Strategic Actions for Integrated Forest Development in Ethiopia

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Foreword

Trees and forests contribute in many ways a wealth of products and services that may be used to improve the well-being of populations of countries. Forestry, besides its direct contribution to the national economy through wood and non-wood products, it contributes significantly to various sectors of the national economy such as energy, agriculture, food, industry, health, environment, tourism and the like. In general, the economic contributions of forestry at national scale can be seen from various angles such as employment generation, earning of foreign currency through export, savings through import substitutions as well as the indirect contribution through support to another sectors of the economy, particularly agriculture.

Among others, the steadily growing population pressure and agricultural expansion in Ethiopia will inevitably increase the forest resources utilization (construction and fuel wood, wood, etc), and hence, different forms of unsustainable forest utilization will take place (fires, encroachment, logging, cultivation, urbanization) in coming decades ultimately leading to the total forest depletion. Therefore, deforestation and forest degradation is one of a serious environmental challenge in Ethiopia, and also the major underlying causes for declining agricultural productivity.

Destruction of the natural forests of Ethiopia results directly in the loss of unaccounted plant and animal species as well as in a shortage of fuelwood, timber and other forest products. It also indirectly leads to more aggravated soil erosion, deterioration of the water quality, further drought and flooding, reduction of agricultural productivity, and to an ever-increasing poverty of the rural population. It is obvious that the depletion of forest resources contributes significantly to the climatic and physical environment change. To worsen the matter, the reforestation effort is not, by any means matching with the rate of deforestation.

Plantation development is a key strategy to address the problem of deforestation and supplement the shortage of supply of woods from natural forests. Plantation programs are conducted to achieve several objectives: to provide high value commercial timbers and fuel wood, to rehabilitate degraded lands, for agroforestry purposes, etc.

Ethiopia, especially since 2007 is undertaking encouraging massive tree-planting campaigns in connection with the celebration of its unique Millennium, mainly with participation of rural people. However, several challenges are reported on these massive annual plantation campaigns, i.e. lack clear strategy on plantation programs, lack of truthful survival and forest inventory data at the regional and national level, poor input provision such as budget, forest seed, and nursery materials etc.
Therefore, there is an urgent need to prepare a clear plantation development strategy in the country. Hence, discussion paper on strategic actions needed for integrated forest development in Ethiopia. It was prepared, deliberated, and enriched on a national workshop involving several stakeholders. The outcome of the whole process is this document entitled “Strategic Actions for Integrated Forest Development in Ethiopia.” I believe that the strategic actions here identified will be taken up by forestry experts and all actors while planning and implementing forthcoming plantation programs.

Finally, on behalf of the Forestry Research Process of EIAR and myself, I would like to forward my sincere thanks to Dr. Solomon Assefa, Director General of EIAR for initiating the idea and for his continuous follow-up of the preparation of this document. My special thanks are to Dr. Abayneh Derero, Negash Mamo, and Kaleb Keleimu for their strong effort and devotion to prepare this invaluable document.

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The importance of forest and trees to climate change adaptation and mitigation, livelihood, national economy, watersheds and agricultural production is eminent. Deforestation still poses the greatest threats to the remnant forests in some parts of the globe, whereas it has been curbed and forest cover is increasing in some other regions. The situation of forest resources in Ethiopia falls under the former category, and this trend needs to be reversed. Reversing the trend requires strategic approach to maintaining what we have and developing new-planted forests and increasing tree cover outside forests. Efforts of various stakeholders are fragmented and there is generally lack of systematic approach and long-term commitment, weak coordination among actors, absence of reliable data on forest resources and forest development, continued forest degradation, inadequate forest technologies, and weak linkage with international communities to use available opportunities and increased vulnerability of agriculture and energy sector due to forest degradation.

It was with this understanding that the assignment of producing strategic ideas by involving the various actors in the forest sector so that all the stakeholders can be aligned better to act synergistically. Then, we conducted series of consultative meetings with several bodies at regional, zonal and woreda levels involved in forestry activities, and produced a discussion paper on strategic actions for integrated forest development. While preparing the discussion paper, recent recommendations on strategic action by the World Forestry Congress and the World Agroforestry Congress were also reviewed. We presented the document first to forestry research staff of EIAR, and then to stakeholders from all over the country at a national workshop. Consequently, the strategic objectives were prioritized and the strategic actions and institutions listed were further refined and enriched during the workshop.

Forest development reports of SNNP, Amhara and Tigray Regions and experiences of Humbo CDM and Bale REDD projects were deliberated in the workshop. Opportunities for forest development disclosed at the workshop include presence of legal frameworks, government commitments, land, labor, and markets, presence of capable NGO's, international organization and forest conditions becoming a global concern, development partners, existence of national institutions, and Ethiopia's international commitments and signatory to various conventions.

