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ETHIOPIAN BAMBOO DEVELOPMENT STRATEGY AND ACTION PLAN

Environment, Forest and Climate Change Commission

About this document

This report was commissioned, developed and written by the Environment, Forest and Climate Change Commission of Ethiopia. It was produced by the International Bamboo and Rattan Organisation, INBAR.

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Acronyms and Abbreviations

B2B	Business to Business
BLDA	Bureau of Land Development and Administration
BoANR	Bureau of Agriculture and Natural Resources
BoCT	Bureau of Culture and Tourism
BoME	Regional Bureau of Mining and Energy
BoTI	Regional Bureau of Trade and Industry
CABC	China-Africa Bamboo Centre
CCIIDI	Chemical and Construction Inputs Industry Development Institute
CSO	Civil Society Organisation
DA	Development agent
DO	Development Organisation
EBC	Ethiopian Broadcasting Corporation
EBCI	Ethiopian Biodiversity Conservation Institute
ECA	Ethiopian Cooperative Agency
ECC	Ethiopian Customs Commission
EFBPIDI	Ethiopian Food, Beverage and Pharmaceutical Industry Development Institute
EFCCC	Ethiopian Environment, Forest and Climate Change Commission
EEFRI	Ethiopian Environment and Forest Research Institute
EiABC	Ethiopian Institute of Architecture, Building Construction and City Development
EIC	Ethiopian Investment Commission
EIPDC	Ethiopian Industrial Park Development Corporation
ERCA	Ethiopia Revenue and Customs Authority
ESA	Ethiopian Standard Agency
ETB	Ethiopian Birr
ETTE	Ethiopia Tourist Trading Enterprise
FeSMMIDA:	Federal Small and Medium Manufacturing Industry Development Agency
GDP	Gross domestic product
GIS	Geographic information system
GTP	Growth and Transformation Plan
IEC	Information, Education and Communication
INBAR	International Bamboo and Rattan Organisation
MIT	Mekelle Institute of Technology
MoA	Ministry of Agriculture
MoCT	Ministry of Culture and Tourism

MoFED:	Ministry of Finance and Economic Development
MoR:	Ministry of Revenue
MoTI	Ministry of Trade and Industry
MoWIE	Ministry of Water, Irrigation and Electricity
MSMEs	Micro-, small- and medium-scale enterprises
NGO	Non-governmental organisation
PIC	Productivity Improvement Centre
PPDA	Public Procurement and Disposal Agency
PPP	Public–private partnership
REFCCI	Regional Environment, Forest and Climate Change Institutions
ReMSEDA	Regional Micro and Small Enterprise Development Agency
SNNPRS	Southern Nations, Nationalities and Peoples Regional State
STDA	Science and Technology Development Agency
ToT	Training of trainers
TVET	Technical Vocational Educational Training

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Foreword

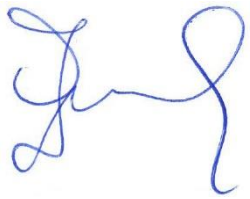
Bamboo and bamboo products hold significant potential to contribute to the sustainable development of Ethiopia, specifically for building green economy. Ethiopia is the primary grower of bamboo in Africa but still far from effective and efficient use of these resources.

This strategy and action plan adopted by the EFCCC is the first step in the right direction to increase and add value to our current bamboo development, sustainable management and utilization efforts. Through the introduction of this comprehensive strategy and action plan, it is envisaged that by the end of 2030, Ethiopia will become the **leading high value bamboo producer and supplier in Africa**.

To achieve this vision, all stake holders will work in unison to sustainably manage the country's bamboo resources and promote bamboo industries by properly implementing this strategy. It will create better integrated and transformed supply chains for bamboo trade. It will enhance and develop the capacity of the people, from the small-scale and traditional bamboo producer to the large-scale modern industrial producer and exporter of bamboo products. These efforts will in turn add higher value to Ethiopia's bamboo products, improve degraded land and contribute to attain Ethiopia's landscape restoration targets, attract investment, increase Ethiopia's exports and reduce volume of wood product imports, create decent jobs and enhance Ethiopia's climate change adaptation and mitigation capabilities.

The strategy and action plan identifies the current challenges and barriers to the development of a strong bamboo market, which is currently under-developed, and highlights where better market linkages are needed. Further, the strategy and action plan guide and provide strategic directions and concrete actions to achieve the objective of the Government of Ethiopia to transform and sustainably manage the country's bamboo resources and develop sustainable green industries that will enhance the food, water, energy and livelihood security of millions of people.

The Ethiopian Bamboo Development Strategy and Action Plan has focused on the country's efforts in making bamboo and bamboo products a key contributor to Ethiopia's sustainable development and to the prosperity of its people. Making this strategy a reality requires a multistage and multi-stakeholder engagement. I would therefore like to request all actors to join hands in implementing this strategy and action plan, and contribute in making the vision of our country a reality.



H.E. Fekadu Beyene (Prof.)
Commissioner,
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Acknowledgements

The Ethiopian Environment, Forest and Climate Change Commission (EFCCC) has taken bold efforts to design the national bamboo sub-sector strategy and action plan through an elaborated stakeholder consultation process. Task groups have been established involving various institutions and continuous consultations were conducted in workshops. The technical experts in the task groups were from EFCCC, INBAR, MoA, and EEFRI. The draft documents have been elaborated through comments and puts from the various stakeholders. In addition, two stakeholder consultation workshops, which ensured the wider participation of all relevant stakeholders were organized.

EFCCC wishes to acknowledge the contributions of the International Network for Bamboo and Rattan (INBAR), Ethiopian Environment and Forest Research Institute (EEFRI), Ministry of Agriculture, Ministry of Trade and Industry, Ethiopian Biodiversity Institute (EBI), Ethiopia Standard Agency (ESA), Ethiopian Institute of Architecture and Building Construction (EiABC), Federal Small Medium Manufacturing Industries Promotion Authority (FeSMMIPA), Ethiopian Tourism and Trading Enterprise (ETTE), Oromia Forest and Wildlife Enterprise, Amhara Forest Enterprise and regional states bureau's in the process of preparation and validation of the bamboo development strategy.

Contributions made by all other stakeholders including the regional government sector institutions, private sector (Adal Industrial P.L.C, SA Bamboo Works P.L.C, etc), NGOs, and individuals who participated in the process are also acknowledged. The important contribution of all peer reviewers and participants in the validation process who enabled the successful completion of this bamboo development strategy and action plan is highly appreciated.

Special thanks and gratitude goes to the INBAR's Dutch-Sino East Africa Bamboo Development Programme, funded by the Dutch Ministry of Foreign Affairs and the Chinese National Grassland and Forestry Administration, for providing financial and technical support in the entire process.

The EFCCC sincerely appreciates the hard work and spirit of collaboration rendered by all stakeholders to develop this national document. It is our sincere wish that the national bamboo development strategy and action plan will provide a clear direction for the development and advancement of bamboo sub-sector and will bring positive change for the benefit of all those involved in this important area.

H.E. Kebede Yiman Dawd (Mr.)
Deputy Commissioner,
Environment, Forest and Climate Change Commission.

1. Introduction

1.1 Background

Ethiopia has one of the largest bamboo resources in Africa, belonging to two main indigenous species—*Yushania alpina* (highland bamboo) and *Oxytenanthera abyssinica* (lowland bamboo)—concentrated in the Amhara, Benishangul Gumuz, Gambela, Oromia, Southern Nations Nationalities Peoples and Tigray regional states. In addition, the Ethiopian Environment and Forest Research Institute (EEFRI), International Bamboo and Rattan Organisation (INBAR) and other development agencies have introduced more than 40 bamboo species, which are being validated for their growth, yield and performance. Bamboo's annual economic contribution to Ethiopia's gross domestic product (GDP) is estimated at Ethiopian Birr (ETB) 56,250,000, and close to 750,000 people depend on bamboo (EEFCCC, 2017).

The Government of Ethiopia has accorded a high priority to the bamboo sector. In its 2016–2020 Growth and Transformation Plan (GTP II), bamboo has been targeted as a strategic species for livelihood development and environmental rehabilitation. Under GTP II, the Ethiopian government has targeted 0.7 million ha of degraded land to afforest/reforest with bamboo and utilise 0.5 million m^3 of bamboo. The Government of Ethiopia pledged to rehabilitate 15 million ha of degraded landscapes by 2025 as part of the Bonn Challenge, a pledge that was increased to 22 million at the 2014 United Nations Climate Summit in New York.

There are numerous development challenges in Ethiopia, such as the high prevalence of poverty, low human development index, youth unemployment, food insecurity, import–export imbalances, environmental degradation and income disparity. To address the development challenges and propel inclusive economic growth, the Government of Ethiopia has been devising multiple plans, strategies and programmes, such as the GTP II, Productive Safety Net Programme, Sustainable Land Management Project, Women Entrepreneurship Development Programme and Climate Resilient Green Economy.

Considering most of the population depends on agriculture and forestry for subsistence, livelihoods and income, the Government of Ethiopia is focussing on inclusive green economy development through agriculture and the forestry sector. Despite bamboo being a versatile resource with proven technologies for higher value addition and an enormous potential to provide triple-bottom-line benefits (social, economic and environmental), it remains underutilised in Ethiopia.

1.2 Global Bamboo Industry and Trade

The global bamboo economy is valued at USD 60 billion. China's and India's bamboo national production values were estimated at USD 19.5 billion and USD 13.5 billion in 2012 and 2010, respectively (INBAR, 2018a). Globally, trades of bamboo products represent only a small portion of the total trade. However, bamboo commodities are one of the important globally traded commodities. The annual international trade value

of bamboo and rattan is valued at USD 2.5 billion (INBAR, 2018a, 2018b). China is the world leader in bamboo commodity production and exports. The European Union and United States are the major importers of bamboo products.

The most globally traded bamboo commodities are as follows: (a) preserved bamboo shoots (17.48%), (b) bamboo and rattan furniture (14.19%), (c) bamboo basketry work (13.04%), (d) bamboo and rattan seats (12.91%), (e) bamboo plyboard (12.24%) and (f) bamboo poles (10.16%; Durai et al, 2018). Emerging bamboo markets are wood substitutes, such as flooring, panels and non-traditional furniture.

1.3 Regional Bamboo Trade

Africa as a whole accounts for about USD 21 million (1.61%) of imports and USD 18 million (1.21%) of the global exports of bamboo. The Common Market for Eastern and Southern Africa block as a whole imports bamboo products worth USD 9.26 million and exports such products worth USD 2.12 million annually.

