciary) about PFM Facilitate the inclusion of REDD+ issues/PES into CBO by-laws Include payment for environmental services (PES) provisions in the natial forest law and in the FMA Organise all PFM user groups to higher level to strengthen their bargaining power (e.g. to union of coops or regional level entities)

<p>Equity and engagement of disadvantaged groups</p>	<p>Ensuring active women participation and their roles in leadership position to enhance their role in decision making Facilitate and capacitate women PFM members to be actively involved in training sessions to raise their awareness and engage in PFM activities by arranging suitable working time and conditions for women (and including these in the by-laws for example); Benefit sharing and management responsibility should take into account the heterogeneity of community members (e.g. degree of forest dependence, livelihood strategies, level of poverty, etc.) Recognise different types/levels of PFM membership and devise corresponding roles and responsibilities in forest management and use in line with the social and cultural practices of the community</p>
<p>Impact on livelihoods</p>	<p>Ensure access rights to adequate forest uses, including timber and lumber (based on management plan), wildlife resources, carbon and environmental benefits with concomitant responsibility to sustainably manage the forest. Strengthen support to diversify forest based livelihoods Integration of forest-based benefits with other livelihoods activities (e.g. livestock production using stall feeding) Enhance value addition and market linkages (e.g. introduce village-based small-scale carpentry; honey processing; converting forest by-products into briquettes, etc.) Ensure community benefits from PES, from international community and from national stakeholders, e.g. EEPCO, irrigation facility users, tourism organisations, etc. Demarcate and delicate forest boundaries for each PFM site</p>
<p>Impact on forest conditions</p>	<p>Strengthen periodic forest resource assessment through community involvement in order to enhance informed decisions towards adaptive forest management Encourage enrichment planting and provide technical support to establish forest plantations around PFM sites as appropriate Enhance community capacity as forest managers and promote forest management plan to ensure sustainable use Use PFM as an instrument for REDD+ implementation Increase synergy of PFM initiatives with other climate change initiatives</p>
<p>Conflict management or resolution</p>	<p>Use as found appropriate customary practices for conflict management alongside formal institutions Provide more legal power to CBOs to look at most of PFM-related issues including conflicts over forests among members and beyond Ensure the participation of all community groups (opinion-makers, women, youth, underserved) and all relevant stakeholders (e.g. distant users) during by-law development Consider the needs and aspirations of non-members and minimise and if possible offset negative impacts of PFM on these segments of the community (through income diversification, employment opportunities, micro-finance, etc.) Periodic updating of internal by-laws taking into account emerging needs and lessons learned</p>

Criteria define the essential components of forest values to be addressed in sustainable forest management while indicators are ways of measuring or describing a criterion (Castañeda, 1999). The International Tropical Timber Organization (ITTO), the Dry Zone Africa Process and the Montréal Process are some of the global initiatives for the development of criteria and indicators for forest management (Prasad & Kotwal, 2001); FAO, 2010). The Montréal Process identified seven criteria and 67 indicators for the sustainable management of temperate and boreal forest. The seven criteria of the Montréal Process are: (1) Conservation of biological diversity, (2) Maintenance of productive capacity of forest ecosystems, (3) Maintenance of forest ecosystem health and vitality, (4) Conservation and maintenance of soil and water resources, (5) Maintenance of forest contribution to global carbon cycles (6) Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies and (7) Legal, institutional and economic framework for forest conservation and sustainable management.

### **3.2.2.2. Selected effective practices**

The identification of effective best practices for scaling up was undertaken by a team of researchers by conducting a study in Benishangul Gumuz region in which majority of the forests are dryland forests. The team used the seven criteria stated above in its evaluation of management practices in the region. Based on the evaluation, Gum and Resin based and Bamboo based dry forest management practices were selected as the two good practices among the evaluated candidate practices. Both management practices were based on the framework of PFM and were facilitated by SoS-Sahel/ Farm Africa in collaboration with the community, BoA and other stakeholders. The gum and resin based dry forest and woodland management found in Kurmuk focuses mainly on production of frankincense from *B. papyrifera* species while the Bamboo based management found in Homosha district focuses mainly on using dead bamboo calms (due to flowering). Both interventions began only 2 years ago. This shows that management of the dry forest and woodland in the region was largely neglected. The team has also identified the following as desirable attributes of the selected practices:

- Use rapid and low-cost methods and local arenas to resolve conflicts among users or with officials.
- Clear and locally understood distinction between legitimate users and non-users.
- Sanctions for rule violations start very low but become stronger if a user repeatedly violates a rule.



- Clear boundaries of the forest patch that separate it from a larger forest and woodland.
- Most individuals affected by the management and use regime of the resource are authorised to participate in making and modifying the rules and the rights of users to make their own rules are recognised by the regional government.
- Users of the resource regularly monitor the condition of the resource over time and evaluate their costs and benefits.

### **3.2.2.3. Potential scaling-up areas within SNNPRS**

Basically, the PFM approach used in improving the management of dry forests and woodlands in Benishangul Gumuz Region was similar to what SNNPRS has been experiencing in promoting PFM in high forests. The regional experts suggested that using PFM in managing dry forests and woodlands in the region could be scaled up in (1) gum and resin bearing species dominated dry forests and woodlands and (2) in other woodlands. PFM for gum and resin producing dry forest and woodlands management could be scaled up in: Tembaro, Gena Bossa, Kindo Kosha, Gibe, Konso, Allie, Bene-Tsema, Hammar, Malie and Kindo Didaie. PFM to managing other dry forests and woodlands could be tested and scaled up in Kucha, Demba Gofa, Zalla, Arbaminch Zuria, Mierab Abaya, Humbo, Boreda, Loka Abaya, Boricha, Offa, Darra, Selamago, Surma, Burji, Amaro, Cheta, Menit Shasha, Menit Goldia, Berro, Enemor, Abeshge, and Yem districts of the region.

### **3.2.3. Managing plantation forests**

#### **3.2.3.1 Global trend and relevant experiences**

Forests represent more than just a livelihood to many people in developing countries. However, the unsustainable exploitation of natural forests is a serious environmental concern in developing countries of Africa. As estimates indicate, by the early 1990s, the rate of deforestation in this part of the globe was many times the rate of afforestation or/and reforestation. If this trend continues, then it would not be too long before most natural forests will be completely removed from the African landscape. In Ethiopia, as in many other developing countries, there is a heavy dependence on fuelwood, in particular and the traditional biofuel sources in general, in both urban and rural areas. Estimates by FAO on areas of plantation forests around the world in 2010 indicated that 31% of the land surface of the world was forested, of which 6% was plantations. There are over 250 million ha of plantation forests around the world.