We are confident that implementation of the strategic actions in a coordinated manner improves the forest conditions and enhance economic, social and environmental benefits thereof. Finally yet importantly, we would like to acknowledge Dr. Solomon Asefa, DG of EIAR for initiating this work, and all parties and individuals who participated in the whole process of producing this strategic document for their very valuable and productive contributions.
Introduction

The Ethiopian Institute of Agricultural Research (EIAR) has mandate to conduct and coordinate research in crop science, forestry, livestock, soil and water and agricultural mechanization all over the country. The institute has clear strategies and working modalities to disseminate and popularize the various technologies. Hence, EIAR engaged in propagation and dissemination of agricultural technologies in recent years. EIAR envisages bringing this experience in to the forestry sector and bringing significant changes in forestry development in the country. EIAR recognizes that the policy environment to forestry developments is conducive and very much confident that its attempt will be given political support both at federal and regional level and that various stakeholders will align themselves with this vision in ensuring successful forestry development in the country.

The goal of EIAR’s intervention in forestry development of the country is to ensure research-development continuum, capacitate, and mobilize the different governmental, non-governmental, and local institutions that have a stake in forest resource management and development and establish a system and forum to synergize and mobilize resources, efforts, and expertise towards sustainable forestry development. This entails deepened understanding of the forestry development efforts of current and past, identifying key constraints, and problems that hampered afforestation/reforestation endeavors in the country and designing ways to overcome the problems.
Status of Forestry Development

With the above objective EIAR organized a technical team to formulate a draft strategy. The team conducted discussions with experts in

- Oromiya (Regional Bureau of Agriculture, Shashemene Woreda Bureau of Agriculture),
- Southern Nations, Nationalities and Peoples Region (SNNPR) (Regional Bureau of Agriculture, Sidama Zone Bureau of Agriculture and Dale Woreda Bureau of Agriculture)
- Amhara (Regional Bureau of Agriculture, Western Gojam Bureau of Agriculture, and Organization for Relief and Development in Amhara) and
- Tigray (Regional Bureau of Agriculture, Wukro Bureau of Agriculture, Relief Society of Tigray and Alaje Forest Enterprise)

on the recent forestry development activities, and learnt the following facts.

Policy and institutions

The bulk of forestry development activities in the four regions are being underway in various Woredas under the Bureau of Agriculture, mostly there are two experts for forestry duties at zonal and Woreda levels and one development agent catering for forestry and other natural resource management activities at Kebele level. However, Oromiya has recently established the region’s Forestry and Wildlife Authority, which is responsible for managing state forests/forest enterprises and parks. The southern region has recently prepared a new forestry legislation of the region. There will be serious of deliberations on the draft forest legislation and is expected to fill the legal gaps in the earlier legislations in the region. In Amhara region, efforts are underway to establishing a forestry agency in the region; draft is prepared for ratification. Furthermore, a forestry enterprise will be established to administer the existing state forests.

Technical capacity building

The forestry program in Oromiya recognizes the importance of farmers training to increasing their expertise in forestry development activities. Hence, massive training scheme was conducted last year involving
486,000 farmers. The southern region also undertakes quite extensive trainings to experts at woreda levels. The Amhara Region on the other hand plans to give trainings to around 1000 experts.

**Stakeholders**

Some of the stakeholders in forestry development activities in the regions include local and international NGOs such as World Vision, Organization for relief and development in Amhara (ORDA), Relief Society of Tigray (REST), Orthodox Church, Mekane Yesus Church, and GIZ. The NGOs sometimes provide material support to tree nursery activities, provide fruit trees and run various rehabilitation projects.

**Forest cover and administration in the regions**

Oromiya and the SNNP regional states claim a forest cover of 8.5% and 11% respectively, whereas the forest cover in Amhara and Tigray is not known precisely. However, there is strong argument that Tigray has become greener in the last few decades through area exclosure, soil and water conservation, and tree planting activities. All the state forests in the Southern region, Amhara and Tigray are under administration of woreda bureaus of agriculture, however in Oromiya they are under the jurisdiction of Oromiya Forest and Wildlife Authority. Quite a number of the forests have been practicing various versions of participatory forest management (PFM) in Oromiya and SNNP regions.

The four regions claim the planting of close to 2.21 billion seedlings in 2009 (i.e. Oromiya, SNNP, Amhara and Tigray: 450 mil, 133 mil, 907 mil and 720 mil, respectively) with survival rate varying from 56 to 87% in various Zones and Woredas. The four regions have planned to plant over 7 billion propagules in 2010 (i.e. Oromiya, the SNNP, Amhara and Tigray: 4.5 billion, 0.31 billion, 1.7 billion and 0.78 billion, respectively), and they claim they have planted over 4.4 billion propagules (3.8 billion seedlings and the remaining broadcasting and planting cuttings), which is 63% accomplishment. The mean of the two years (2009 and 2010) then stands at planting and broadcasting of over 3.3 billion propagules per annum.

Zonal level tree planting varies from 24 million to over 120 million seedlings, and the plan for 2010 varies from 39 to 291 million.
The Woreda level tree planting varies from 1.1 to 3.5 million seedlings but with meager financial resources, for example, 3000 Birr in Shashemene Woreda). Tree plantings are being carried out on private as well as in forms of community woodlots. There are at least one state run and several community and private nurseries in various Woredas of the four regions to preparing tree seedlings. The Woredas give technical support to most of the private and community nurseries. Some of the Woredas in the regions undertake the tree planting activities through safety net schemes.