2. The State of Bamboo Development in Ethiopia

In general, the Ethiopian bamboo sector development is at its infant stage. Bamboo in Ethiopia is used for sustenance uses and to produce low-quality products, such as fences, traditional houses, rudimentary furniture, mats and household utensils. Recently, a few industries have started producing bamboo industrial products. Overall, the bamboo sector provides low economic return for farmers and other actors along the bamboo value chains.

2.1 The Resource Base

Ethiopia has one of the largest bamboo resources in Africa. Different inventories indicate different figures regarding the quantity of bamboo resources. A study conducted by LUSO Consultant Gmbh (1997) estimates that there is 129,626 ha of highland bamboo and 700,000–850,000 ha of lowland bamboo in Ethiopia. The INBAR Production to Consumption study (Kelbessa et al, 2000) estimates the availability of 1.1 million ha of bamboo, out of which about 150,000 ha come from highland bamboo and 950,000 ha from lowland bamboo. Lobovikov et al (2007) reports 849,000 ha of bamboo. According to a recent remote-sensing-based inventory conducted by INBAR and Tsinghua University, Ethiopia has a total of 14,744.63 km^2 or 1.47 million ha of bamboo (INBAR, 2018b).

EEFCCC and the World Resources Institute have mapped 3 million ha of suitable land for bamboo restoration.

2.2 Existing and Potential Value Chains

The bamboo production and consumption landscape consists of the following: (a) bamboo resource producers, (b) bamboo processing enterprises, (c) traders and/or intermediary and (d) consumers. Bamboo resource production is dominated by smallholder farmers who supply bamboo for value-addition enterprises. In most cases, smallholder farmers play a dual role of resource producers (bamboo poles) and production of bamboo basketry and mat-based products. Most of the current bamboo processing activities are undertaken by household enterprises using manual technology for the production of low-value domestic rural markets (Durai et al, 2018).

In towns and cities, semi-modern enterprises or micro- and small-scale enterprises are at work, producing bamboo furniture, and to some extent, bamboo crafts. In addition, a few large industries (located in Addis Ababa and Injibara) produce industrial products, such as bamboo flooring tiles, bamboo stick curtains, bamboo stick-based and energy products. Therefore, the enterprises can be classified as follows: (a) bamboo resource producers (smallholder farmers producing bamboo poles); (b) micro-, small- and medium-scale enterprises (MSMEs; bamboo basketry, mats, furniture); and (c) organised industries (factories producing industrial products).

Most of the MSMEs are small, informal and survivalist. They have limited options to gain market access, infrastructure, tools and equipment, finance, knowledge and/or capacities to innovate products. As a result, they are engaged in the production of traditional products with manual technologies to support their daily subsistence. In addition, the bamboo and product producers are unable to reach high-value bamboo products markets. Bamboo is still considered a poor man's timber, and the buyers or consumers have poor perception and doubts about quality and durability of the product. Thus, the bamboo sector in Ethiopia is largely unstructured and dominated by low-quality, low-priced products catering to the informal market.

2.3 Market

Markets for bamboo and bamboo products are underdeveloped. Market linkages are weak, with a small number of intermediaries. Trade is largely restricted to local and national markets. The bamboo product and/or market environment still mainly comprises small household processors, small traders and intermediaries, who are driven by profit margins and not by quality standards.

Currently, Ethiopia is a negligible player in the global bamboo trade. Averaged annual imports and exports of bamboo products for the years 2014, 2015 and 2016 show that Ethiopia, on average, imports bamboo commodities worth USD 5.7 million, accounting for about 0.43% of the global imports (Durai et al, 2018). Significant imported bamboo commodities are as follows: (a) bamboo plywood (USD 1.5 million), (b) bamboo pulp and paper (USD 1.07 million), (c) bamboo and rattan furniture (USD 2.66 million) and (d) bamboo flooring (USD 0.18 million). Ethiopia exports bamboo products worth USD 0.23 million, accounting for about 0.02% of the global exports. The most commonly exported bamboo commodity is bamboo pole, accounting for about USD 0.23 million.

2.4. Opportunities for Development

Bamboo has a huge potential to contribute to the development of Ethiopia's green economy. A large untapped bamboo resource base is available that could be used to generate large-scale employment, income and socio-economic development, in addition to environmental benefits.

Bamboo is an annually yielding crop, requiring annual harvesting; unlike most trees, its harvesting does not result in deforestation. Studies have shown that both indigenous bamboo species can be utilised for high-value products (UNIDO, 2007; Zehui et al, 2007, Redda and Alene, 2016; Tolessa and Feleke, 2017).

Opportunities for development include the following:

a) **Promoting bamboo as a timber substitute:** In total, Ethiopia imports wood and wood products worth USD 176 million annually (Durai et al, 2018). By 2020, demand for wood and timber will be about 1.5 million sawn logs, 47,000 m^3 of plywood and 4.5 million m^3 of construction wood. A number of bamboo industrial products can be produced with indigenous bamboo resources, such

as the following: (a) bamboo panels (parquet flooring and ceiling); (b) stick-based products (curtains, tablemats, incense sticks, toothpicks, barbeque sticks, matchsticks, etc); (c) bamboo lumber and boards (bamboo plyboard, bamboo laminated lumber, oriented strand board, medium-density fibreboard and bamboo fibre composite boards), which can be suitable timber substitutes;

b) **Promoting bamboo pulp and paper:** Ethiopia, on average (2014, 2015 and 2016), imports about USD 17 million worth of pulp from wood or other fibrous cellulosic material and USD 349 million worth of paper and paperboards (Durai et al, 2018). Wood pulp is entirely imported. There is a large outflow of funds for the purchase of pulp, paper and paper-based articles. Bamboo is extensively used for pulping and papermaking in many countries of the world, most importantly, India, China, Bangladesh, Argentina, Sri Lanka and Japan. India and China produce about 2 million tonnes and 1.06 million tonnes of bamboo pulp a year, respectively (Zehui et al, 2007);

c) **Bamboo furniture:** Ethiopia imports furniture in large quantities. On average (2014, 2015 and 2016), Ethiopia imports metal, wood, plastic, bamboo and furniture made from other materials worth USD 125 million (Durai et al, 2018), which can be changed for bamboo-made furniture;

d) **Bamboo construction:** Annually, on average, 400,000 new housing units are built and an additional 450,000 housing units are repaired in Ethiopia, consuming about 6.6 million m^3 of wood in 2013 (CSA, 2007; EEEFCCC, 2017). The market value of the construction sector is estimated at USD 384 million. Bamboo can be a suitable alternative for construction of rural housing units, urban housing units, eco-tourism resorts and interior and exterior decoration. In addition, construction requires a number of panels, boards and composite materials for flooring, roofing, kitchen cabinets, interior decoration, doors, windows and partitions. Such panels, flooring tiles, roofing tiles and lumber for doors and windows could be made from bamboo;

e) **Bamboo energy:** Biomass is the primary energy source in Ethiopia. There is a huge market demand for this but shortage of timber. The INBAR and Nanjing University (2010) bamboo charcoalisation test results for Ethiopian lowland and highland bamboo species concludes that both species have desirable fuel characteristics. Bamboo charcoal could also be further value added into active carbon. Ethiopia is a net importer of activated carbon. In Ethiopia, about 116 million m^3 of wood fuel is consumed, with a per capita consumption of about 1.2 m^3 per annum, and the wood fuel demand is projected to increase to 142 million m^3 by 2033. This will create a supply gap of about 80 million m^3 (EEEFCCC, 2017). Bamboo can fill the gap if sustainably managed. Lowland bamboo is especially suitable for energy application; and

f) **Bamboo crafts and basketry:** Due to lack of data, it is difficult to estimate the current market volume and value of bamboo crafts basketry. Ethiopia imports bamboo basketry products worth USD 23,274. Its export contribution is not known. On a global scale, bamboo basketry is a traded commodity representing 14.3% of the export value. On average, annually, USD 215 million worth of basketry or plaited products are exported. The European Union and United States import about USD 46 million and USD 54 million worth of bamboo basketry (Durai et al, 2018).

2.5 Barriers

Although the bamboo sector in Ethiopia is one of the notable sectors in Africa, there are some key barriers that need to be addressed. Constraints and bottlenecks arise due to the lack of a policy and strategy framework specific to bamboo and include the elements described below.

2.5.1 Institutional Barriers

a) **Lack of strategy, implementation and integration:** The extent of Ethiopia's bamboo resources, the prevailing market conditions and the capacities of the implementing agencies have not been previously assessed. Many bamboo-related activities have not been target based and were not allocated sufficient budgetary support. The current implementation mechanism is not flexible enough to support successful bamboo projects and stop funding unsuccessful ones. The strategy will create the environment to support successful bamboo production.

b) **Communication and linkages:** There is a weak linkage between different institutions. Bamboo resource development and utilisation is simultaneously promoted by different ministries and organisations at the national level, as well as at regional levels. There is a lack of coordination between the ministries and among other bamboo development projects and industries. In addition, there is weak communication among the implementers, researchers, policymakers and institutions, resulting in a lack of coordinated development. A considerable amount of technical and/or research information is available, but it has not been effectively shared within the bamboo sector.

c) **Skilled manpower and support:** Numerous manpower capacity shortages exist. There are no assigned personnel at national-, regional- or local-level agencies to coordinate the development of bamboo activities. This also applies to the training and research institutions. Bamboo development is one of the many activities under their portfolio, but it is treated as a low priority. Less time and importance is dedicated for bamboo. Because it has been treated as a low-

priority sector until now, required resources, such as budget, staff and other facilities, have not been sufficiently allocated.