The trend is expected to continue and the plantation area is anticipated to rise to about 300 million ha by 2020 (FAO, 2010). A little over one half of the plantation area was just in five countries – China, USA, Russia, Japan and India. In 2005, about three-quarters of the plantation were being grown for “production”, that is, wood for building, paper or fuel, or for products such as gum arabic, rubber, palm fibre, palm oil, or cork. The rest were being grown for “protective” functions such as environmental protection, catchment protection, etc. Over the period 2000–2010, the area of all types of forests around the world declined by an average of 5.2 million ha/year (FAO, 2010). By contrast, plantation areas increased by an average of 4.9 million ha/year (FAO, 2010) and much of this is happening in Asia.

Plantation forests supply about one-third of wood used for industrial purposes, mainly building and paper. Wood supply around the world is shifting progressively from natural to planted forests. Although different hardwood and softwood tree species are used in plantations, only three species dominate. These are pines (making up 35% of the total area), China fir (11%) and the eucalypts (8%). In addition to supplying industrial wood, plantations can be grown to produce bioenergy, to fix CO<sub>2</sub> from the atmosphere, to rehabilitate or stabilise land after clearing, to reduce soil salinity and to detoxify sewage waste (Bekele, 2011).

#### **3.2.3.2. Selected effective practices**

A team of senior experts assigned to identify effective smallholder plantation forest management practices for scaling up in Amhara region came up with smallholder plantations of *A. decurrens* in Fagita Lekoma district, Awi zone and *E. globules*-based plantation in Lay Gaint district, South Gonder zone. The identified beneficial attributes of the selected *A. decurrens*-based smallholder plantation include its adaptability, high growth rate, compatibility to the other land use and acceptance of the products in the market. The silvicultural management practices applied by framers in growing *A. decurrens* especially spacing, planting techniques and tending operations were found to be reasonably good. The smallholders knew about the advantages of adequate silvicultural management for enhancing the productivity of plantations. The members of the community who were involved in planting trees stressed the decline in soil fertility and they were looking for alternatives to make better use of the available land. The commonly used spacing between rows and between trees is 1 X 1 metre. According to the tree

growers, tree planting is conducted along with cereals until the seedlings grow. Planted trees showed good survival rates. According to farmers, *A. decurrens* will be ready for harvesting within 5 to 6 years after planting. Farmers were encouraged to plant *A. decurrens* due to its fast growth, its use as fuel and construction wood, charcoal, animal fodder, soil fertility maintenance and availability of market for the products. Smallholder tree planting has provided occasional employment opportunities for the jobless youth and women. The major purpose of the plantation is to generate income by selling the stand to charcoal producers and wholesalers. The farmers are familiar with the multiple socio-economic advantages of *A. decurrens* compared to *E. globulus*, the other potential tree species commonly planted in the zone. The economic benefits of growing trees are reportedly higher than cultivating annual crops.

The research team has also identified two other practices for scaling up in Amhara region: These are the communal plantation found at Shabra Got of Abchikli Kebele of South Achefer district in West Gojam zone and the cluster (blocks) form of plantations on communal lands but managed independently by groups of individuals at Eyesus Kebele of Farta district in South Gondar zone. In SNNPRS, Eucalyptus plantations are expanding rapidly but the region does not intend to promote Eucalyptus plantations but wants to promote other species. Thus, additional research is needed in this regard to support and inform the extension service.

### **3.2.3.3. Potential scaling-up areas within the region**

The region has identified 12 sites found in the highlands of the region for testing and then scaling up of *Acacia decurrens*-based smallholder plantations. These are the highlands of Gurage, Silte, Hadya, Kembata-tambaro, Sidama, Gedeo, Gamo Gofa, Yem, Wolayta, Dawro, Kefa and Bench-Maji.

### **3.2.4. Managing area enclosures**

#### **3.2.4.1. Global trend and relevant experiences**

There are different terms in the literature to explain the same concept. Among these are: enclosure, area closure, protected area, closed area, enclosure etc. The national team mandated to identify effective practices in area enclosures suggested the use of the term area 'enclosure' and defined it as "a method for land rehabilitation by protecting an area from interference of animals and human for limited period of time depending on site capacity and

vegetation re-establishment.” Thus, the main objective of most exclosures is for rehabilitation/reclamation of the sites and the technique is usually applied in steep, eroded and degraded areas previously used for grazing or farmlands (Bendz, 1986). Severe droughts that repeatedly occurred over the past few decades in Ethiopia have led to accelerated rates of soil erosion and deforestation. The level of public awareness about the need for managing natural resource has improved over time. This is expressed by peoples’ participation in the establishment and management of area exclosures. The team also reported positive attitude towards exclosures that might have been due to the environmental, social and economic benefits that area exclosures provide to rural communities. In Ethiopia, the practice of area exclosures has been traditionally used for centuries by restricting the use of forests around churches and sacred religious sites (Mengistu, 2001; Birhane, 2002). It has also been practiced to allow agricultural land rest for some time and to improve productivity. However, the modern technical method of area exclosures was initiated as a development package and an integral element of the soil and water conservation programme after 1980. Using this technique, the degraded lands are protected and rested for a few years, allowing regeneration of the natural vegetation (Bendz, 1986).

#### **3.2.4.2. Proposed improvement measures in scaling up area exclosures**

Based on the reports of a research team that reviewed the experience of area exclosure in Tigray region and a series of regional consultations made with the key actors in the region, the following measures are proposed to be considered as area exclosures are scaled up in SNNPRS.

- Actively engage and negotiate with communities to clarify ownership rights (with all community members or with selected youth groups and poor women to reduce conflicts over ownership and benefits from the rehabilitated land resources), agree on site selection, on objectives setting, on the identification of beneficiaries, and on mechanisms of responsibilities and benefit-sharing arrangements. According to regional experts, dividing areas under exclosures to individuals will result in more secure tenure and thereby improve the management of exclosures. But farmers prefer individuals nested in associations or communities. Moreover, contribution based benefit sharing is suggested by experts but farmers favor equitable sharing. Therefore, to proceed with either of these options, there should be

discussion and agreement between the experts, local administration and the farmers themselves.

- By-law establishment should be participatory and should attempt to maintain balance between protection and production roles.
- Integrate income generating activities with area exclosures (e.g. fattening, beekeeping, ecotourism, etc.) and diversify products and services (e.g. carbon)
- Develop in a participatory way management plans that are in line with agreed upon land rehabilitation objectives and integrate conservation and livelihoods outcomes
- Integrating biophysical soil and water conservation measures but with minimal disturbances of the natural environment including in-situ water harvesting structures and planting of multipurpose trees and shrubs, which have both economic and environmental services
- Enhance natural regeneration process through over sowing of selected species and introducing and broad casting of native flora with seed treatment and enrichment planting with selected species,
- Policy and legal support systems for reducing free grazing and to enforce agreed up on internal by-laws,
- Provide institutional, technical and legal support to link producers with markets (e.g. for carbon trading)
- Provide tailored research and extension services/training support on identifying appropriate measures to be introduced in area exclosures to maximise benefits (e.g. species mixes)
- Improve the monitoring system of exclosures and generate reliable data. The team proposed a 5-year time series data collection schedule for efficient and effective monitoring and evaluation of exclosures,
- Establishing corridors to better link fragmented patches of exclosures and enhance species richness of exclosures and their ecological contribution.