Not all the propagules planted were seedlings but also included direct sowing and cuttings. For example, the tree planting on 2009 in Tigray included broadcasting of 470 million seeds and planting of 100 million splits and 152 million seedlings. Plan for 2010 in Tigray includes establishment of woodlots, fruit orchards, periurban plantation, and biofuel crops by cooperatives on degraded lands, area exclosure, and their management. The Amhara region conducts compiling and scaling up of the success stories. One of the zones in the region West Gojam Zone will carry out a campaign called as "4 trees in the 3rd millennium."

In the Zone, 140 million seedlings will be prepared by private nurseries, 87 million by community nurseries, and 30 million by state owned nurseries. In Tigray, there are 401 community nurseries, 280 state nurseries and 18,000 private nurseries with varying capacity. There are 23 specialized fruit tree nurseries, and there is a plan to plant 21 million fruit trees (orange, mango, avocado, apple, and banana) next year in the region. FAO used to support the fruit trees nursery establishments and managements. For timber species and fruit trees potted seedlings are normally prepared. The seedling production of the region for 2010 will be carried out in state nurseries (156 million), community nurseries (40 million) and private nurseries (34 million).

Rehabilitation and area exclosures
The regions undertake extensive area exclosure activities. The Southern Region is undertaking area exclosure at Silti, Hadya, and Kambata Zones. The rehabilitation activities in Amhara region include extensive land husbandry and gully reclamations. Tigray claims about 80% of agricultural field in the region as already being under soil and water
conservation management. In the Region, moisture enhancement structures are always introduced in area exclosures. The plan of area exclosure in Tigray for 2010 is 261,701 ha.

**Tree planting and rehabilitation in watersheds**

Some of the Woredas in the Southern Region have opted to follow watershed approach and hence 5 model catchments are identified for tree planting in Dale Woreda, Sidama Zone. The Amhara region has planned to undertake integrated watershed development with participatory approach on 131 micro catchments at zonal and Woreda levels, and three major watersheds at regional level.

**Species of focus**

Eucalypt and *Grevillea robusta* are the major plantation species in the four regions. Oromia alone plans to plant 500 million seedling of *Grevillea robusta* in 2010. Other tree species being planted include *Podocarpus falcatus*, *Olea africana*, *Grevillea robusta*, *Pinus patula*, *Sesbania sesban*, *Millettia feruginea*, *Acacia saligna*, *Calliandra calothyrsus*, *Leucaena leucocephala*, *Moringa stenopetala*, *Jatropha curcas*, neem, and various fruit trees (avocado, mango, and apple). Bamboo happens to be a priority species in the Southern region, and consequently a total 1252 ha of land in the zone was covered by Bamboo in 2009. We propose various mixes of agroforestry technologies and tree species for various agroecologies (Annex 1) to be considered for planting but farmers make the final decision for the planting both in private and in communal lands.

**Private nurseries**

In Amhara Region, there are private nurseries that can produce up to 500,000 seedlings, and earn as high as 11,000 birr from sale of part of seedlings. In Shashemene, Oromiya, the youth have formed associations for raising seedlings, and hence have managed to prepare 4.5 million seedlings this year. They have also established their own plantation. The farmers in the Woreda produce as well as sale seedlings of *eucalypt* and *Cupressus lusitanica*. Seedling sale is becoming source of income to some farmers in Dale Woreda, Sidama zone.
Forestry development by NGOs and private sector

The organization for relief and development of Amhara (ORDA) participates in site selection and post planting management activities, undertakes soil conservation activities in hilly areas, undertakes plantations on degraded sites, and protects its own project sites. After some intervention years, ORDA passes on the sites to the community, and proposes state-community ownership and administrations to be put in place for efficient utilization of plantations. 60-70% of the plantation establishment cost of ORDA is for building physical structures. Furthermore, ORDA gives protection to the plantations it establishes. Survival of the plantations ranges from 62 - 87%. ORDA has planted more than 60 million seedlings in 2009. Great emphasis was given to Jatropha plantation in which 25-30 million seedlings were established through direct sowing.

The other major species included eucalypt, Acacia senegal, Grevillea robusta, Cordia africana, Hagenia abyssinica, Olea africana and Juniperus procera. ORDA also runs a biodiversity project on the indigenous species. However, ORDA is facing terrible shortage of tree seeds for its various planting programs. It has strong rehabilitation projects but much needs to be done on agroforestry interventions. However, preparation and planting of apple seedlings was done quite extensively. In Tigray, REST is active in many soil, water, and forestry development activities.

Alaje forest development and utilization PLC was established 5 years ago. Over 16,000 ha eucalypt plantation are established at Adigrat, Ambalage, Hagereselam, Maichew, and Korem by the PLC. The species planted are E. camaldulensis, E. globulus, E. cladocalyx, and E. grandis. It is also planned to establish plantations that considers production and environmental services. There are regenerations of Olea and Juniperus under the plantations. The PLC supplies logs to Maichew Chipwood factory: 270 cubic meters daily. The PLC is briquetting woods for fuel, and plans to establish aloe, agave, and Jatropha plantations. Local people benefit from grass collection and honey production from the plantation areas.
Factors affecting forestry development in four regional states

The discussions held with the various Bureaus of Agriculture at Regional, Zonal and Woreda levels and with other relevant institutions engaged in natural resource management, have revealed some factors that have negatively influenced the forestry development activities of the country; the major problems of forestry development are discussed in the following sections.