2.5.2 Market Value-Chain Development Barriers

a) **Sustainable management of bamboo:** The success of the bamboo industry depends on a sustainable supply of raw material in the required quality and quantity. Management and cultivation of bamboo resources is a prerequisite for bamboo industrialisation and value addition. The existing bamboo resources in forests, as well as in farms, are not well managed. Many bamboo resources are highly degraded owing to a lack of management and annual harvesting.

b) **Weak supply-chain linkages:** There is no horizontal or vertical integration among the actors in the bamboo value chain, and especially, among industrial value-chain actors. Bamboo poles for industries are procured from small-scale farmers individually by the industries themselves or through traders who supply to industries. Without horizontal integration and vertical integration, bamboo poles procured are transported in their original form, with no primary processing activities carried out in bamboo growing areas. As a result, the industry is responsible for all processing activities, incurring high transportation and processing costs.

c) **Governance:** In both the public sector and the private sector, governance mechanisms of the value chain are poor. So far, government has worked with non-government agencies and organisations only on product innovation in the MSME sector, on new design development and on providing new product and skills training to MSMEs. There has been a lack of inter-organisational practices for quality and production improvement and for “functional innovation”, improved value-chain governance, new market development and institutional innovation.

d) **Lack of product differentiation:** There is no product differentiation in industries. All the industries carry multiple product lines, which means huge investments in machines and infrastructure. Currently, there is no mechanism for product differentiated production and horizontal linkages among industries that will reduce investment, maximise utilisation of biomass and improve work efficiency and quality.

e) **Lack of innovation:** Innovation in the bamboo sector is important because of the need for substantial value addition from raw material to the final product and for the diversity of product ranges. Currently, most of the products are traditional, lack diversity and are of poor quality. However, to upgrade the value chain, to compete with alternative products and to enter global markets, there is a need for continuous innovation starting from raw material to market.

f) **Lack of awareness:** There is a general lack of awareness of the potential of bamboo. Bamboo is perceived as a cheap and less durable product. This is due to a lack of advanced skill and technology quality control mechanism, lack of standards and the preservation and treatment of bamboo.

g) **Lack of incentives:** MSMEs and industries producing bamboo products are treated on par with mature industries, such as timber, plastic or steel enterprises. There are no additional incentives for bamboo MSMEs and industries to enable them to compete with well-matured competitive sectors.

h) **Finance:** Banks and financial institutions are not well aware of the profit-making cycle of bamboo and its potential, and this constrains the availability of finance for MSMEs and industry.

3. Vision, Mission, Guiding Principles and Objectives

3.1 Vision

By the end of 2030, Ethiopia will become the leading high-value producer and supplier of bamboo products in Africa.

3.2 Mission

To achieve the vision, the Government of Ethiopia shall sustainably manage bamboo resources, enable higher value addition and attract investment. It shall transform Ethiopia's bamboo sub-sector to contribute to GDP growth via decent job creation, progressively realise import substitution of wood and promote exports and enhance environmental and social services, including climate change adaptation and mitigation.

3.3 Guiding Principles

The following guiding principles underpin this strategy and action plan:

a) **Market driven:** The market has a fundamental role in driving the sector. However, necessary support shall be given by the government to promote bamboo clusters, upgrade product quality and market competitiveness of the bamboo products;

b) **Decent job creation:** The bamboo industry is labour intensive, with a long supply-chain ranging from primary to secondary and tertiary value addition. Bamboo can be promoted to provide jobs and income for rural youth and women by promoting MSMEs and by creating jobs and income in industries and high-end value addition;

c) **Climate resilient green economy:** Bamboo is a significant resource, but its economic and ecological potential in the country remain underutilised: bamboo can play an important role in poverty alleviation, employment generation, economy development and environmental and forest protection (bamboo forests contribute to soil and water conservation). Being a renewable resource, bamboo is a perfect raw material for producing low-carbon, circular and environmentally friendly, resource-efficient products;

d) **Enhancing farmers' livelihood security:** In Ethiopia, the majority of the population depends on agriculture as its primary source of livelihood and income. Bamboo, with its annual harvesting cycle, labour-intensive production, potentially diverse products and value addition, can become one of the main economic resources for smallholder farmers;

e) **Reducing pressure on forests:** Demand for timber and non-timber forest products is growing. Considering the decline in forest coverage and the Government of Ethiopia's target to increase forest cover, an alternative is

necessary. Compared with tree species, bamboo has unique biological and ecological features, a wide value-addition possibility and high economic potential. It makes the ideal alternative to timber. This is because, once planted, it takes five years for clumps to mature. Thereafter, annually selective harvesting (for example, three-year-old mature poles) can be undertaken without degradation and deforestation. Bamboo can be promoted to enhance energy security of rural and urban households. It can also be promoted as a timber substitute for producing furniture, panels and boards for domestic consumption and exports; and

f) **Enhancing ecosystem services:** Bamboo can be promoted to perform ecosystem functions, such as soil erosion control, water quantity and quality improvement, landslide control and overall improvement of watersheds.

3.4 General Objective

To transform and sustainably manage bamboo resources by focussing on the development of green industries and livelihood promotion to produce value-added products catering for domestic, regional and global markets.

3.5 Specific Objectives

The specific objectives of this strategy and action plan over ten years are as follows:

- Increase the national bamboo area coverage from the existing 1.4 million ha to 1.6 million ha;
- Sustainably manage 200,000 ha of existing bamboo resources;
- Create and/or strengthen direct income and complementary employment opportunities for about 500,000 green jobs, with an annual income increase of 10%; create 100,000 new jobs in MSMEs and large-scale industries;
- Produce 2 million m^3 of bamboo panels and boards;
- Produce 1–2 million tonnes of energy products from bamboo by-products;
- Increase public awareness on bamboo resources and products and improve the capacity of the growers and processors involved in the entire value chain.

4. Strategic Directions

This strategy and action plan shall create an enabling environment for the sustainable management of bamboo resources nationwide. This strategy formulates directions and actions that shall create an enabling institutional framework and build capacities to promote sustainable management of the available resources and foster new bamboo plantations. The strategic directions provide guidance on the development of value chains and marketing, the promotion of bamboo-based industries and the enhancement of innovation and technology. The strategic directions also provide information on capacity-building requirements, as well as the mechanisms for setting up a rigorous and transparent monitoring and evaluation system. The strategic directions and actions are outlined in the subsequent sections. (Key activities are indicated in the action plan in Annex I).

4.1. Establish Bamboo Clusters

Clustering is an important approach that aggregates the various actors that engage in the production of the raw materials, processing, manufacturing and marketing of products to the final users. It helps provide effective support that facilitates primary and intermediary processing, strengthening markets, building capacities and enhancing the supply-chain linkages in adjacent geographical locations. (The specific location vs product matrix is attached in Annex II). Clustering accelerates development of the value chain and brings in competitive advantages.

Strategic action:

- Form clusters based on criteria that include the resource base, infrastructure, market and value chain.

4.2. Manage Existing Bamboo Resources

Sustainable management of available bamboo resources requires a regular assessment of the existing stock. Regular information from national-, regional- and local-level inventory data are fundamental inputs for the planning and implementation of the sustainable management of bamboo forests. Regular assessments are also key for issuing and developing a management plan for concessions. Together with the concession arrangement, regular assessment of the existing stock enhances the active participation of any private actors that are engaged in the development and utilisation of bamboo resources.

Strategic actions:

- Conduct bamboo resource assessment at a regular interval of five years;
- Make concession arrangements for communities and/or the private sector to sustainably harvest bamboo based on a management plan; and
- Provide technical capacity-building to communities and the private sector to improve productivity.

4.3 Promote the Establishment of New Bamboo Plantations

Ethiopia's bamboo sector development relies heavily on a sustained supply of bamboo culms as raw material that meets the quality and quantity desired by processing enterprises and industries. Therefore, it will be necessary to encourage large- and small-scale bamboo plantations through need-based technical supports and training. The provision of quality planting material also needs to be a priority.

Strategic actions:

- Encourage and undertake end-use-specific and ecologically suitable bamboo plantation for production and conservation purposes;
- Provide capacity-building;
- Support and enhance the production of indigenous and exotic species planting materials using large-, medium- and small-scale nurseries and micro-propagation techniques; and
- Establish a standard and certification system for bamboo planting materials.

4.4. Develop Value Chains

Ethiopia would optimally unlock the potential of its bamboo resources if proper value-chain development were in place. To that end, diversification of products, introduction of modern processing and treatment equipment and the establishment of prototype bamboo-processing workshops are priority actions. Developing value chains enables the various actors along the chain to earn the utmost possible return from the trading of bamboo products. Furthermore, high-value bamboo products should be produced by industries and small-scale enterprises. It must be noted that it is important to transform industries to become globally competitive, meeting scale, quality and environmental standards to encourage the export of value-added bamboo products.

Strategic actions:

- Establish and/or strengthen a model production and training centre in each cluster with facilities for primary processing, preservation and treatment;
- Improve vertical integration between growers, primary processors, enterprises and industries to ensure sustainable supply of age- and size-graded raw materials;
- Introduce appropriate tools, jigs and fixtures to improve production efficiency and quality;
- Diversify the use of existing bamboo products to serve various purposes;
- Provide capacity-building training on design and innovation to MSMEs;
- Promote the establishment of new bamboo industries and support existing industries.

4.5 Create an Enabling Market Environment

Market availability is one of the key factors that directly determine the success of the development of bamboo resources. An increasing demand for the various bamboo products in the local and international markets calls for more engagement of the private sector. Government support is needed to ensure the creation of market opportunities and outlets.

Strategic actions:

- Facilitate the marketing of bamboo products through policy and institutional supports;
- Enhance public awareness and sensitisation to promote wider use of bamboo products and support access to information for the marketing of bamboo products; and
- Promote traditional value of bamboo.

4.6 Enhance Skills

Sustainable management, as well as product diversification and processing, shall be guided by research-based knowledge and technology. Where appropriate, innovation and technology shall be adopted from countries advanced in their bamboo sub-sector. Local research support shall also be strengthened to address more specific and localised gaps and challenges.

Strategic actions:

- Promote bamboo research that generates information addressing the technical, policy and institutional gaps; and
- Enhance knowledge on the development, management and utilisation of bamboo through innovation, research and promotion of traditional knowledge.

4.7 Build Human Capital and a Knowledge Management System

Integrating bamboo in the educational system helps to ensure the availability of well-trained human resources that support resource development, product processing and marketing. Curriculums of selected tertiary institutions that offer forestry and natural resource programmes should include courses on bamboo. Short-term in-service trainings will be offered to technical experts, farmers and other development practitioners. Moreover, a retrievable, accessible and user-friendly knowledge management systems that facilitates sharing of available knowledge among key stakeholders shall be set up. This will also enhance the engagement of the private sector.

Strategic actions:

- Promote bamboo education and tailor-made on-the-job training; and
- Develop a functional knowledge management system.

4.8 Develop Partnerships and Mobilise Resources

Where appropriate, Ethiopia shall strengthen its partnership with countries with advanced experience of bamboo development and utilisation. Such partnerships are also important to mobilise resources that will be used to finance sustainable management of existing bamboo resources, promote new bamboo plantations and expand bamboo-based enterprises and industries. In line with this, it will be useful to establish and link sustainably managed bamboo forests to carbon credit mechanisms.

Strategic actions:

- Promote collaboration, cross-learning, technology transfer, joint venture and advocacy; and
- Mobilise resources for the development and sustainable utilisation of bamboo resources.