#### **3.2.4.3. Potential scaling up areas – in the region**

SNNP has sites for managing exclosures in different parts of the region. The regional bureau reported that area of land under exclosures is about

400,000 ha. The regional experts suggested that proposed measures be adopted not only in establishing and managing new area exclosures but also in improving the management of already established area exclosures. This is expected to significantly enhance the economic and environmental benefits of exclosures.

## 4 STRATEGY FOR SCALING UP EFFECTIVE FOREST MANAGEMENT PRACTICES

### 4.1 Rationale and objectives of the regional strategy

The region has natural forests and woodlands, diverse agroforestry systems and plantations. Often times forests, agroforestry systems and agriculture are integrated on landscapes. The present landscapes are the result of a long-term interaction between populations and forest ecosystems. Over the years, communities in the SNNPRS have been using multiple social, economic and environmental goods and services provided by forest ecosystems. These goods and services contribute directly to food security of large number of rural and urban population in the region.

Increasing demands of a rapidly growing population has led to overgrazing and overexploitation of forest products which in turn are accelerating deforestation and forest degradation. In order to continue getting the multiple social, economic and environmental goods and services from forests, woodlands and agroforestry systems, it is of paramount importance to conserve and manage these resources in a sustainable manner. This requires developing a strategy that provides guidelines to promote effective forest management practices in the region and at national level at large. The general objective of this strategy is to support efforts of SNNPRS to scale up effective forest management practices with emphasis on agroforestry over a wider geographical area and to bring about more equitable and lasting livelihood and ecological benefits from better managed forests and agroforestry systems. Its specific objectives are:

- to help SNNPRS select and scale up effective practices in the management of agroforestry systems, plantations, area exclosures and natural forests and woodlands;
- to enhance the role of agroforestry systems, forests and area exclosures to local livelihoods and the national economy and to increase and sustain flow of environmental services from these systems; and
- to enhance the level of participation of key stakeholders in responsible management of agroforestry systems, plantations, area exclosures, natural forests and woodlands for multiple outcomes.



## **4.2. Strategy development process**

To develop the strategy the team collected relevant information and consulted regional stakeholders. At national level five senior experts from different institutions of federal and regional forestry institutions discussed on points to be considered during the selection of effective agroforestry practices. During subsequent meetings at regional capital and districts levels the team enriched the approaches followed and criteria developed by the team to select practices for scaling up. A number of experts at zonal and district levels took part in regional level discussions and took part in data collection that led to the write-up of this strategy.

While developing the strategy the team assigned made a number of consultative meetings with relevant stakeholders who were identified based on their potential contribution towards developing the regional scaling up strategy. The consultation process also helped to establish a working relationship and mutual trust amongst the stakeholders and the research team. In the process of developing this strategy five consultative meeting took place with stakeholders and experts at regional level. In order to assist the team on development of regional scaling up strategy, the Regional Office of Natural Resource Management assigned four experts. During consultative meetings, the extensive experience of the regional experts was documented and used during the preparation of this strategy document.

## **4.3. Scaling up effective forest management practices**

### **4.3.1. Scope and guiding principles in scaling up**

Scaling up is defined as “bringing more quality benefits to more people over a wider geographical area more quickly, more equitably and more lastingly” (IIRR, 2000). Gündel et al. (2001) distinguish between “horizontal” and “vertical” scaling up. Horizontal scaling up refers to an increase in the geographical coverage of the benefits, or a spread to new categories of beneficiaries, while vertical scaling up moves beyond service delivery to changes in structures, policy or institutions which allow more people to benefit more quickly, equitably and lastingly. The main objective of scaling up is to enable poor, rural people, with their diverse priorities, needs and circumstances, to gain access to develop and adapt appropriate solutions to priority problems. Given this diversity, policymakers need to identify practices and scaling-up strategies that can be matched to a defined set of agro-ecological and socio-economic conditions. Even then, ensuring that the poorest and most marginalised can adopt the good practices often requires

greater costs and longer time investments than for other groups (World Bank, 2003) Numerous technologies have been developed by national, regional and international research centres and are being promoted in different areas by governments, NGOs and CBOs. There will be a need to select appropriate technologies and validating them with the communities and local governments. For those that have already been promoted, it is necessary to upscale them, while those technologies that have been found to be working elsewhere require testing and adapting and ensuring timely acquisition of adequate quantity and good quality planting materials. This needs to be complemented with proper documentation and use of traditional ecological knowledge (Bishaw et al., 2013).

#### 4.3.2. Scaling up modalities

The architecture for a broader scaling up of selected agroforestry and other forest management strategies was discussed with team leaders and natural resource experts from SNNPRS. From the five effective forest management practices, two of them were considered as technological and three of them as managerial innovations. With regard to the former, four agroforestry practices/technologies were identified to be suitable for application in SNNPRS (Table 1). The region is interested in scaling up apple and bamboo-based AF practices in 44 districts; coffee–fruit tree–enset based AF practices in 30 districts; *Faidherbia albida* parkland AF in 17 districts; and *Moringa stenopetal*-based AF in 36 districts. The regional experts also wanted to promote use of *Acacia decurrens* with annual crops during establishment phase (simple taungya practice) and then as woodlot thereafter in 13 zones (Table 1).

**Table 1.** The number of districts where each of the forest management practices proposed in this strategy could be scaled up in SNNPRS.

Management practice	No. of districts identified for scaling up
Agroforestry	
• Apple and bamboo based (highland)	51
• Coffee–fruit tree–enset based (moist midland)	45
• <i>Faidherbia albida</i> parkland (dry midland)	29
• <i>Moringa stenopetal</i> based (lowland)	37
PFM	13
Improved management of dry forests and woodlands	15
<i>A. decurrens</i> based woodlots)	13 (zones)

The scaling up strategy would include: 1) linking these practices to the objectives of enhancing food security, environmental resilience and households income, particularly of resource poor smallholder farmers; 2) planning to build capacity at all levels; 3) creating policy and institutional framework and other enabling conditions for wider adoption; 4) establishing and strengthening strategic linkages and partnerships with public institutions, the private sector and civil society; 5) improving products diversity, volume and quality and adding value and creating market links for forest/AF products and environmental services so that greater socio-economic and environmental benefits can be derived; 6) creating sustainable seed delivery systems for forestry and AF species; 7) resource mobilisation; and 8) encouraging farmer experimentation and participation in AF development while taking special focus on women involvement.