Lack of appropriate institutional arrangements
The forestry sector has existed within the MoA since about the mid 1940s under various capacities. Following the federal arrangement, the responsibilities for management and conservation of forest resources have been transferred to the regions. Over the past decades, there have been a number of restructuring activities. Such frequent changes in organizational structure has resulted in discontinuity in project planning and implementation and caused imbalances and inequities in the allocation of financial, human, and other resources as well as staff turnover, and hampered forestry development (MoA, 1999). It is learnt that the Bureaus of Agriculture give less attention to forestry development and hence the forestry sector still suffers from lack of proper attention, which is reflected in its poor institutional arrangement.

Unknown contribution of forestry to the GDP
The contribution of forestry to the GDP remains unknown and heavily underestimated due to improper accounting. For example, 20 - 30 tracks of eucalypt poles are exported to the Sudan every day from the Amhara region alone.

Inadequate budget
Some of the bureaus could not carry out appropriate monitoring and evaluation of the tree planting activities carried out in the region due to logistic problems. The experts in such bureaus are restricted to only compiling reports. Some of the Woredas are given very huge task of
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preparing seedlings (up to 3 million) but with very low budget (with 3,000 birr only).

**Skill gaps in forestry**

There is apparent skill gap among experts involved in forestry development activities. The experts need to be provided with series of trainings on successful forestry development techniques.

**Absence of clear strategy**

Attempts have been made to prepare action plan for forestry development at federal as well as regional level for proper implementation of forestry development program especially in selected forest priority areas. However, the forestry strategy and action plans developed at regional and federal levels (EFAP, OFAP, and TFAP) have not been properly implemented. Due to this the national forest priority areas were neglected and degraded due to illegal cutting of trees as well as forests. The lack of clear strategy is being reflected in some of the regions with the execution of communal planting without the full willingness of the society. There is lack of systemic approach, coordination, and appropriate planning of projects. No clear strategy is set what to plant where (in agroforestry), what kind of management to apply on the existing area exclosures and how to help the local people from the interventions. In the region planting is mainly done on communal lands, most farmlands are bare, Communal plantations are dominated by eucalypt; other alternative species need to be sought.

**Insufficient land use planning and administration**

There is no proper land use planning and land use policy, which is impediment for conservation and management of natural resources in some of the regions. Land use policy and policy instruments need to be in place to harmonize resettlement programs and investments with natural resources and ecosystems protection. There is a need to enforce proper land management regulations otherwise land degradation will remain unabated.

**Deforestation**

There are illegal cuttings and embezzlements in some areas, and hence deforestation of the existing natural forests remains unchecked.
Deforestation remains unchecked also due to the pressure from other land uses including resettlement and investment and due to the need for fuel. Since forest is a social resource and belongs to all, it needs to be administered through strong regulations.

**Inadequate information**

The forestry sector of the country lacks sufficient and accurate information of forest resources at national as well as regional levels. There is poor and inaccurate information about the number of seedlings planted and other forestry development endeavors in the regions. Moreover, there is poor information exchange among the actors and the stakeholders of the sector. Because of poor reporting system, the sector also lacks information on efforts, success and failure stories of the national forestry development endeavors.

**Less technical support**

Poor quality seedlings including bare rooted seedlings, low level of technical back stopping to the tree planting activities of the community, as well as poor seedling establishment techniques were among the factors for poor survival rate of seedlings on agroforestry and plantation development. In addition, low level of knowledge in technological adoption like alley (hedgerow) cropping practices was also problematic.

**Inadequate and poor quality tree seeds**

There is critical shortage of tree seeds in all of the regions. The shortage of some of the species like *Grevillea robusta* and *Acacia decurrens* happens to be chronic in some of the regions. There are problems with mother tree selections for local collection and generally, there is poor germination. Most of seed procurement is carried out from natural forests and plantations but not from seed orchards. The genetic histories of most of the plantations are not very well known. Furthermore, the need of farmers for fruit trees remains unsatisfied.

**Poor seedling quality and inappropriate silviculture**

The poor quality of seeds is reflected on the quality of produced seedlings. The other major problem in tree planting is most of the
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Seedlings planted are bare-rooted, which makes survival of seedlings even more difficult. This shows shortage of capital in potted seedlings preparation. Seedlings need great care from nursery through planting, which often are overlooked by many during handling and planting. There are site preparation problems, planting problems and unfortunate time competition with agricultural activities. There is also problem on post harvesting attendance of the seedlings which coupled with free grazing and deliberate uprooting greatly reduce the overall survival of the seedlings planted. In many places, there are efforts to carry out forestry development by various actors but the outcome seems not satisfactory. Eucalypt is widely planted by farmers successfully; however, there are always certain problems of survival with the other tree species. Forestry is always conceived as a very easy intervention by non-professionals and this misconception needs to be turned around. The Majority of the millennium tree plantings were carried out on farmlands. The problems related with seedlings survival need a further investigation. Focusing on numbers is a problem: there needs a paradigm shift from quantity to quality. There is serious seedlings survival problem; there are trees on backyard, however, farm lands remaining bare; this depicts management problems in the latter. Grazing poses the greatest problem on the success rate of agroforestry interventions, open grazing remains to be a threat to seedlings survival. Moisture stress happens to be the principal causes of seedling death in arid localities. In some places, termite attack is the major cause of seedling death. Due to all these and other problems in nursery, planting and post planting activities, performance of the planted seedlings happen to be inferior quality. There is also problem of species/provenance site matching.