4.9 Create Enabling Institutions, Governance Mechanisms and Incentive Modality

Strong institutional support for the overall development and utilisation of bamboo is essential for the development of the sub-sector. Units specifically entrusted with the provision of overall guidance and technical support to initiatives of government, private sector and civil society organisations (CSOs) will be established at both the federal and regional levels. Political support that guarantees a high level and integrated guidance can be secured through steering committees established at various levels. Likewise, technical committees can facilitate intersectoral coordination and ensure the active involvement of multiple sectors. Different incentive packages that attract the private sector will be developed and implemented. Consideration will be given to the establishment of a bamboo production and processing certification system to make bamboo investors competitive in global bamboo markets.

Strategic actions:

- Set up appropriate bamboo units and recruit a pool of experts at the federal, regional and woreda levels;
- Establish steering and technical committees; and
- Provide enabling institutional and policy support.

4.10 Monitoring and Evaluation

A monitoring and evaluation mechanism needs to be established to guide the implementation of this strategy and resolve challenges identified in the course of implementation. Future interventions planned in the bamboo sub-sector will be guided by periodic evaluations of impacts.

Strategic actions:

- Monitor the implementation of the strategy; and

- Conduct mid-term and final evaluation of the implementation of the strategy and document lessons learned for future interventions.

5. Institutions and Their Key Roles in Bamboo Development

Institution	Role
EFCCC	• Overall coordination of bamboo development in Ethiopia. • Establish dedicated bamboo development unit at EFCCC and facilitate establishment of bamboo development unit at regional level. • Establish federal-level steering committee with participation of all stakeholders; facilitate establishment of regional steering committee to develop joint action plan and monitor progress. • Create “bamboo development fund” within the “forest fund”. • Leverage domestic government resources and donor funding for bamboo development by developing joint action plan, programmes and projects. • Undertake cluster development and national bamboo inventory, develop model management plan for concessions and promote bamboo sustainable harvesting and management. • Coordinate establishment of bamboo plantations in forest land, communal land, farmland and green corridor. • Issuance of forest concession and monitoring. • Coordinate development of supply chain network (vertical and horizontal integration). • Coordinate development of bamboo MSME, industry and market development. • Establish federal-level technical stakeholder platform; facilitate establishing regional level technical stakeholder platform. • Develop knowledge management system, operation and management. • Harmonise bamboo strategy and action plan with existing laws, regulation, policies, directives and strategy to develop synergy in implementation. • Monitor, evaluate and redesign action plan.
MoA	• Provide support in bamboo nursery, plantation (farm, communal, green corridor, shelter belts) and sustainable management.
Regional Bureau of Agriculture and Natural Resources / Environment	• Conduct site-specific inventory and demarcation of bamboo resources (concession and protection). • Support in establishing large- and medium-scale bamboo nursery; establish bamboo plantation in communal land,

Institution	Role
Forest and Climate Change Agency	farmland and shelter belts and riverbank, water body and green corridor planting.
Development Agents (DAs)	• Provide grassroots support, conduct replication training for farmers on sustainable management and harvesting, bamboo plantation establishment and management,
EEFRI	• Develop management and harvesting guideline, site-specific management plan, tissue culture protocol and tissue culture unit demonstration. • Collaborate with ESA for development of standards and certification mechanism. • Research on bamboo resource, value-chain, eco-system services and carbon. • Develop training package on bamboo plantation establishment, maintenance and sustainable harvesting and management. • Undertake demand-driven research to solve existing bottlenecks in entire value chain.
Ethiopian Institute of Architecture, Building Construction and City Development (EiABC)	• Technology development, demonstration and training on bamboo construction.
Regional Bureau of Construction and Urban Development	
Ministry of Construction and Urban Development	• Develop an enabling environment and market for bamboo and its engineered products in large-scale construction projects.
Ethiopian Food, Beverage and Pharmaceutical Industry Development Institute (EFBPIDI)	• Action research on bamboo shoot processing, preservation and packaging. • Popularise bamboo shoots as a delicacy. • Attract investments in the bamboo shoot value chain.
Energy and Mining Authority	• Promote bamboo charcoal, pellets and briquettes as alternative clean energy products—a substitute to wood.
Regional Bureau of Mining and Energy (BoME)	
Ethiopian Investment Commission (EIC)	• Attract investment in the bamboo sector by prioritising and developing an attractive investment incentive package. • Promote joint ventures between domestic and foreign investors. • Coordinate development of “business models”; organise business-to-business (B2B) and investment meetings.
Ethiopian Industrial Park Development Corporation (EIPDC)	• Allocate suitable land, building and infrastructure for investors in existing and new industrial parks.

Institution	Role
Chemical and Construction Inputs Industry Development Institute (CCIIDI)	• Support research and development of ancillary input industries, such as chemicals, dyes, adhesives and finishing materials.
Ethiopian Cooperative Agency (ECA)	• Handhold establishment and strengthening of farmers, primary processors and industry cooperatives (horizontal linkages); develop vertical linkages between cooperatives.
Public Procurement and Disposal Agency (PPDA)	• Inclusion of bamboo and its products in public procurement list.
Ethiopian Broadcasting Corporation (EBC)	• Production and broadcasting of awareness/sensitisation and technology transfer video and radio programmes.
Bureau of Land Development and Administration (BLDA)	• Allocate suitable land for market hubs and investors.
Ethiopia Tourist Trading Enterprise (ETTE)	• Bamboo product promotion and sales in the government and private outlets.
Ethiopian Biodiversity Conservation Institute (EBCI)	• Partner with EEFRI in research on biodiversity and ecosystem services.
China-Africa Bamboo Centre (CABC)	• Knowledge centre for sub-Saharan Africa (located in Addis Ababa) providing long-term training, demonstration, promotion of industries, research, policy and international cooperation.
Ethiopian Wildlife Conservation Authority	• Eco-tourism trial and infrastructure development and promotion. • Develop bamboo culture museum.
Ministry of Culture and Tourism (MoCT)	
Regional Bureau of Culture and Tourism	
Ethiopian Customs Commission (ECC)	• Harmonise bamboo-specific Harmonized System code with World Customs Organisation Harmonized System code.
Ethiopian Insurance Corporation	• Develop, trial and validate insurance products for farmers, MSMEs and industries.
Ministry of Education	• Develop course curriculum and accreditation in collaboration with technical partners: EEFRI, INBAR, FeSMMIDA and TVET.
Ministry of Trade and Industry (MoTI)	• Promote bamboo in international trade fairs and exhibition. • Organise national-, regional- and local-level trade fairs and exhibition. • Support operationalising government run bamboo industries in public–private partnership (PPP). • Support in creating an enabling environment, technology development and handholding support for MSMEs and industries.
Regional Bureau of Trade and Industry (BoTI)	
Ministry of Finance	• Allocate budgets for bamboo development.

Institution	Role
Ministry of Innovation and Technology	• Support in innovation, technology promotion and transfer.
Ministry of Science and Higher Education	
Ethiopian Standards Agency	• Develop and/or adapt standards and certification system for bamboo planting material and sustainable harvesting. • Develop bamboo product standards, code of practice and guidelines to facilitate domestic, regional and international trade.
Ministry of Revenue (MoR) Ethiopian Customs Commission (ECC)	• Review the existing levies, taxes and royalties related to bamboo transport, MSME and industry products; provide maximal tax incentive for the bamboo sector.
Ministry of Water, Irrigation and Electricity (MoWIE)	• Promote bamboo for catchment area and watershed protection.
Federal Small and Medium Manufacturing Industry Development Agency (FeSMMIDA)	• Establish and/or operationalise regional centre for excellence and demonstration model production centre. • Development of machines, tools, equipment, jigs and fixtures. • Diversification of product lines • Conduct training to entrepreneurs on MSME product lines (mats, basketry, furniture, incense stick). • Develop training package for MSME enterprise and industry. • Conduct Training of Trainers (ToT) and skill development training for trainers and entrepreneurs.
Technical Vocational Educational Training (TVET)	
Regional Small and Medium Manufacturing Industry Development Agency	
Science and Technology Development Agency (STDA; in Southern Nations Nationalities Peoples Regional State [SNNPRS])	
Regional Technology Promotion Center	
Productivity Improvement Centre (PIC)	
INBAR	• South–south cooperation and technology transfer. • Conduct action research; develop and validate different growing and value-addition enterprise models. • INBAR collaborates with EFCCC and donors for development of new programmes and projects.
Universities	• Facilitate demand driven research.
Banks	• Concessional loans and special financing window for growers, MSMEs and investors.

Institution	Role
Development Organisations (DOs) and NGOs	• Converge development efforts for scaling up and scaling out of interventions.

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Annex

Annex I: Action Plan (2019–2030)

Goal: By the end of 2030, Ethiopia will become the leading producer and supplier of bamboo products in Africa.

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Strategic direction 1: Establish bamboo clusters																		
Form clusters	Determine set of criteria for the establishment of clusters	No. of meetings	1	1												Staff time—federal and regional	400,000	EFCCC	A document containing criteria like bamboo resource, existing bamboo value chains, logistics and markets; potential for scaling up, etc. will be prepared
	Identify and determine clusters	No.	0	To be determined															Number of clusters to be determined
	Identify specific bamboo products that should fall within clusters	No. of products	20	10	10											Diagnostic study report; field visit and consultative meeting; staff time—federal, regional and local	500,000	EFCCC	Consultation with all stakeholders in a cluster will be conducted; bamboo cluster map developed
	Strategic direction 2: Manage existing bamboo resources																		

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Conduct bamboo resource assessment on a regular interval of five years	Conduct national-level inventory and mapping	No.	2		1					1						Geographic information system (GIS) maps, GIS team; field inventory and ground truthing	600,000	EFCCC	Area (species-wise) and inventory (biomass) of bamboo resources
	Conduct site-specific inventory	Specific bamboo potential sites	60		20					20					20	GIS maps, GIS team; field inventory and ground truthing	3,000,000	Regional Environ-ment, Forest and Climate Change Institutions (REFCCI)	In-depth studies on specific forests (e.g. Bale, Masha, Sheka) with detailed compartmentalisation and plot inventory. Include utilisation-specific data such as diameter at breast height, wall thickness, internode, height, etc.
	Demarcate and legalise bamboo forests	No. of demarcated bamboo sites	20			20										GIS team	100000	REFCCI	Aimed at issuing bamboo concession and legal enforcement
Make concession arrangements for communities and/or private sector to sustainably harvest based on management plan	Develop management and harvesting guideline	No. of guide-lines	3		3											Staff time	500000	EEFRI/INBAR	Develop management and harvesting guidelines aimed at different purposes - timber stand, shoot stand, combined timber and shoot stand.
	Develop base management plan that will serve as a reference for concession holders	No. of management plans	2		2											Staff time; consultancy ; field inventory and data collection	50,000	EFCCC	Guideline or first management plan that acts as a reference. One base management plan each for highland (*Y. alpina*) and lowland bamboo (*O. abyssinica*)
	Develop concession guideline	No. of guide-lines	1		1												30,000	EFCCC	