Implementing the strategy requires planning for each of effective forest management practices to be scaled up. In doing so, it is important to consider the following depending on the area where and what to scale up: 1) practices to be scaled up may need to be pilot-tested and evaluated by active participation of intended users; 2) policy and institutional support required for scaling up needs to be properly formulated; 3) partnerships and networks providing the infrastructure, support and leadership for going to scale should be built right from the beginning of programme design and planning; 4) the plan should start with existing experiences, institutions and infrastructure in the region and build on what exists; 5) and there should be a well-thought out plan to build human capital and mobilise resources.

#### **4.3.3. Mechanisms of scaling up**

Forestry and AF development can be enhanced in many different ways. The mechanism of scaling up of the selected innovations and technologies is variable as presented in Table 2. For the selected potential districts and zones for scaling up (Table 1), the region needs to define a business plan for scaling up. A single organisation cannot adequately afford to deal with all these alone without involving other stakeholders. Hence, involving partners is critically important in scaling up of innovations. Another key mechanism will be capacity building at all levels. Developing partnership is an effective strategy to generate more information and mobilise more materials, financial and human resources. This helps to reach more communities/farmers and cover wider areas.. Experts should be trained and federal and regional offices should prepare

manuals and training materials. This needs to be preceded with the development of comprehensive extension packages on innovations to be scaled up. It involves mainly (i) further refining list of districts and wards and villages within each district for scaling up, (ii) developing detail operational/business plan to scale up selected practices and (ii) developing networks and learning platforms to facilitate learning and build on experiences.

#### **4.3.4 Opportunities and challenges for scaling up**

The experience of SNNPRS in traditional agroforestry practices, in plantation forests, in the management of natural forests and woodlands using PFM, in establishing area enclosures is an important opportunity. For example 70 percent of the Gedeo zone is under traditional agroforestry system. Favourable government policies and strategies, existence of organised governmental structures from the region up to ward level, involvement of non-governmental organisations in forest management and the growing demand for wood and NTFPs are other opportunities.

Challenges in scaling up effective practices could be classified as common for all and specific to individual technology and innovation. The challenges commonly encountered in scaling up of innovations are: 1) resource limitations (staff, logistics and operational funds); 2) lack of leadership commitment; 3) difficulties in communicating and coordination leading to competition and duplication of effort; 4) inadequate incentives for staff in government organisations resulting in high staff turnover; 5) weak links between extension service providers and NGOs; and 6) gaps in the research–extension–farmer continuum. Other challenges to be addressed and enabling conditions for scaling up selected practices are highlighted in Table 2.

**Table 2.** Specific challenges to be addressed and enabling conditions to be created for scaling up selected forest management practices in SNNP.

Selected practices and related tasks	Challenges	Enabling conditions
1. Agroforestry		
<p>Partnership with other development actors (research institutes, NGOs, etc.);</p> <p>Prepare extension packages to facilitate introduction and promotion by the extension agents</p> <p>Use appropriate extension methods including demonstrations, farmer-to-farmer visits, monitoring and evaluation plans, etc.)</p>	<p>Longer time and engagement is needed to facilitate adoption of new technologies and approaches;</p> <p>Shortage of improved planting materials;</p> <p>Managing partnership;</p> <p>Underdevelopment of markets for agroforestry products;</p> <p>Free grazing;</p> <p>Limited decision-making power of women on utilisation of forestry and agroforestry products.</p>	<p>Use relevant provisions in national and regional policies and strategies build on existing indigenous knowledge in AF practices</p> <p>Study the demand for agroforestry products and services</p> <p>Work with NGOs to expand coverage and/or maximise impacts</p>

<p><b>2. Participatory forest management</b></p>		
<p>Adoption of proposed improvement measures on PFM process in new sites; Strengthen existing PFM sites (by revising the guideline in use and introduce improvement measures suggested);</p> <p>Build capacity of actors involved in PFM</p> <p>Assign experts to be specifying responsible for PFM at zonal and district levels</p> <p>Attract experienced NGOs to intervene in the newly selected districts/sites;</p> <p>Conduct monitoring and evaluation to learn from the process and outcomes of PFM.</p>	<p>Limited knowledge and skills of experts at local level in establishing and managing PFM;</p> <p>Allocating parts of natural forests for plantations of tea, coffee or rubber</p> <p>Inadequate enforcement of the forest law;</p> <p>Limited involvement of community members in decision-making process; Increasing demand for forest products;</p> <p>Limited value addition and marketing of NTFPs;</p> <p>Boundary related conflicts; Value of forests not fully known and quantified; Limited knowledge of silvicultural aspects of indigenous tree species and in the management of natural forests</p> <p>Encroachment into and settlement inside forests.</p>	<p>Build on experiences of PFM in the region</p> <p>Revise the national PFM guideline taking into account proposed improvement measures</p> <p>Use relevant policies, strategies and laws</p> <p>Use international initiatives such as REDD+</p> <p>Engage donors and NGOs to support PFM;</p> <p>Research biodiversity maintenance and NTFPs by higher learning and research institutions;</p> <p>Existence of traditional institutions managing resources;</p> <p>Willingness of the community to participate in PFM;</p> <p>Availability of diverse and high value forest and agroforestry product and services;</p>

3. Management of dry forests and woodlands		
<p>Two approaches will be employed to adopt innovative ideas:</p> <p>a) innovative ideas and approaches from Benishangul Gumuz will be adopted for gum and resins resource management;</p> <p>(b) innovative ideas and approaches in PFM experiences in high forests will be adopted for the dry land forest and woodlands</p> <p>Develop guideline and appropriate technical package for management, harvesting, processing and marketing of dry forest products;</p> <p>Build capacity at all levels</p> <p>Assign experts specifically responsible for PFM;</p> <p>Attract NGOs and development partners to support PFM intervene in the newly selected districts;</p> <p>Conduct regular monitoring and evaluation.</p>	<p>Inadequate skill and knowledge in the management of gum and resin using PFM</p> <p>Reluctance of some communities to participate in the collection and marketing of gums and resins;</p> <p>Weak enforcement of the forest law and the land use policy;</p> <p>Contribution of the resource to HH income and to the regional economy is not well known;</p> <p>Limited value addition and marketing practices;</p> <p>Limited scientific based information on dry forests and woodlands characteristics and their silviculture;</p> <p>Encroachment and settlement inside dry forests.</p> <p>Over exploitation of the resource and conversion of the forest and woodland to agricultural investment;</p> <p>Resource use conflict between CBOs and pastoralists;</p> <p>Expansion of invasive alien species (e.g. Prosopis);</p>	<p>Encourage employment generation;</p> <p>Experience in PFM in the region and presence of national PFM guideline;</p>