However, these narrated problems on seedling survival happen to contradict with the reported seedlings survival report of 56 to 87% to a certain extent. There are site preparation problems, planting problems, time competition with agricultural activities and people sometimes do not own the planting objective.

Forestry is a long-term investment

The long gestation period of plantation development activities as compared to agricultural development did not motivate many of the
investors or donors contribute to the forestry development program in the country. Therefore, it is worth to introduce attractive and active mechanisms to promote the involvement of investors in agroforestry and plantation development program of the country.

**Insufficient research extension linkage**
The research institutions are not solving the technical problems in forestry development and are not delivering sound technologies. Old technologies are used for the last several years. For example, the nursery technologies and the type of species prepared remain unchanged. It is clearly recognized that the linkage between research and extension services is poor. This is recognized as one of the main reasons for poor performance of forestry development in the country.

**Weak coordination**
Federal institutions' are not performing their national mandates, which can include preparation of strategic plans, capacity building, and data base management. There has never been an all-inclusive discussion on identifying and prioritizing strategic interventions in the forestry sector. Moreover, the various GOs, NGOs, and PLCs in the regions fail to work in harmony and happen to be uncoordinated in realizing sustainable forestry development with a shared vision.

**Strategic Issues for Successful Forestry Development**

Besides the assessment at local level, review of pertinent findings of recent international congresses on forestry, agroforestry and climate change (Annex 2-4) has been made while developing this strategy. To achieve the overall objective of the strategy, the following ten strategic issues are identified as indispensable components of the intervention.

**Agroforestry**
It in general, in the tropics that the number of trees in forests is declining and the number on farms is increasing (FAO, 2005). Hence, promoting agroforestry, which is perceived as a dynamic, ecologically based
natural resources management system that, through integrated trees into agricultural systems and landscapes, diversifies and increases production, while simultaneously promoting social, economic, and environmental benefits for land users’ is necessary. Agroforestry makes agricultural land a net sink of carbon, multifunctional and evergreen. Multifunctional agriculture and evergreen agriculture are relatively new but widely embraced concepts in ensuring ecology protection and conservation of natural resources while increasing agricultural productivity (WAC, 2009). Tree components in agroforestry systems through their deep roots explore a large soil volume of water and nutrients, which help to maintain production during drought seasons. Trees in agricultural lands can pump excess water out of the soil profile more rapidly by higher evapotranspiration and maintain aerated soil conditions in high rainfall areas and seasons. The increased soil cover and multi strata cropping pattern system in landscapes under agroforestry utilize the light resource efficiently and guard the soil from direct sunlight that leads to a reduction in soil temperature.

As the preliminary assessment in the four regions indicated, the most of produced seedlings are distributed to farmers to be integrated in agricultural fields and to be planted around homesteads. We then have to make sure that the species selected to planting and the agroforestry schemes are appropriate and innovative. We can integrate fertilizer trees for land regeneration and soil health; fruit trees for nutrition and income; fodder trees that improve livestock production; timber and fuelwood trees for shelter and energy; medicinal trees to combat disease; and trees that produce gums, resins or latex products (Garrity, 2004) in the agroforestry system. In Malawi, maize yields were increased up to 280% in the zone under the canopy of the acacia-like tree species, *Faidherbia albida*, compared with the zone outside the tree canopy (ICRAF, 2009). Hence introduction and proper management of *Faidherbia albida* and other leguminous woody species (such as *Cajanus cajan*, *Sesbania sesban*, *Tephlrosia spp*, *Acacia spp*, *Callianda calothyrsus*, *Leucena spp* and *Senna spp*), which are also proved to increase crop productivity (Sileshi et al, 2009) on to maize fields and other major crop fields would certainly increase crop productivity. The introduction and management of both conventional and indigenous fruit trees and fodder species will also be the target of the intervention. Such an intervention
will ensure our agricultural landscape to be evergreen, multifunctional and contribute to the environmental resilience.

**Strategic actions**

- Identify suitable and high value species and profitable agroforestry practices for major agroecologies
- Promote suitable species and profitable agroforestry practices in selected areas
- Document and evaluate success stories in agroforestry
- Enhance research and development in tree domestication and value addition of agroforestry products
- Optimize and promote traditional agroforestry practices
- Promote farm microclimate improvement through tree based systems
- Integrate agroforestry system with conservation agriculture

**Minimizing deforestation and forest degradation**

The trend of forest depletion needs to be averted for the well-being of humanity in this planet. Continued deforestation otherwise would lead to shortage of wood and non wood products, ecological degradation and loss of biodiversity, deterioration of watersheds and watershed services and emission of green house gases (GHG) coupled with minimized carbon sequestration. Hence, this poses grave global concern including the uncertainties of our futurity with the much felt climate changes. Reducing emissions from deforestation and forest degradation in developing countries (REDD) has moved to center stage in the international climate debate in recent years. Hence, efforts need to be exerted by all the regional states, by all concerned bodies and individuals to halt deforestation and depletion of the remnant natural forests and woodland vegetation of the country. We have to do this for our own national interest and for the benefit of the current and the future generations. We should also be encouraged by such international provisions as REDD and build the national capacity to negotiating and tapping of such resources.