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Develop management plan for bamboo forests decided for concession	No. of management plans	175		5	10	10	10	10	20	20	20	20	25	25	Private sector to develop management plan as per the guideline	175,0000	REFCCI	Development of management plan for concessions to private sector, community groups, investors
	Issue bamboo concessions (sustainable management)	ha	175,000		5000	10,000	10,000	10,000	10,000	20,000	20,000	20,000	20,000	25,000	25,000	Staff time for administrative works; field measurement	875,000	REFCCI	Tentatively, the size of concession for private sector, investor and community groups will be about 1000 ha; especially for large consumers, such as pulp and paper industry, the scale of concessions can be increased according to demand
	Facilitate development of bamboo forest access roads	km	1050		50	100	100	100	100	100	100	100	100	100	100	Staff time for road alignment; EIA, private sector covering cost of road preparation	105,000,000	REFCCI, EFCCC and concession holder	Government responsible for major connectivity roads. The land for concession will be identified in location with good road connectivity, and internal link road will be developed by concession holders
	Ensure sustainable management of existing bamboo in private farms	ha	25,000		2000	2000	2000	2000	2000	2000	2000	2500	2500	3000	3000	Experts, training material, tools and training cost	1,000,000	REFCCI	Bamboo resources in farmland
Provide technical capacity building training to communities and private sector to improve productivity	Provide trainings to Participatory Forest Management cooperatives/ community groups and concession holders	No. of trainings	180		20	40	40	40	40							Experts, training material, tools and training cost	18,000,000	REFCCI	Conduct training on end-product-specific management practices, enrichment planting, harvesting methods to improve clump intensity, growth and yield
		No. of trainees	9000		1000	2000	2000	2000	2000										

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Provide training to smallholder farmers	No. of trainings	500		100	100	100	100	100							Experts, training material, tools and training cost	25,000,000	REFCCI	ToT will be provided to DAs on bamboo resource management; DAs will provide training for farmers
		No. of trainees	25,000		5000	5000	5000	5000	5000										
	Strategic direction 3: Promote the establishment of new bamboo plantations																		
Encourage and undertake end-use-specific and ecologically suitable bamboo plantations for production and conservation purposes on state, private and communal lands	Establish species-specific plantation in state forests	ha	30,500	500	2000	2000	2000	3000	3000	3000	3000	3000	3000	3000	3000	Bamboo planting material, manpower for site and land preparation, pit making, plantation, maintenance	305,000,000	REFCCI	Planting for production purposes, strategically placed in accessible locations
	Establish species-specific plantation in communal lands	ha	67,500	500	1000	2000	4000	4000	8000	8000	8000	8000	8000	8000	8000	Bamboo planting material, manpower for site and land preparation, pit making, plantation and maintenance	675,000,000	REFCCI	Planting for production purposes, strategically placed in accessible locations
	Establish species-specific plantation on farmlands	ha	40,500	500	2000	3000	3000	4000	4000	4000	4000	4000	4000	4000	4000	Experts and bamboo planting material	405,000,000	REFCCI	Promote bamboo as farm forestry via homestead and woodlot planting

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Establish private commercial/industry bamboo plantation	ha	19,000			1000	2000	2000	2000	2000	2000	2000	2000	2000	2000	Allocation of land and technical support	190,000,000	REFCCI	Allocate land for private investors to grow bamboo
	Plant bamboo for landscaping and conservation purposes	ha	42,500	500	2000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	Experts, planting material, manpower for site and land preparation, pit making, plantation and management	425,000,000	REFCCI	Watershed and catchment treatment (planting bamboo in watersheds, along riverbank, shelterbelt and water bodies). This land could be under state, communal and private land
Provide capacity-building training	Provide training to experts, farmers and other bamboo growers on bamboo plantation	No. of trainings	209	15	15	15	20	20	20	20	18	18	18	15	15	Experts, training material and training cost	20,900,000	EFCCC/REFCCI/EEFRI/INBAR	Conduct training on site preparation, plantation establishment and management; an expectation of 60 trainees per training was considered
		No of trainees	12,540	900	900	900	1200	1200	1200	1200	1080	1080	1080	900	900				
Support and enhance the production of indigenous and exotic species planting material using large-, medium- and small-scale community and private nurseries	Establish large scale nurseries	No of Nurseries	9		5		4									Allocation of land and development of infrastructure such as bed preparation, shade net, poly tunnel, nursery tools and equipment and water source; manpower		REFCCI, and private sector	A production capacity of 350,000 bamboo plants is assumed ***(All Calculations of planting material were determined with an assumption of 5*5 m planting space and 20% contingency)***

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
and micro-propagation techniques		No of planting materials (in thousands)	31850		1750	1750	3150	3150	3150	3150	3150	3150	3150	3150	3150	Bamboo cuttings and propagules, manpower, polytubes, sand, soil, manure, transportation	637000000	REFCCI, private sector, and other partners	
	Establish medium-scale nurseries	No. of nurseries	40		18	22										Allocation of land and development of infrastructure, such as bed preparation, shade nets, poly tunnels, nursery tools and equipment and water sources; manpower		REFCCI, private sector and other partners	Production capacity of 100,000 bamboo plants is assumed
		No. of planting materials (in thousands)	36,670	960	1610	3410	3410	3410	3410	3410	3410	3410	3410	3410	3410	Bamboo cuttings and propagules, manpower, polytubes, sand, soil, manure, transportation	733,400,000	REFCCI, private sector and other partners	
	Establish small-scale nurseries	No. of nurseries	200			100	100									Training and mother plant; basic tools and equipment	252,000,000	Farmer groups, individuals, cooper-atives	Production capacity of 5000–10,000 bamboo plants per nursery is assumed; nurseries are assumed to be established by

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
		No. of planting materials (in thousands)	12,600			540	540	1440	1440	1440	1440	1440	1440	1440	1440	Initiate the production of bamboo plants through mother plants provided and adopt macro-proliferation for multiplying the bamboo plants			communities and individuals
	Promote micro-propagation/tissue culture technology for mass propagation of quality planting material	No. of tissue culture units	5			2	3									Additional equipment and tools, bamboo protocol, training for lab technicians, hormones and chemicals; primary and secondary hardening facilities and plant production costs	44640000	EEFRI, REFCCI, EFCCC, univer-sities, CSOs	Establish new tissue culture units and upgrade existing tissue culture laboratory to include bamboo planting materials in their portfolio; the work includes plus clump identification and protocol development for tissue culture plant production
		No. of planting materials (in thousands)	14,880			60	100	160	2080	2080	2080	2080	2080	2080	2080				
	Provide capacity-building training on preparation of planting materials using macro-and micro-propagation techniques	No. of trainings	84		8	8	8	10	10	10	10	10	10			Community mobilisation and training material and costs	8,400,000		Training on vegetative propagation, macro-proliferation and nursery management will be provided at the federal and regional levels; regions are expected to provide the same training to experts, DAs and nursery technicians
		No. of trainees	4200		400	400	400	500	500	500	500	500	500						

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Establish standard and certification system for bamboo planting materials	Establish and revise standards for bamboo planting materials	No. of documents for the standard	1	1												Drafting/re-drafting; working group and technical committee meeting	10,000	EFCCC, ESA, EEFRI	EFCCC/EEFRI work with ESA and other stakeholders in finalising the certification mechanism
	Establish certification system for bamboo planting materials	Document for the certification system	1	1															
	Strategic direction 4: Develop value chains																		
Establish and/or strengthen model production and training centre in each cluster with facilities for primary	Establish centre of excellence for bamboo training	No.	6		2	2	2									Additional equipment and tools; specialised human resource for product innovation, mini-library, exhibition, etc.	3,000,000	BoTI, FeSMMIDA, Science and Technology Development Agency (STDA), TVET	Centre of excellence will have facilities for innovation and product development; knowledge management, technology demonstration and platform for value-chain actors

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
processing, preservation and treatment	Establish model production centre	No.	20		4	4	4	4	4							Land allocation, infrastructure development; basic machines and tools for primary processing - preservation and treatment unit, cross-cutting, splitting, slat making, slicing machine and hand tools for production of crafts and furniture	20,000,000	Regional Micro and Small Enterprise Development Agency (ReMSEDA),STDA, TVET, cooper-atives	Demonstration centre with minimal facilities for bamboo preservation and treatment; primary processing machines, tools and equipment. Functioning as both training and production centre; must operate on self-sustaining model
Improve vertical integration between growers, primary processors, enterprises and industries to ensure sustainable	Develop supply-chain network between farmer groups, primary processors, MSMEs and industry	No.	20			4	4	4	4	4						Experts to support the mobilisation of farmers; BoTI to mobilise MSMEs and industry and cooperative agencies	200,000	EFCCC, ECA, BoTI and CSOs	Enable farmers to have a sustainable market chain with primary processors (who value add raw bamboo poles into different commodities and intermediary products); further supply to MSMEs and industry that finally produce a finished product

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
supply of age- and size-graded raw materials	Support establishing farmer associations/ cooperatives	No.	40		5	5	10	10	10							Mobilisation, formulation and registration costs; capacity-building costs on management of cooperative	400,000	EFCCC, ECA, INBAR	Develop and strengthen farmer/bamboo harvester cooperatives
	Establish and operationalise platforms that enhance communication among the various actors	No. of meetings	12	1	1	1	1	1	1	1	1	1	1	1	1	Costs associated with the organisation of events	6,000,000	EFCCC, INBAR	
Introduce appropriate tools, jigs and fixtures to improve production efficiency and quality	Develop machines, tools, jigs and fixtures			Need based												Estimated cost of items	5,000,000	FeSMMIDA, ReMSEDA, STDA, INBAR, DO	Introduce, innovate, develop and adopt/adapt new tools, jigs and fixtures for MSMEs, industries and farmers
Diversify the use of existing bamboo products to serve for various purposes	Diversify the use of bamboo mats and basketry and create new markets by adding value	New basketry and mat products	20			5	5	5	5								200,000	PIC; FeSMMIDA and ReMSEDA	Develop packaging material targeting agriculture, horticulture (coffee, tea and spice), floriculture, apiculture, fishery and tourism sector, construction; develop bamboo mat board (industrial product) with handmade mats from artisans. Project-based approach can be adopted
	4.1 MSME enterprises																		