<p><b>4. Plantation forests</b></p>		
<p>Building partnership with other development actors (research institutes, NGOs, etc.);                  Prepare extension packages to facilitate introduction and promotion by the extension agents                  Use appropriate extension methods including demonstrations, farmer-to-farmer visits, monitoring and evaluation plans, etc.)</p>	<p>Reluctance of some community members to accept new species and management practices                   Limited knowledge of the economics of growing A. decurrens over Eucalyptus species</p>	<p>Engage and work with NGOs and the private sector interested in plantation forests                  Build on the rich experience that farmers have in woodlot plantation management;                  Aim at meeting the increasing demand for wood</p>
<p><b>5. Exclosures</b></p>		
<p>awareness creation                  Establishment of user groups and development of by-laws;                  Agreeing on multiple objectives over time and develop management guideline and business plan;                  Facilitate value addition and marketing of products;                  Involve partners to facilitate scaling up of good practices                  Capacity building (technical and physical) of key sectors and institutions                  Monitoring and evaluation;                  Create equitable benefit-sharing scheme</p>	<p>Conflicting interests over the resource (e.g. for grazing)                  Poor market linkages for products                  In case of assisted regeneration low survival rate of seedlings;                  Lack of knowledge and skills for management and utilisation of exclosure resources;                  Limited capacity (technical and physical);                  Low level of commitment of the local government structure in the face of increased demand for land by the landless youth.</p>	<p>Employment generation opportunity                   Existence of experience in exclosure management in the region                   Existence of degraded lands</p>

#### **4.4. Creating enabling conditions for scaling up**

##### **4.4.1. Aligning scaling up programmes with ongoing plans and initiatives**

This scaling-up strategy focuses on promotion of effective practices to better manage natural forests and woodlands and facilitate the rehabilitation of degraded forests and farmlands through area exclosures, agroforests and reforestation and afforestation for ecological and economic gains. Thus, the strategy greatly contributes to the targets set by the Climate Resilient Green Economy (CRGE, 2011) and to the international pledge that Ethiopia made at the UN Climate Summit in September 2014 to restore 22 million ha of degraded forests and landscapes by 2030. The CRGE strategy has set a target to manage 4 million ha of forest (2 million ha of natural forest; 2 million ha of woodlands). SNNP is expected to contribute to this national plan. Major national programmes such as the SLMP (Sustainable Land Management Programme), the AGP (Agricultural Growth Programme) and PSNP (Productive Safety Net Programme) are also operating in the region targeting area closure and seedling production.

REDD+ initiatives in the country are becoming important instruments for engaging key actors in addressing emissions from deforestation and degradation. Similarly, in SNNPRS, six candidate natural forests (Chebera-Churchura, Bonga, Aroessa Churi, Sheka, Sheko-Guraferda and South Bench) were selected for REDD+ implementation that aims to improve forest conditions and forest-based livelihood through carbon financing. Two of the natural forests (Bonga and Sheka Biosphere

Reserve) are officially registered as natural heritage sites and there is a need to conserve them as such. The Konso cultural landscape was registered by UNESCO as a heritage site in 2013. The Gedeo traditional agroforestry system is close to being registered as a heritage site under UNESCO. The core areas are designated as no-go zones except for scientific research. The buffer zones can be used for forest-based income generation activities such as honey production and harvesting of other NTFPs.

##### **4.4.2. Linking with livelihood strategies of communities**

Forests in SNNP produce numerous NTFPs, such as honey, bamboo, spices, gum and resin, medicinal plants, mushrooms, forest coffee, essential oils, edible fruits, etc. that can be harvested by the community in a sustainable manner and marketed, preferably after processing and value addition to increase income to producers. Possibilities for non-wood income from forest (e.g. ecotourism, from eco system services) – e.g. income generated from biosphere reserves, the Humbo

community-based assisted natural regeneration project and the Sodo Zuria agroforestry-based carbon projects are indicative of the possibility for carbon trade. The Humbo project alone is targeted to sequester some 880,000 t of carbon within 30 years and first round of payment of USD 296,586 was made to community organisations; the second round payment of USD 60,861 is yet to be disbursed (World Vision, 2014). The rural communities in SNNPRS are commonly engaged in diversified forest-based and agricultural non-farm activities for their livelihoods. Therefore, in order to effectively implement this strategy it is important to ensure its synergy and compatibility with other rural livelihoods. Therefore, this regional effective forest management strategy needs to be integrated with regional strategies of other economic sectors such as agriculture, water, energy and road construction and the social sector.

**4.4.3. Ensuring active participation of communities and increasing their benefits** SNNPRS has experience in involving the community in the management of natural forest and establishing and managing of exclosures. Scaling up of the selected forest management practices requires even more involvement of the community in setting objectives and preparing a management plan and in the implementation and evaluation of agreed-upon activities. Participation of the community in decision making on benefit sharing, tenure rights and developing by-laws is critical. By so doing, the region will ensure ownership by the community and sustain the outcome of the scaling-up process.

**4.4.4. Building capacity of local government structures and CBOs**

The institutional and organisational capacity of relevant offices at all levels needs to be strengthened in order to carry out the scaling-up process. It is vital to assess the existing institutional arrangements and their capacities for scaling up of the proposed interventions to benefit a large number of people. Scaling up is about political and organisational leadership and the vision and values should be shared with key actors mandated to promote wider use of innovations in the forestry sector. If leaders don't drive the process of scaling up with a clear vision, if institutions don't embody a clear set of values that empower managers and if staff do not have the technical capacity to scale up successful interventions, achievements will remain minimal. Establishing and strengthening local-level institutions with clearly defined roles and responsibilities and creating linkages among key actors at all levels is critical. Building the capacity of those

institutions and staff is key to effectively and efficiently implementing the strategy. The capacity building needs to be based on gaps identified by involving all stakeholders in the process of needs assessment including the rural communities and their CBOs. Based on the gaps identified, training modules with an emphasis on practical training and that build organisational and human resource capacity should be conducted.

#### **4.4.5. Enhancing the role of State agencies and non-State actors**

Scaling up is effectively the task of the government as it requires reaching out to more people in wider areas. This is generally done under the leadership and coordination of federal ministries and regional bureaus mandated to carry out extension. Extension service providers are responsible for formulating strategies to implement national and regional plans, developing guidelines and extension messages in the form of packages for development agents; establishing demonstration sites; providing tailored trainings to users; organising the community in various forms (e.g. CBOs, user groups, or associations, etc.); and conducting monitoring and evaluation. They are also expected to assist smallholders in having better access to credits and markets, besides building strong linkages with research and higher learning institutions that are expected to generate innovations (e.g. management and processing techniques) and scientific information (e.g. productive species, farming techniques, market related data, etc.). These institutions can also play a role in collating baseline data to assess the impacts of effective practice and to organise training of trainers.