All regional states are expected to show commitment to fighting deforestation and depletion of the remnant forests and lowland vegetation by checking for possible policy alignment failures (i.e. investment policy versus forest policies).
Strategic Actions

- Identify, properly delineate (map), document the existing forest and wood land resources
- Develop mechanism for sustainable forest management and utilization
- Evaluate existing forest management activities including the various PFM approaches in priority forest areas
- Develop mechanisms for economic valuation of forests
- Check for possible policy alignment failures and come up with cross-sectoral policies
- Initiate efforts to utilizing international provisions in REDD
- Undertake plantation establishments for restoration of degraded forest lands
- Design and promote energy efficient technologies to decrease deforestation.

Enhancing tree seed supply

The Ethiopian Government has been setting out different afforestation strategies and targets under different programs like the National Forestry Development Program, the national 10 year indicative development plan and the Plan for Accelerated and Sustained Development to End Poverty (PASDEP). The national plan is to reforest millions of hectares in the coming few years time. It is obvious then that all afforestation and reforestation programs need a bulk number of seedlings to be raised annually and there are calls for large quantities of tree seed all over the country. Today, the supply of forest products is far below demands. To meet future demands for industrial wood, it is estimated that an annual afforestation rate of at least 10,000 ha/year is required. A long-term solution to Ethiopia's rural energy problem is requires to establish another 762,000 ha by year 2010 (Davidson 1988). The afforestation and reforestation programs that took place in the country in the last three decades to meet such demands were not successful due to various reasons. Few of the very important reasons were the use of seeds/seedlings of poor seed source/origin and the existence of poor species/site matching.

Tree seed data in FRC from 2007-2010 indicates that the center on average has been supplying 7,278 kg of pure seeds annually in the stated period satisfying 78 % of the request, but apparently the national demand can be much higher. Therefore, a better national capacity is needed to satisfy the needs for forest seeds both quantitatively and...
qualitatively, and much remains to be done with regard to quality. In the Ethiopian Forestry Action Program (EFAP, 1994), it is underlined that the supply of quality seed is essential for the fulfillment of afforestation. It is also indicated that more emphasis should be given to indigenous tree species to improve and enhance rehabilitation of depleted/degraded natural high forests.

Enhancement of the seed supply requires us to understanding the formal and the informal sector and to identifying the actors and their roles in the tree seed system and working for a common goal in a synergistic fashion. In this regard, the Forestry Research Center will play the leadership role in the tree seed system. The tree seed supply should be enhanced to a level of meeting the demand for quality seed together with the other actors in the system. Gaps for producing seedlings of high physiological quality should be assessed and modern tree nurseries should be established across the country. Special attention should be given to establishing fruit tree nurseries of both tropical and temperate nature.

**Strategic Actions**

- Identify seed collection areas and establish seed stands and orchards for the priority species
- Ensure the collection and supply of the priority species through capacity building in the Regional States
- Identify seed source owners, seed collectors, seed distributors and private nurseries, and improve the tree seed system
- Establish consultation forum for good collaboration and information exchange among actors
- Develop forest seed quality maintenance and certification mechanisms.
- Establishing seed storage and networking system

**Ensuring proper land use planning**

As pointed out in the global assessment report of agriculture in the Sub Saharan Africa, it is very essential to have proper land use planning to minimize land degradation. Hence, bold decisions need to be made to set aside sloppy areas under continuous vegetation cover, practice land husbandry and rehabilitation activities. Forestlands should stay as permanent estates, thus, should not be converted to other land uses. Therefore, the agricultural bureaus and other relevant bureaus will be
Strategic actions for forest development

consulted on the undergoing activities and constrains in this regard and solutions will be suggested as well.

**Strategic Actions**

- Evaluate existing land use policies and plans and identify gaps
- Identify and allocate permanent forest development areas the land use plans
- Prepare and implement land management regulations

**Strengthening integrated watershed management**

Land degradation is one of the main environmental problems of Ethiopia. The problem is highly concentrated in the highlands of the country. Some 27 million ha representing about 50% of the highlands are already significantly degraded. Despite tremendous efforts made to combat land degradation in Ethiopia through tree planting and soil and water conservation measures, the scope and degree of the problem is increasing. The threat posed by land degradation and soil erosion on the livelihood of millions of people residing in the country is grave. Land degradation and soil erosion also are resulting in economic damage by shortening the life span of reservoirs, siltation of irrigation channels and damaging hydroelectric power generation infrastructure downstream. A comprehensive, multi-sectoral, and integrated approach is required to addresses the root causes.

Restoration of degraded lands can be achieved through improved tree/shrub cover. Land cover is the most important factor to control soil erosion and hence to halt land degradation. In this regard, fast-growing trees are helpful to improve the harsh and fluctuating microclimate conditions and reverse soil degradation by enhancing soil microbiological activity through increased litter production and nitrogen fixation. Similarly, exclosures are important means to restore native flora and rehabilitate degraded lands.