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Provide capacity-building training on design and innovation	Provide training on bamboo mats and basketry	No. of trainings	240	30	30	30	30	30	30	10	10	10	10	10	10	Job creation and food security technicians, trainer cost, raw materials, finishing materials, tools and equipment training and material cost	24,000,000	ReMSEDA; STDA,TVET; and DO	Bamboo mats, bamboo basketry, bamboo furniture, bamboo construction training, in addition to craft skills, will incorporate bamboo preservation and treatment aspects
		No. of trainees	7800	1000	1000	1000	1000	1000	1000	300	300	300	300	300	300				
	Provide training on bamboo furniture	No. of trainings	90	10	10	10	10	10	10	5	5	5	5	5	5		9,000,000	ReMSEDA, STDA, TVET and DO	
		No. of trainees	1800	200	200	200	200	200	200	100	100	100	100	100	100				
	Provide training on bamboo construction	No. of trainings	90	10	10	10	10	10	10	5	5	5	5	5	5	Trainer, raw materials, tools and equipment, site preparation for construction, training costs	9,000,000	EiABC, Regional Bureau of Con-struction and Urban Develop-ment, DO	Training on bamboo construction–ground preparation, column erection, walling, truss and purlins, roofing, finishing, etc.
		No. of trainees	1800	200	200	200	200	200	200	100	100	100	100	100	100				

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Provide training on bamboo shoot collection, preservation, storage and packaging	No. of trainings	75			5	5	5	5	5	10	10	10	10	10	EFBPIDI staff time for research and development of shoot products; tools and equipment costs; training costs	7,500,000	EFBPIDI	Training components, include sustainable management of bamboo for shoot production, harvesting methods and pre-processing and storage; methods for preservation of shoots for improving durability and freshness; and packaging
		No. of trainees	1500			100	100	100	100	100	200	200	200	200	200				
	Provide training on charcoal and briquette production	No. of trainings	180	20	20	20	20	20	20	10	10	10	10	10	10	Equipment for charcoal, briquetting and pelleting; staff and trainee costs; training cost	18,000,000	BoME	Aimed at substituting wood charcoal and energy products with bamboo. Training components include bamboo selection of charcoal production, processing and preparation of briquettes and pellets
		No. of trainees	5400	600	600	600	600	600	600	300	300	300	300	300	300				
	Provide training on incense stick production	No. of trainings	200		10	10	10	10	20	20	20	30	30	30	10	Equipment for charcoal and binder preparation; rolling equipment;	20,000,000	ReMSEDA, TVET, Mekelle Institute of Technology (MIT)	Aimed at substituting imports and to tap into domestic and export market. Training components include bamboo stick

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
		No. of trainees	4100		200	200	200	200	400	400	400	600	600	600	300	input materials, such as Diethyl Phthalates oil, perfume and packaging; trainer cost and training material			preparation, raw material processing - charcoal and jigat; rolling and perfuming; and packaging
	Provide training on matchsticks	No. of trainings	7			1	1	1	1	1	1	1				Equipment, training costs	700,000	ReMSEDA, TVET, MIT	Expected to provide income-generating opportunities
		No. of trainees	140			20	20	20	20	20	20	20							
	Provide training on toothpicks	No. of trainings	16		2	2	2	2	2	2	2	2				Equipment, training costs	160,0000	ReMSEDA ReMSEDA, TVET, MIT	Expected to provide income-generating opportunities
		No. of trainees	480		60	60	60	60	60	60	60	60							
	4.2 Industries: Transform industries to become globally competitive meeting scale, quality and environmental standards																		

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Promote the establishment of new bamboo industries and support existing industries	Promote processing of bamboo based products by regional forest enterprises	No. of enter-prises	2						2							Facilitate experience sharing visits, provide technical support, facilitate training opportunities	100,000	EFCCC, INBAR	Oromia and Amhara Regional forest enterprises are expected to engage in the bamboo sector either in their own or through PPP
	Operationalise non-functional government-managed production centres through PPP	No. of enterprises / industries	7		3	4										EFCCC and MoTI staff time, advertisement costs	700,000	EFCCC, MoTI	Negotiation in government department; issuing Expression of Interest and negotiation with private sector and monitoring progress
	Facilitate the establishment of bamboo industries in existing and new industrial parks			Need-based depending on the clusters												EFCCC, MoTI, Industrial Parks Development Corporation of Ethiopia (IPDC) staff time; meeting, transportation and coordination costs	1,000,000	EFCCC, MoTI, IPDC	Sensitise partner agencies on potential of bamboo. EFCCC shall coordinate with other partners to ensure the allocation of shade for bamboo processing in existing industrial parks and the establishment of new industrial parks
	Support development of ancillary industries	No. of industries / enterprises	18				2	2	2	2	2	2	2	2	2	Technical project consultancy; technology transfer costs; EFCCC and CCIIDI staff time	1,800,000	EFCCC; CCIIDI	Develop and/or cooperate with ancillary input material industries, such as glue, adhesives, finishing material and chemicals for bamboo processing industry

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Support establishing enterprises/industry associations/ cooperatives	No.	35			5	5	5	5	5	5	5				Mobilisation, formulation and registration costs; capacity-building costs for management of cooperative	700,000	EFCCC, and ECA	Develop and strengthen horizontal associations of primary processors and industry and develop vertical linkages of growers, primary processors and industry including formal agreements
	Develop incentive packages for various high-end industrial products	Document for incentive package	1		1											EFCCC, MoTI, EIC, MoR, ECC, BLDA staff time; Information, Education and Communication (IEC) material development, printing and dissemination costs	200,000	EFCCC, EIC, MoTI	Appropriate incentive measures that attract investors will be included
	Promote export of value-added bamboo product	Directive	1		1											Workshop and consultative meeting with regional government; EFCCC staff time	200,000	EFCCC, ECC	Issue a directive to promote export of processed and value-added products.
	Organise investment platforms and B2B meetings of industries and potential investors at the national and international levels	No. of meetings	11		1	1	1	1	1	1	1	1	1	1	1	Investor platform and B2B meeting and travel costs	2,200,000	EFCCC, EIC, MoTI	Organise investment platform and B2B meetings

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Develop transformative bamboo industry 'business models'	No. of models	5		1	1	1	1	1							Consultancy costs	750,000	EIC	EFCCC collaborates with EIC, INBAR and other development partners to develop business models
	Strategic Direction 5: Create Enabling Environment for Market Development:																		
Facilitate the marketing of bamboo products through policy and institutional supports	Put bamboo products on the governments preferential procurement list to open up markets for furniture, construction and bio-energy	Type of bamboo products	7		2		3			2						EEFCCC, PPDA, Ministry of Finance and Economic Development (MoFED) staff time, consultative workshop and meeting cost	140,000	EFCCC, PPDA, MoFED	EFCCC works with PPDA to include bamboo and its products in preferential procurement list and develop guidelines for purchase
	Allocate land to facilitate establishment of bamboo markets in urban centres	No. of land for regional/ federal market hubs	6		2	2	2									Land allotment and basic infrastructure development costs	600,000	EFCCC, BLDA	EFCCC collaborate with pertinent federal institutions and Regional Bureau of Trade and regional land development and administration or city administration and municipalities to allocate land for developing bamboo market hubs
		No. of lands for local market hubs	20		5	5	5	5								Land allotment and basic infrastructure development costs	1,000,000	EFCCC, BLDA	EFCCC collaborates with local bureau of trade and land administration to allocate one local market hub in each cluster

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Establish market linkage and agreement with other potential sectors that can use the products	No. of sectors linked	6			2	2	2								Workshop and consultative meeting costs; prototype development and demonstration	1,200,000	EFCCC, MoWIE, MoA, Ministry of Health, Ministry of Construc-tion and Urban Development	EFCCC collaborates with partners to develop formal market agreements to generate sustained demand for bamboo products
	Support marketing and sales of bamboo crafts, bamboo furniture, and industrial products through government run and private sales outlets; e-commerce and franchise business	No. of outlets	12		2	2	2	3	3							Consultative meeting costs; market promotional development costs, EFCCC, ETTE, FeSMMIDA staff time and coordination costs	600,000	ETTE, FeSMMIDA, EFCCC	EFCCC develops market linkages with government and private marketing outlets. Develop mechanism for creating market through e-commerce and franchise business
Enhance public awareness and sensitisation to promote wider use of bamboo products and support access to information for the marketing of bamboo products	Conduct assessment of consumer attitude	No. of assessments	3		1				1				1			Cost of conducting consumer survey	225,000	EFCCC/ EEFRI/ INBAR	To understand consumer perception and its changes on bamboo products so that the findings can inform planning of awareness-creation activities
	Prepare video programmes	No. of programmes	11		1	1	1	1	1	1	1	1	1	1	1	EBC, EFCCC staff time and equipment	2,200,000	EBC, EFCCC	EFCCC collaborates with EBC (both at federal and regional levels) to develop video and radio awareness and sensitisation programmes and technology transfer video programmes for dissemination through EBC, regional television
	Broadcast on TV programmes		44		4	4	4	4	4	4	4	4	4	4	4	Promotional airtime	4,400,000		

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Prepare radio programmes	No. of pro-grammes	22		2	2	2	2	2	2	2	2	2	2	2	EBC, EFCCC staff time and equipment	110,000	EBC, FM radio channels, EFCCC	channels and private channels
	Broadcast on radio programmes	No. of pro-grammes	66		6	6	6	6	6	6	6	6	6	6	6	Promotional airtime	1,980,000		
	Conduct national/ regional trade fairs	No. of events	30		2	2	2	3	3	3	3	3	3	3	3	Exhibition/trade fair organisation costs, publicity material costs, advertisement, participant transport and facilitation costs	30,000,000	EFCCC, MoTI, BoTI	Facilitate organising exclusive bamboo trade fair and participate in major trade and industry fairs and exhibitions
	Organise international trade fairs	No. of events	4			1			1			1			1	Space and stand costs, decoration costs, publicity material printing and preparation costs, travel, accommodation and per diem costs	8,000,000	EFCCC, MoTI, EIC	EFCCC collaborate with MoTI and EIC support participation of private sector in international trade fairs; along with promotion for investment