The role of non-State actors such as community-based organisations, NGOs and the private sector is also important. The private sector can contribute through creating links with markets, new product development, sharing of experiences on processing and marketing of tree and forest products; providing extension and other support services to growers (organised through fair contractual agreement where the State would play important role in protecting growers from exploitation or mistreatment); supply planting materials (seed, cuttings) and assist in the certification processes when feasible and needed. The non-State actors such as NGOs can contribute to scaling up selected forest management practices through supporting government structures technically and/or financially through projects or by being directly involved in the planning and implementation of tasks in the scaling up programme. In some cases, they could simply support certain activities in the process of scaling up, such as sponsoring training sessions, or providing logistical and budgetary

support. Finally, donors can play important roles by supporting scaling up projects of governments and NGOs.

#### **4.4.6. Strengthening cross-regional and regional–federal collaboration in forestry**

Strengthening collaborations across regional states is the major step to share and learn from experiences of the regional states. There are also certain forestry activities that require joint planning, implementation and evaluation such as product and market development, assessing and improving ecosystem services, notably hydrological outcomes and the management of trans-regional forests and woodland resources, protecting forests (from fires, pests and diseases, etc.) managing conflicts over use of resources, etc.

Implementing scaling up also requires active collaboration between regional states and federal institutions. Effective regional and federal collaboration help improve coordination and reduce duplication of efforts while ensuring synergy. To facilitate this collaboration, cascading the organisational structure from federal/national to district level is necessary. The regional–federal and region-to-region collaborations are particularly needed and facilitate the task of identifying and addressing policy and institutional as well as legal gaps. It makes it easier to set and meet national targets and standards and negotiating tasks and responsibilities amongst key government actors at different levels. Tasks such as (i) standardising and enforcing the tree seed system and forest product and services, (ii) improving the management of trans-regional forest resources and man

aging conflicts over these resources, (iii) monitoring disease and pest incidence at national level, (iv) managing challenges and conflicts in using trans regional resources and (v) conducting periodic forest inventory works and building national and regional database and information-sharing benefit from such collaborations.

## **5. IMPLEMENTING THE STRATEGY**

### **5.1. Strategic directions**

The strategic directions to be followed during scaling up of the selected technologies and innovation are:

- Increase the production and productivity of forests, woodlands and agro forestry systems;
- Enhance ecosystem services of forests and other tree-based systems;
- Increase the involvement of the local communities and the benefits they gain from these systems;
- Support the engagement of the private sector in the development of the forestry sector;
- Strengthen the input and output market system;
- Ensure continuous assessment, introduction and wider use of innovations that enhance the economic and environmental contributions of forests, woodlands and agro forestry systems;
- Build institutional and human power capacity at all level;
- Enforce existing legal and policy provisions and contribute to their improvement.

### **5.2. Preparing an operational plan**

Considering these strategic directions as guiding principles, the concerned regional bureau needs to develop an operational plan for scaling up selected forest management practices. This could be either a longer term, stand-alone programme, a simple project activity to be developed by building on experiences and lessons learned, or could be designed as an integral activity of the regional bureau. Based on the political decisions to be made, then a detailed operational plan shall be prepared.

### **5.3 Addressing organisational, human resources and financial requirements**

Depending on the plan adopted, the organisational, human and financial resources required need to be quantified. Then the region will have to make concerted efforts to generate the required resources from the government's own funding and by soliciting support from development partners.

#### **5.4. Implementation and coordination: Engaging key actors and negotiating roles**

During planning and implementation of strategy for scaling up of effective forest management practices, it is important to identify key State (from Federal to Kebele levels) and non-State actors and specify their roles.

##### **5.4.1. The role of the State**

At the regional level, the following key actors were identified and their respective roles were identified.

**Natural Resource and Environmental Protection Authority.** This authority will be responsible to develop regional plans and provide strategic guidelines for supporting forest sector development efforts in the region. It will prepare relevant regional regulations in line with national laws and prepare respective acts and guidelines. It will prepare extension packages for innovations (technology, processes, management practices, etc.) taking into account regional contexts and legal frameworks. It plays key role in building capacity at all levels within the region. It is also mandated to coordinate actors involved in the forestry sector and ensure availability and quality of planting materials (seed, seedlings). It ensures that there is regular reporting by all concerned and attempt to build database. It reviews and approves plans and reports from zonal offices in line with regional and national plans/targets. It also conducts monitoring and evaluation supervision on quarterly or biannual basis.

**Zonal offices:** These offices facilitate implementation of regional plan by the districts through reviewing district plans and monitoring and evaluation of their undertakings. They also review and approve district plans and reports before submitting to the regional office, besides organising and providing training, jointly with the region for district experts.

**District offices:** The district offices are perhaps the most important in getting things done on the ground. They developed an initial plan in consultation with Kebele offices and communities and aligned these plans in line with targets set by zonal and regional offices. They also implemented the regionally approved plan (in this case, scaling-up plans). In collaboration with the zonal offices, district offices organised training for development agents and communities. They also conducted monitoring and evaluation of activities by Development Agents stationed at the Kebele levels and reported to the zones. They also provided feedback to zonal and regional offices on zonal and regional plans and targets.



#### **5.4.2. The role of non-State actors**

The major non-State actors are communities, NGOs and the private sector. In forest management, it is mainly those forest dependent communities, preferably organised in some sort of forest users groups, cooperatives or associations that could play important roles in the adoption and sustained use of effective forest management practices. Organised community members actively participate in the planning and implementation of better forest management

practices; develop and enforce their own by-laws after getting it approved by concerned authority, sign agreement to responsibly manage and use forests with relevant district or higher level offices based on approved plans, engage in the collection and marketing of forest products by forming cooperatives and unions, engage in forest and product certification and work towards raising the awareness of community members awareness and their right and benefits in managing forest and woodlands.

NGOs could support the process of extension and widespread adoption of effective practice. Commonly they either have projects of their own or assist in training, capacity building, community mobilisation and policy dialogue. If they are well-managed and assisted, they can effectively support the implementation of the regional scaling-up strategy.

The role of the private sector has so far been minimal. But the private sector can play an important role in improving the input and output marketing system. There are opportunities that they could assist communities in product and market development, in value addition and processing and in engaging in out-growers' schemes for selected tree products for example.

#### **5.5. Identifying potential risks and mitigation measures**

Potential risks associated with implementation of the scaling up of the selected technologies and innovations could be site specific but the general ones are: deforestation and degradation of forest resources; climate change and natural disaster; forest fire, disease and pest; resettlement and investments.