Various regional states, bureaus, ministries such as Ministry of Water Resources, Ministry of Mines, and Energy can be engaged in watershed managements. Mass mobilization of people can be carried out to build soil conservation structures as well as planting tree and grass species. Success stories in one part of the country can be scale up in the other.
part. With such an intervention, the country can save multimillion Birr that could otherwise be incurred due to siltation of the dams.

**Strategic Actions**
- Identify key dams and watershed for intervention
- Identify key intervention elements, design and implement integrated watershed management on selected water ways
- Evaluate the national experiences of rehabilitation of degraded lands
- Scale up success stories in rehabilitation of degraded lands
- Develop sustainable management plan for rehabilitated areas

**Promoting energy forests**

Biomass fuels constitute 95% of the total energy consumption of which firewood and charcoal combined account for more than 77% and agricultural residues (dung and crop residues) an estimated 15%. While the supply and need for fuelwood varies from place to place, fuelwood deficit is alarming in many parts of the country. The fuel wood requirement of the Ethiopians is estimated 0.8 m³ per person per annum. This is impossible with the current deforestation rate of 0.34 % per annum, and a huge task is ahead to put a large area under energy forests.

Fast growing tree species like *Eucalyptus* and *acacia* contributed a lot in averting fuel wood crisis in the country but not satisfying energy need of the country. Suitability of short rotation forests for biomass production is dependent upon such factors as biomass yield potential, tolerance to poor habitat and climatic condition, biomass fuel values, harvesting, transportation and storage (Neenan, 1980). Countries like Brazil, India, and Spain etc are using oil-bearing crops to meet their energy requirements. The government of Ethiopia has developed biofuel development strategy, which is coordinated by Ministry of Energy and Water. However, much needs to be done to put in place good governance and ensure sustainable biofuel development.

**Strategic Actions**
- Identify high priority species for energy
- Establish energy forests in peri-urban and rural areas
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- Design and implement appropriate governance in biofuel development in a cross-sectoral approach
- Scale up biofuel technologies

Developing industrial plantations

Plantations can contribute a range of benefits to the society. Plantation developments have often been considered as a “quick fix” solutions to the problems of over exploitation of the natural forests. Any kind of plantation development program requires planning, designing, organizing and research back stopping. Plantation planning needs to take into account the wider context, in where the plantation is established, the effects it will have on the ecology and landscape and the contribution to or adverse impacts on the local biodiversity.

The plantation layout should be designed to include as much diversity as possible within the productive areas. The principle of ecological landscape planning should be applied to plantation layouts. This includes creating variety in species composition, size and distribution of management blocks, creating mosaic of stands by combining with natural vegetation, planting local and indigenous species plantation blocks and establishment of stands with different rotation periods preferably short rotation species for quick income generation. Selection of species, provenances, and clonal materials should be based on their known suitability for the site and their potential to meet the management objective of the plantation development program. Plantations can meet the required needs of the society provided the right species are planted in the right places and that proper management practices from planning up to implementation phase are put in place. Therefore, plantation forests complement and mutually reinforce the environmental and production services of the remaining natural forests.

Ethiopia started large-scale industrial plantations in the early 1960’s. Even though, it is difficult getting the current exact figures of plantation coverage, most of the industrial plantations were established with the support of the Swedish government. There have been good examples of industrial plantation development projects carried out in the country. For instance, the then Munesa Shashemene Wood Enterprise, Tiro Boter
Bocho state forest project, and Addis-Bah fuel wood project can be mentioned.

Studies show that Ethiopia is importing forest products and the national supply is way below the demand. According to EFAP (1994), the consumption of wood by the year 2014 has been projected to increase by about 640,000 m³ for industrial wood and about 3.1 million m³ for construction wood while the current fuel wood deficit will be doubled. Therefore, large-scale plantation development program should be the central part of the forestry development strategies of the country. To this end, large-scale plantation development may clearly play a very important role in satisfying domestic consumption as well as export promotion. In addition to that, if the rates of plantation development increased, plantations can serve to alleviate the pressure on the dwindling natural forests.

**Strategic Actions**

- Identify suitable species and sites for plantation development
- Devise mechanisms (infrastructure, technical support, marketing, concession and management support) to promote investment in industrial plantations
- Adapt, develop and implement environmental friendly technologies and management options to increase productivity
- Recognize the importance of industrial plantations in meeting economic, social and environmental needs

**Capacity Building**

In order to improve the performance and contribution of the sector to the development of the country, it is important to strengthen the capacity of the implementing body at different levels. One of such areas is improving the technical capacity of the staff in the institutions involved in forest development and management. There is series technical knowledge gap among experts at Woreda as well as at regional levels on various aspects of forestry development. Building capacity of Woreda and regional bureaus staff on technical issues from nursery to post-planting management is necessary package to implement successful tree planting activities and forest rehabilitations in the country. This will help fill the technical expertise gap on forestry related subjects and practical elements from nursery management up to
Strategic actions for forest development

post planting management. Hence, the technical backstopping will provide continuous trainings on seed collection and storage, nursery development and management, seedling handlings, proper planting and management to experts at all levels. This will improve the technical capacity of regional and Woreda experts on forest rehabilitation capacity and forestry development.