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Conduct international market assessments to identify potential markets, understand the desired quality and type of products, etc.	No. of assessments	4		1			1			1			1		Consultancy costs	600,000	EFCCC, INBAR, Develop-ment partners	EFCCC and MoTI conduct product-specific market study, for products like bamboo wood substitutes, bamboo fibres, bamboo stick based products to expand existing value chains and attract investment in new value chains
Promote traditional value of bamboo	Eco-tourism site development	No. of sites	2			1	1									Bamboo trial construction, sheds, cottages, publicity materials, training guides	5,000,000	EFCCC, Bureau of Culture and Tourism (BoCT), EBCI	Develop bamboo forest trials for wildlife viewing, including development of infrastructure like eco-resorts, furniture and crafts with bamboo; this could function as a marketing point
	Bamboo cultural museum	No. of museums	1				1									Infrastructure development cost, IEC material development costs, initial operational cost	1,000,000	EFCCC, MoCT, BoCT	Bamboo house, traditional and contemporary bamboo artefacts; collection of audio, video and publication of bamboo culture
	Strategic direction 6: Enhance knowledge on the development, management and utilisation of bamboo through innovation, research and promotion of traditional knowledge																		
Promote bamboo research that generates information	Establish a technical platform to identify gaps in innovation, technology and capacity	No. of platforms	1		1											EFCCC and EEFRI staff time; workshop/meeting cost	100,000	EFCCC, EEFRI	Platform with participation of technical institutions, including ministries and departments working on bamboo, research

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
addressing the technical, policy and institutional gaps	Conduct regular research review meeting	Workshop/ meeting	10		1	1	1	1	1	1	1	1	1	1			2,000,000		institutions, universities, private bamboo growers and developers, association representatives, international organisations, non-governmental organisations (NGOs) and subject matter specialists to identify technical bottlenecks and find solutions. The platform is also expected to bridge the gap among development, education, research and extension
	Regional technical/ stakeholder platform	No. of platforms	6		6											REFCCI, workshop/ meeting cost	600,000	REFCCI	Platform with participation of regional bureau (agriculture, education, trade and industry, construction, energy), research institution, private sector, association representatives, NGOs and subject matter specialists
	Regional technical platform meeting	No. of meetings	60		6	6	6	6	6	6	6	6	6	6			12,000,000		
	Undertake and support research on species selection, vegetative propagation and tissue culture, property testing and end-use-oriented management	No. of studies	10			2		2		2		2		2		Researcher and assistant staff time; research material, data collection and publication cost	1,500,000	EFCCC, EEFRI	Conduct demand–driven research

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Undertake research and facilitate development of multi-product value chain to increase the conversion rate of bamboo from the current rate of 20–30% to at least 80%	No. of studies	13		1	2		2		3		3		2		Researcher and assistant staff time; research material, data collection and publication cost	1,950,000	EFCCC, EEFRI, PIC	Based on properties of bamboo segments and existing industrial processes, conduct research and facilitate development of multi-product value chain to maximise the usage of biomass and high-end value addition
	Undertake and support research on identification and development of cost-effective and environmentally friendly technologies and input materials for enterprises and industries	No. of studies	10			2		2		2		2		2		Researcher and assistant staff time; research material, data collection and publication cost	1,500,000	EEFRI, CCIIDI	Aimed at development of cost-effective and locally made input materials, such as preservation and treatment chemicals, glues, adhesives, chemicals and finishing materials. Studies on quality of raw material, problems with processing (shrinking, twisting), joinery, finish will be conducted
	Undertake research on valuation of ecosystem services of bamboo	No. of studies	3		1		1		1							Researcher and assistant staff time; research material, data collection and publication cost	450,000	EEFRI, EBI	Hydrological, soil, carbon, social values and other ecosystem values
	Conduct research to develop carbon standard methodology to leverage carbon funds to provide additional benefits for bamboo growers	No. of studies	3		1			1				1				Researcher and assistant staff time; research material, data collection and publication cost	450,000	EEFRI	Allometric and carbon metrics studies to quantify the carbon sequestration of bamboo (2–3 species assumed to be addressed in one research conducted across locations)

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Set up a research fund to catalyse research on bamboo	No. of funded researchers/ grants	To be determined																
	Establish bamboo arboretum for preservation of germplasm, research and learning	No. of arbor-eta	8			2	2	2	2							Land and site preparation, planting and maintenance costs	2,400,000	EEFRI	Aimed at provenance trials to validate species, preserve germplasm and determine location for undertaking research. Arboreta will be established to follow growth and phenology of different bamboo species in different agro-ecological zones and be aligned to identified clusters
	Strategic direction 7: Build human capital and knowledge management system																		
Promote bamboo education and tailor-made on-the-job training	Develop specialised bamboo curriculum and modules to train a pool of professionals at various levels in bamboo development	No. of pro-grammes	4		1	3										MoWIE and TVET staff time, course development workshop costs, course development consultant cost, printing cost, training for teachers	1,200,000	EFCCC, MoWIE, TVET, CABC	Aimed to develop education course curriculum in TVET, forest and technical schools and universities. This encompasses entire course on bamboo and elective subjects/courses (Technical Diploma, BSc, MSc and PhD programmes)

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Scholarship and fellowship	No. of scholarship beneficiaries	200		10	10	20	20	20	20	20	20	20	20	20	Course/research project–based funding support	100,000,000	EFCCC, MoWIE,	Provide scholarship and fellowship for research or course based on evaluation of proposals by students and professionals
	Develop tailor-made training modules on bamboo technologies for farmers, MSME entrepreneurs and industry	No. of modules	10			2	4	4								EFCCC, EEFRI, TVET, FeSMMIDA, INBAR staff time; designing and printing costs	1,500,000	EEFCCC, EEFRI	Develop training package for bamboo resource development, value addition, entrepreneurship and marketing
	Train, certify and license trainers to conduct training on bamboo resource, skill development (products, business development services) on selected value chains and enterprise development	No. of trainings	20		2	2	2	2	2	2	2	2	2	2		Training and material costs; transport, logistics, per diem costs and trainer costs	6,000,000	EFCCC, EEFRI, INBAR, CABC	Intensive training on bamboo resource development (nursery, plantation and sustainable harvesting and management); targeted skill development training on bamboo crafts and mats, furniture, construction, energy, incense stick production and bamboo shoots
		No. of trainees	400		40	40	40	40	40	40	40	40	40	40					
	Facilitate the required facilitates to run CABC	No centre	1				1	*	*	*	*	*	*	*	*	Funding support for training, operation, manpower and management cost of the centre	50,000,000	EFCCC, CABC	EFCCC cover all costs related to operation and management of the centre.

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Develop functional knowledge management system	Develop a functional and living knowledge management system allowing access to data, information sharing and generation of technical knowledge	No. of established system	1		1											EFCCC staff time; consultancy for development, operation and management of knowledge management system, staff training costs	200,000	EFCCC	The system may consist of various knowledge documentation and dissemination mechanisms including electronic and print media
	Enhance awareness on established knowledge management system	Awareness creation events	10			1	1	1	1	1	1	1	1	1	1		200,000	EFCCC	Can be aligned with other pertinent events
	Update and maintain established knowledge management system	Frequency of update	20			2	2	2	2	2	2	2	2	2	2	EFCCC, staff time	200,000	EFCCC	
	Strategic direction 8: Develop partnerships and mobilise resources																		
Promote collabor-ation, cross-learning, technology transfer, joint venture	South–south cooperation with bamboo growing countries in Asia, Africa and Latin America	No. of agree–ments	4		1	1	1	1								High-level dialogue and agreement	80,000	EFCCC	Develop cooperation with United Nations Office for South–South Cooperation; cooperation with China, India Vietnam and Colombia

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
and advocacy	Encourage collaboration and joint ventures with entrepreneurs outside the country with technology, finance and market linkages	No. of joint ventures	10			1	1	1	1	1	1	1	1	1	1	Guideline development	200,000	EFCCC, EIC	Joint venture with existing and new domestic industry/private players with foreign investors on large-scale industries
	Strengthen collaboration, networking, partnership and support mechanism with regional and international organisation working in bamboo sector	No. of Memoranda of Understanding signed	7		1	1	1	1	1	1	1					High-level dialogue, organising donor workshops	140,000	EFCCC, INBAR	Collaborate with donors working in livelihood, industry and environmental sector; research agencies working in bamboo sector (e.g. INBAR, International Center for Bamboo and Rattan)
Mobilise resources for the development, and sustainable utilisation of bamboo resources	Integrate bamboo activities in annual work plan and budgets	No. of annual work plans	12	1	1	1	1	1	1	1	1	1	1	1	1	Stakeholder meetings and consultation—staff time and meeting costs	240,000	EFCCC, stakeholder ministries and depart-ments	Develop convergence of action plan with discussion during steering committee.
	Organise events to leverage corporate social responsibility investment and projects	No. of events	10			1	1	1	1	1	1	1	1	1	1	Workshop costs	2,000,000	EFCCC	Aimed to scale up bamboo plantation, provide micro- and small enterprise development support and engage in market development
	Leverage green, impact investment fund and climate finance	No. of projects for resource mobilisation	6		1		1		1		1		1		1	EFCCC staff time, consultancy cost	900,000	EFCCC	
	Establish bamboo fund (generate revenue from forest fund, tax, royalties and payments to ecosystem services)	Fund	1			1										High-level meeting and consultation costs	50,000	EFCCC	Targeted for increasing the bamboo cover in the country

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Communicate the strategy and action plan for development partners and investors to bridge investment gaps and barriers through public private dialogue	No. of dialogues	5		1	1	1		1			1				Workshop costs	1,000,000	EFCCC	Aimed at leveraging resources from partner institutions, concessional finance through banks, and agencies including donor agencies
	Mobilise the local community to engage in bamboo plantation	House-holds engaged in planting	11 00		100	100	100	100	100	100	100	100	100	100	100	Expert staff time, logistics and mobilisation cost	5,500,000	REFCCI	Mobilising farmers and community members to undertake bamboo planting and management activities (Kebele based)
	Strategic direction 9: Create enabling institutions, governance mechanisms and incentive modality																		
Set up appropriate bamboo unit and recruit pool of experts at the federal, regional and woreda levels	Establish a dedicated unit at the federal and regional levels with adequate staff and resources to coordinate implementation and monitoring of bamboo development	No. of units	7	1	6											EFCCC and REFCCI dedicated staff time and administration cost	3,500,000	EFCCC and REFCCI	Dedicated unit with at least five staff members to coordinate overall bamboo sector development at federal and regional levels
	Assign focal persons at woreda offices	As needed																	