Assumptions considered to be important are: ensure capacity building, i) environmental policies and strategies, regulations, ii) functioning support by-laws adequate budget available; harmony within and among community created; proper land-use plan prepared and applied hence investment on forest lands regulated; enabling conditions for retaining staff (adequate allowances/incentives, good governance, etc.) integration of development actors (State and non-State) created; create/upgrade market linkages as appropriate; establish carbon financing schemes for the climate change adaptation and mitigation; The organisational structure of the forestry sector within the region established and strengthened to address scaling projects.

### **5.6. Monitoring, evaluation, reporting and improvement strategy**

As a part of MERI strategy for the scaling-up process, monitoring and reporting are required. There should be plans to undertake participatory monitoring and evaluation by involving the community and other relevant actors at regional, zonal and district levels. Proper formats need to be prepared for reporting. Available mechanisms to timely document and report should be used. Reports could be written (formally using standard procedures, simple e-mails or even telephone calls and reports. A district-net database that links district-zone-region to the federal level can play an important role in timely reporting of project progresses and challenges. In terms of frequency of reporting, districts can send reports to zones and regions monthly, whereas regions can do so quarterly. The reports should emphasise achievements against plans, challenges faced and measures taken as well as major lessons learned to be used in improving the next planning cycle.

## 6. THE WAY FORWARD

The current strategy focuses only on selected best practices identified from five regions. The selected best practices are AF practices from SNNP region, PFM practices in Oromia region, plantation forests in Amhara region, management of dryland forests in Benishangul Gumuz region and management of exclosures in Tigray region. The limitation in resources forced the study teams to focus the study in only one region. Thus the selection was not made at national level. This needs to be done to support the efforts of developing fully fledged scaling up strategy of forest management practices in the country in the general and the region in particular. Considering the strategic opportunities of regions, the following are important issues of forestry sector in SNNPRS:

- Fully-fledged forest institutions should be established and made operational from regional to lower levels
- Establish a forest enterprise that will play a lead role in the management and utilisation of forests and the collection and processing and marketing of wood and NWFPS. This should be based on a detailed study of existing natural forests and in view of promoting plantation forestry in the region;
- Rethinking is needed on investment projects in high forest areas that are drastically affecting forest cover and quality as well as the gene pool of the region.
- Forest protection should be given priority and strong surveillance is required to detect incidence of pests and diseases, alien species and fire, all of which are important challenges to the forestry sector in the region.
- Lack of/poor market linkage for forest products (timber and non-timber) and lack of product standards are also critical problems in the region. Value addition for forest products and creating market linkages need to be created and strengthened in a way that they can contribute to generate income for the communities.
- Enforcement of forest law and land use policy should be ensured.
- Standard the process of license provision for seed, NTFPS and timber products by the forestry agency in the region. Currently, license provision for forest products collection and marketing is given by another sector that is not involved in the management and utilisation of the forest resource.

## Enhancing the role of the forestry sector in Ethiopia

- Encourage import substitution and income generation through increasing product volume and quality and improving market linkages
- Put in place mechanisms for carbon financing for agroforests, forests and woodlands
- Manage resource-based conflicts associated with trans-boundary forests
- Recognise, manage and enhance the role of dry forest and woodlands for livestock production (in pastoral and agro-pastoral areas) and by strengthening sectoral linkages
- Manage wetland resources of the region (in the lake region and along rivers)
- Support forestry research.

The following are important issues for the forestry sector at national level:

- Better sectoral linkages between forestry and others sectors
- Better linkages of federal and regional forestry institutions
- Strengthened linkages between regions and the federal system with well-defined roles and responsibilities of each party.
- There should be a national forestry strategy.

## REFERENCES

- Antle, J.M., Stoorvogel, J.J. and Valdivia, R.O. 2007. Assessing the economic impacts of agricultural carbon sequestration: Terraces and agroforestry in the Peruvian Andes. *Agriculture, Ecosystems and Environment* 122: 435–445.
- Assefa, S. 2007 Economic value of afro-montane natural forest in Sheka zone, south-west Ethiopia. In: Masresha, F. (ed.) *Forests of Sheka: Multidisciplinary Case Studies on the Impacts of Landcover Changes, Southern Ethiopia*. MELCA Mahiber, Addis Ababa. 183–217.
- Bedru, S. 2007. Land use/landcover changes in Anderacha and Masha districts of Sheka zone, SNNP regional state. In: Masresha, F. (ed.) *Forests of Sheka: Multidisciplinary Case Studies on the Impacts of Land Cover Changes, Southern Ethiopia*. MELCA Mahiber, Addis Ababa. 21–56.
- Beer, J., Muschler, R., Kass, D. and Somarriba, E. 1998. Shade management in coffee and cacao plantations. *Agroforestry Systems* 38: 134–164.
- Bekele, M. 2011. Forest plantations and woodlots in Ethiopia. *African Forest Forum Working Paper Series*. Nairobi, Kenya.
- Bekele, M. and Tesfaye, T. 2013. Project impact assessment. Final report. Non-timber forest products – participatory forest management (NTFP–PFM). Research and Development Project, South West Ethiopia.
- Bendz, M. 1986. Hill Side Closures in Wollo. Ethiopian Red Cross Society Mission Report, Vaxjo, Sweden.
- Birhane, E. 2002. Actual and potential contributions of enclosures to enhance biodiversity in drylands of eastern Tigray, with particular emphasis on woody plants. MSc thesis. SLU, Sweden.
- Bishaw, B. 2001. Deforestation and land degradation in the Ethiopian highlands: A strategy for physical recovery. *Northeast Africa Studies* 8(1): 7–26. Oregon University, Corvallis.
- Bishaw, B., Neufeldt, H., Mowo, J., Abdelkadir, A. Muriuki, J., Dalle, G. Assefa, T., Guillozet, K., Kassa, H. Dawson, I.K., Luedeling, E. and

- Mbow,C. 2013. Farmers' strategies for adapting to and mitigating climate variability and change through agroforestry in Ethiopia and Kenya. Oregon University.
- Castañeda, F. 1999. Why national and forest management unit level criteria and indicators for sustainable management of dry forests in Asia? In: Cheng,T.L. and Durst, P.B. (eds). Development of National-level Criteria and Indicators for the Sustainable Management of Dry Forests of Asia. Bhopal, India.
- [CRGE] Climate Resilient Green Economy Strategy. 2011. Climate resilient green economy strategy. Environmental Protection Authority, Addis Ababa, Ethiopia.
- Dessie, G. and Kleman, J. 2007. Pattern and magnitude of deforestation in the South Central Rift Valley region of Ethiopia. Mountain Research and Development 27(2): 162–168.
- [EFAP] Ethiopian Forestry Action Plan. 1994. Final report. Ministry of Natural Resources Development and Environmental Protection, Addis Ababa, Ethiopia.
- [FAO] Food and Agriculture Organization of the United Nations. 2010. World view of plantation grown wood. Forestry Department Caracalla, 00100 Rome, Italy.
- [FFE] Forum for the Environment. 2009. Ethiopian forestry at a crossroads: The need for a strong institution. Proceedings of a Workshop. Heckett, T. and Aklilu,N. (eds.) Forum for Environment, Addis Ababa, Ethiopia.
- Gündel, S., Hancock, J. and Anderson, S. 2001. Scaling up strategies for research in natural resources management: A comparative review. Chatham, UK, Natural Resources Institute.
- Hurni, H. 1988. Degradation and conservation of the resources in Ethiopian highlands. Mountain Research and Development 8(2/3): 123–130.
- [IIRR] International Institute for Rural Reconstruction. 2000. Going to scale: Can we bring more benefits to more people, more quickly? International Institute for Rural Reconstruction, Silang, Cavite, The Philippines.
- Kang, B.T. and Akinnifesi, F.K. 2000. Agroforestry as alternative land-use production systems for the tropics. Natural Resources Forum 24:

137–151.