Strategic Actions

- Enable forestry institutions to act on climate change, biofuel, biodiversity, food security and poverty alleviation in integrated way
- Enable institutions involved in forestry overcome technical problems in tree planting and management activities

Developing forestry information data base

The forestry development program of the country suffers from poor information flow among the actors and the stakeholders in the sector. We need to gather and compile relevant information; produce bulletins and bibliography, and disseminate them to the various stakeholders and the public at large on the efforts, successes, and failures of the national forestry research and development endeavors. This intervention will very much employ information technology and communication (ITC) and reach out the international community with up to date and relevant information. This intervention will have tremendous impact in facilitating information flow among stakeholder, regional states, and the public at large for sustainable forest development.

Strategic Actions

- Inventory all forestry related existing information
- Establish a standardized reporting system on various forestry activities
- Establish an IT assisted documentation system
- Establish a monitoring and evaluation system
- Release a valid national forestry development report biannually

Strengthening linkages in forestry research and development

The lack of a regular consultative forum on forestry research and development has resulted in failure to bringing perspectives, interest,
and priorities of the stakeholders in forestry research process and has hampered the extension and use of available forestry technologies in development activities. Therefore, there is a need to establish forestry research and extension advisory council, which can serve as a mechanism to prioritize forestry research and development intervention, check and regulate implementations. Due to the very diversity of stakeholders and customers of forestry research, complex nature of forestry and environmental problems, establishing a separate advisory council that specifically deals with forestry related issue and problems at a national level help to critically deal with the prevailing environmental problems, address the diverse technological needs of customers.

**Strategic Actions**
- Establish national forestry research and development advisory council
- Outline the major roles and functions of the council
- Determine the mode of operation, functional linkages, coordination and financial arrangements of the council
# Strategic Actions

Table 1. Strategic Objectives, Actions, and Responsible Institutions (edited taking inputs from the Workshop)

<table>
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<tr>
<th>Strategic Objective</th>
<th>Actions</th>
<th>Institutions</th>
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| Enhance the role of agroforestry in food security, livelihood improvement and environmental resilience | • Identify suitable and high value species and profitable agroforestry practices for major agroecologies  
• Promote suitable species and profitable agroforestry practices in selected areas  
• Document and check success stories in agroforestry  
• Enhance research and development in tree domestication and value addition of agroforestry products  
• Optimize and promote traditional agroforestry practices  
• Promote farm microclimate improvement through tree based systems  
• Integrate agroforestry system with conservation agriculture | EIAR, MoA, Bureaus of Agriculture, NGOs, Private sector, RARIs, HLIs |
| Minimize deforestation and forest degradation for sustainable forest resource utilization | • Identify, properly delineate (map), document the existing forest and woodland resources  
• Develop mechanism for sustainable forest management and utilization  
• Evaluate existing forest management activities including the various PFM approaches in priority forest areas  
• Develop mechanisms for economic valuation of forests  
• Check for possible policy alignment failures and come up with cross-sectoral policies  
• Initiate efforts to utilizing international provisions in REDD  
• Undertake plantation establishments for restoration of degraded forest lands  
• Design and promote efficient energy technologies to minimize deforestation. | EIAR, Bureaus of Agriculture, NGOs, IBC, EPA, State Forestry Enterprises/agencies, Private sector, RARIs, HLIs, Ministry of Trade and Industry, Ministry of Mines and Energy, Federal and Regional Offices |
| Enhance the national tree seed supply | • Identify seed collection areas and establish seed stands and orchards for the priority species  
  • Ensure the collection and supply of the priority species through capacity building in the Regional States  
  • Identify seed source owners, seed collectors, seed distributors and private nurseries, and improve the tree seed system  
  • Establish consultation forum for good collaboration and information exchange among actors  
  • Develop forest seed quality maintenance and certification mechanisms.  
  • Establishing seed storage and networking system | EIAR/FRC, MoA, Bureaus of Agriculture, Private seed suppliers and nurseries, NGOs, State Forestry Enterprises/Agencies, Privates sectors RARIs, HLIs, IBC |
| Ensure proper land use planning and its implementation for forest development | • Evaluate existing land use policies and plans and identify gaps  
  • Identify and allocate permanent forest development areas in the land use plans  
  • Prepare and implement land management regulations | EIAR, MoA, Bureaus of Agriculture, State Forestry Enterprises, Regional states |
| Strengthen integrated watershed management for rehabilitation of degraded lands and protection of major dams | • Identify key dams and watershed for intervention  
  • Identify key intervention elements, design and implement integrated watershed management on selected water ways  
  • Evaluate the national experiences of rehabilitation of degraded lands  
  • Scale up success stories to rehabilitate degraded lands  
  • Develop sustainable management plan for rehabilitated areas | EIAR, Bureaus of Agriculture, NGOs, Ministry of Water Resources, Ministry of Mines and Energy, Ministry of Agriculture, RARIs, Private sector, EEPCO, Regional EPLAUA |
| Promote energy forests and ensure sustainable biofuel development | • Identify high priority species for energy  
  • Establish energy forests in peri-urban and rural areas  
  • Design and implement appropriate governance in biofuel development in a cross-sectoral approach  
  • Scale up biofuel technologies | EIAR, MoA, Bureaus of Agriculture, NGOs, State Forestry Enterprises, Ministry of Mines and Energy, RARIs |
### Strategic actions for forest development

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