- Kebede, W., Mengistu, T., Taddese, H. and Tolera, A. 2014. Impact of land cover change on water quality and stream flow in Lake Hawassa watershed of Ethiopia.
- Lemenih, M. and Woldemariam, T. 2010. Review of forest, woodland and bushland resources in Ethiopia up to 2008. In: Edwards, S. (ed.) Ethiopian Environment Review No. 1. Forum for Environment, Addis Ababa.
- Méndez, V.E., Bacon, C.M., Olson, M., Morris, K.S. and Shattuck, A.K. 2010. Agrobiodiversity and shade coffee smallholder livelihoods: A review and synthesis of ten years of research in Central America. *Professional Geographer*. 62: 357–376.
- Mengistu, T. 2001. The role of area closures in the recovery of woody vegetation in degraded hillsides of Biyo and Tiya, central and northern Ethiopia. Swedish University of Agricultural Sciences.
- Mezgebo, A. Tessema, W. and Asfaw, Z. 2013. Economic values of irrigation water in Wondo Genet district, Ethiopia: An application of contingent valuation method. *Journal of Economics and Sustainable Development* 4(2): 2336.
- Molla, A. 2013. Woody species diversity and carbon stock under patch natural forests and adjacent enset–coffee based agroforestry systems. MSc thesis. Hawassa University, Wondo Genet College of Forestry and Natural Resources.
- Montagnini, F. and Nair, P.K.R. 2004. Carbon sequestration: An underexploited environmental benefit of agroforestry systems. *Agroforestry Systems* 61: 281–295.
- Nair, P.K.R. 1993. *An Introduction to Agroforestry*. Kluwer Academic Publishers, Dordrecht, The Netherlands.
- Nair, P.K.R., Kumar, B.M. and Nair, V.D. 2009. Agroforestry as a strategy for carbon sequestration. *Journal of Plant Nutrition and Soil Science* 172: 10–23
- Negash, M. 2013. The indigenous agroforestry systems of south-eastern Rift Valley escarpment, Ethiopia: Their biodiversity, carbon stocks and litterfall. PhD thesis. University of Helsinki, Finland.
- Neupane, R.P. and Thapa, G.B. 2000. Impact of agroforestry on soil fertility and farm income under the subsistence farming system of the



- middle hills, Nepal. *Agriculture, Ecosystems and Environment* 166: 1–11.
- Nyssen, J., Haile, M., Naudts, J. et al. 2009. Desertification? Northern Ethiopia rephotographed after 140 years. *Science of the Total Environment* 407: 2749–2755
- Pohjonen, V. and Pukkala, T. 1990. *Eucalyptus globulus* in Ethiopian forestry. *Forest Ecology and Management* 36: 19–31.
- Prasad R. & Kotwal P.C., 2001. Progress of implementation of Sustainable Management of Dry Forests in Asia with special emphasis on Indian initiative. Paper contributed for the International expert meeting on Monitoring, Assessment and Reporting (MAR) on the progress toward Sustainable Forest Management, 5-8 November 2001, Yokohama, Japan.
- Satterlund, D.R. and Adams, P.W. 1992. *Wildland Watershed Management*. 2nd edn. John Wiley & Sons, New York, N.Y.
- [SNNPR] Southern Nations, Nationalities and Peoples Regional State. 2011. *Forest Development, Conservation and Utilisation Proclamation No. 2011*, Hawassa.
- Tasfay, F. 2011. Woody species diversity, management and carbon stock along an elevation gradient in coffee-based agroforestry. MSc thesis. Hawassa University, Wondo Genet College of Forestry and Natural Resources.
- Teketay, D., Lemenih, M., Yohhanes, B., Bekele, T., Yemishaw Y., Feleke S., Tadesse W., Mogess Y., Hunde, T. and Nigussie, D. 2010. Forest resource and challenges of sustainable forest management and conservation in Ethiopia. In: Bongers F. and Tennigkeit, T. (eds). *Degraded Forest in Eastern Africa: Management and Restoration*.
- Tekle, K. 1999. Land degradation problems and their implications for food shortage in South Wello, Ethiopia. *Environmental Management* 23: 419–427.
- Tekle, K. 2001. Natural regeneration of degraded hill slopes in southern Wello, Ethiopia: A study based on permanent plots. *Applied Geography* 21: 275–300.
- Verchot, L., Van Noordwijk, M., Kandji, S., Tomich, T., Ong, C., Albrecht, A., Mackensen, J., Bantilan, C., Anupama, K.V. and Palm, C. 2007. *Climate change: Linking adaptation and mitigation*

through agroforestry. *Mitigation and Adaptation Strategies for Global Change* 12: 901–918.

- [WBISPP] Woody Biomass Inventory and Strategic Planning Project. 2004. Forest resources of Ethiopia. Woody Biomass Inventory and Strategic Planning Project. Ministry of Agriculture. Addis Ababa.
- Woldemariam, T. 2007. The impact of landuse/landcover changes on biodiversity in Masha and Anderacha districts of Sheka zone, SNNP regional state. In: Masresha Fetene (ed.) *Forests of Sheka: Multidisciplinary Case Studies on the Impacts of Land Cover Changes, Southern Ethiopia*. MELCA Mahiber, Addis Ababa. 57–88.
- World Bank. 2003. *Scaling-up the impact of good practices in rural development*. Report No. 26031. Washington, DC.
- World Vision. 2014. *Climate change and environmental project experience of World Vision, Ethiopia*. Hawassa, Ethiopia.
- Zewdie, J. 2007. The impact of the cultural changes on the people of Sheka and their traditional resource management practices: The case of four wards in Masha district, In: Masresha, F. (ed.) *Forests of Sheka: Multidisciplinary Case Studies on the Impacts of Land Cover Changes, Southern Ethiopia*. MELCA Mahiber, Addis Ababa. 89–136.