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Establish steering and technical committees	Establish and conduct a steering committee with participation of key stakeholders at federal and regional levels	No. of federal steering committees	1	1												EFCCC staff time, consultancy cost	30,000	EFCCC	Steering committee with high-level decision-making officials from EFCCC, MoA, MoWIE, MoFED, MoTI, DO, association representatives and industry representatives
		No. of federal steering committee meetings	11		1	1	1	1	1	1	1	1	1	1	1	Meeting cost	1,650,000	EFCCC	Review action plan, synchronise action plan and budgets and monitor the progress
		No. of regional steering committees	6		6											EFCCC/Bureau of Agriculture and Natural Resources (BOANR) dedicated staff time and administration cost	180,000	REFCCI	Steering committee with high-level decision-making officials from EFCCA, BoANR, BoME, BoE, Bureau of Finance and Economic Development , BoTI, association representatives and industry representatives
		No. of regional steering committee meetings	60			6	6	6	6	6	6	6	6	6	6	Meeting cost	9,000,000	REFCCI	Review action plan, synchronise action plan and budgets and monitor the progress
	Establish a consultative forum and conduct meetings to coordinate the efforts of steering committees at the federal and regional levels	No. of meetings	11		1	1	1	1	1	1	1	1	1	1	1	Meeting, transportation and logistics costs	3,300,000	EFCCC	Representatives of federal- and regional-level steering committees to synchronise the actions at the federal and regional levels
Provide policy support	Mainstream bamboo strategy and action plan with regional action plans	No. of regions	6		6											Meeting, workshop and associated costs	180,000	EFCCC	Regional institutions ensure the alignment of the bamboo action plan with the operational plan of their respective regions

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Adopt or develop bamboo standards and code of practice for priority value chains	No. of bamboo standards and codes of practice	12	2	2	2	1	1	1		1		1		1	ESA, EFCCC, FeSMMIDA, TVET, PIC, EEFRI staff time; working group and technical committee meeting costs, publication costs	900,000	ESA; EFCCC	Develop standards, codes of practice to enable regional and international trade
	Review the existing codes used; and harmonize with World Customs Organization (WCO) HS code.	No. of docu-ments	1		1											EFCCC and Ethiopia Revenue and Customs Authority (ERCA) staff time and meeting costs	100,000	ERCA	Review the existing codes used in Ethiopia and take measures to harmonise the codes with WCO HS codes to enable global trade of bamboo products
	Develop mechanism for land leasing for private sector for bamboo growing and establishing industries	No. of guide–lines	1	1												EFCCC, EIC, MoTI, BLDA staff time and meetings for developme nt of guideline	150,000	EFCCC, EIC	Develop land concessions to private bamboo planters similar to agriculture land concessions.
	Establish a platform to link financial institutions and potential investors to facilitate concessional loans and special financing windows	No. of platform	1		1											EFCCC, EIC, MoTI, MoFED, bank officials staff time and meeting costs	30,000	EFCCC, EIC	Develop a special financing window for financing bamboo projects
		No. of meetings of the platform	6		1		1		1		1		1		1		600,000		

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Review the existing levies, taxes and royalties related to bamboo transport and recommend on free movement of bamboo	Review document	1		1											EFCCC, EIC, MoTI, MoFED, MoR, ECC officials staff time and meeting costs	100,000		Study the transport permit, taxation and royalty related to bamboo; issuance of Pan-Ethiopian Bamboo transit permit and increase of royalties
	Review taxes and tariffs related to bamboo products; lobby for tax exemption through policy briefs and platforms	No. of policy brief docu-ments	3		1					1					1	EFCCC, MoTI, MoR, ECC officials staff time and meeting costs	300,000	EFCCC, MoR, ECC	Exemption of taxes related to bamboo products produced in household, micro- and medium-scale enterprises and industries
	Exploit insurance system opportunities to mitigate the risks of bamboo plantation	No. of insurance institutions	1		1											EFCCC, Ethiopia Insurance Companies staff time; develop, trial and validate the insurance system.	50,000	EFCCC	Develop a model insurance scheme for bamboo growers (both smallholders and large plantations)
	Develop a model out-growers–industry/enterprise linkage mechanism for out-growers scheme	No. of estab–lished model schemes	1			1										EFCCC, EFCCA, BoANR staff time along with private sector investor or industry and farmers	50,000	EFCCC, private sector	Trial, develop and validate model out-growers model
	Test and document the effectiveness of model out-growers scheme	Review document	1				1									EFCCC, BoANR, EFCCA staff time; consultant cost	150,000		

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Scaling up and scaling out tested schemes	Potential areas	10					3	3	2	2					EFCCC, BoANR, EFCCA staff time	1,000,000		
	Be part of global bamboo certification system	No. of certifying institutions	As needed							*	*					Cost of processing the requirement for being a forest stewardship council	1,000,000	EFCCC, INBAR	
	Strategic direction 10: Monitoring and evaluation																		
Monitor the implement-ation of the strategy	Regularly monitor the progress of the bamboo development interventions	Frequency of monitoring missions	11		1	1	1	1	1	1	1	1	1	1	1	EFCCC and EFCCA staff time	550,000	EFCCC	Monitoring of achievements vs indicators and making the necessary adjustments
Conduct mid-term and final evaluation of the implement-ation of the strategy and document lessons learned for future interventions	Evaluate the progress of entire value chain of bamboo development in coordination with key stakeholders	No.	3				1				1				1	Consultancy and external evaluation cost	150,000	EFCCC	Evaluate the progress with participation of all stakeholders
	Produce evidence-based advice to influence policy and decision making to further improve bamboo development	No.	3					1				1			1	EFCCC and EFCCA staff time	300,000	EFCCC	Revise the action plan and interventions

Strategic direction/ action	Key activities	Unit	Total target	Target and timeline												Resource required / cost items	Estimated cost (ETB)	Responsi-ble body	Remarks / Output
				2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
	Document and package best practices and disseminate lessons learnt	No.	5			1		1		1		1			1	EEFRI, FeSMMIDA, TVET, PIC staff time; consultancy costs, IEC material preparation and publicity costs	1,000,000	EEFRI, FeSMMIDA, STDA, univers-ities, TVET	Develop package of practice for different approach, techniques, and technologies

Total Budget (ETB in millions)	**4,660**
Estimated Annual Budget (ETB in millions): 12 years	**388**
Total Budget (USD in millions)	**166**
Estimated Annual Budget (USD in millions)	**13.8**

Annex II: Location, Species and Product Matrix

Region	Zone	Woreda	Species	Bamboo pole		Bamboo mat		Bamboo basketry		Bamboo furniture		Bamboo housing		Bamboo industry		Bamboo energy	
				Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential
Addis Ababa		Addis Ababa	*Y. alpina*												FRT, SBP, LBL		Waste
Amhara	Awi	Fagita Lekoma Addis Kidam/ Banja	*Y. alpina*														
		Injibara, Kesachawsa, Tilili	*Y. alpina*												FRT, SBP, MDF, LBL		
		Guanguashikudad	*Y. alpina*														
	Bahir Dar	Bahir Dar	*Y. alpina*														
	East Gojjam	Bibugn, Erobgebeya	*Y. alpina*														
		Senan	*Y. alpina*														
	Mirab Gojjam	Bure	*Y. alpina*														
		Debubachefer	*Y. alpina*														
		Dembecha	*Y. alpina*														
		Wemberma	*Y. alpina*														

Region	Zone	Woreda	Species	Bamboo pole		Bamboo mat		Bamboo basketry		Bamboo furniture		Bamboo housing		Bamboo industry		Bamboo energy	
				Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential
	North Gondar	Debratabor	*Y. alpina*														
	North Gondar	Quara and Matema	*O. abyss-inica*	3000 km^2											PP, LBL, MDF, OSB		Bamboo charcoal, pellets and briquettes
Benish-angul Gumuz	Assosa	Bilidigilu, Assosa, Homosha, Bambasi and Maokomo Special	*O. abyss-inica*	8500 km^2 of bam-boo forest							Assosa			Non-functional	SBP, LBL, OSB		Bamboo charcoal, briquettes, pellets, chips
	Kamashi	Kamashi, Yaso, Agalometi, Bilo Jiganfoy, Gizen, KurmukandSirbabay	*O. abyss-inica*								Kamashi				PP, LBL, MDF, OSB		
	Metekel	Guba, Dangur, Wenbera, Bulen, Dibate and Mandura	*O. abyss-inica*								Guba				PP, LBL, MDF, OSB		
Oromia	Arsi	Asela, Munessa,	*Y. alpina*								Arsi						

Region	Zone	Woreda	Species	Bamboo pole		Bamboo mat		Bamboo basketry		Bamboo furniture		Bamboo housing		Bamboo industry		Bamboo energy	
				Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential
		Dodolo, Herero, Shedem															
	Bale	Goba, Gololcha Bale and Goro	*Y. alpina*								Goba		1 (Bale)		FRT, SBP, LBL, MDF, OSB		
	Western Shewa	Dere Enchini, Shenen	*Y. alpina*								Ambo				FRT, SBP		
	Guji	Bore	*Y. alpina*														
	South West Shewa	Wonchi	*Y. alpina*														
	East Wellega	Haro Limu, Gia Kiremu	*O. abyss-inica*	~ 300 km^2											LBL, MDF, OSB		Bamboo charcoal, pellets and Briquettes
	West Wellega	Manusibu and Gudetu Kondole	*O. abyss-inica*	~ 300 km^2											LBL, MDF, OSB		
SNNPRS	Sidama	Hawasa	*Y. alpina*								Hawasa				FRT, LBL, SBP		
		Arbegona, Daye	*Y. alpina*												FRT, LBL, SBP		
		Bursa	*Y. alpina*														

Region	Zone	Woreda	Species	Bamboo pole		Bamboo mat		Bamboo basketry		Bamboo furniture		Bamboo housing		Bamboo industry		Bamboo energy	
				Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential	Existing	Potential
		Hula	*Y. alpina*												FRT, LBL, SBP		
	Sheka	Masha, Tepi	*Y. alpina*								Masha				FRT, LBL, SBP		
		Keffa	*Y. alpina*														
	Gedeo	Bule, Yirgalem	*Y. alpina*								Dilla						
	Guragie	Gurage/ Agena	*Y. alpina*														
	Gamo Gofa Zone	Chencha, Gamo, Gofa, Dokko, Ezo, Zala	*O. abyss-inica* and *Y. alpina*								Arbaminch				OSB, MDF, LBL, SBP		Bamboo charcoal, briquettes and pellets
Tigray	Wolqayt Tsegede	Shere	*O abyssinica*														
		Tsegede	*O abyssinica*														
	Mehakelegnaw	Axum															

Note: FRT (Flooring and Ceiling Tiles); LBL(Laminated Bamboo Lumber); SBP (Stick Based Products); OSB (Oriented Strand Board); MDF (Medium Density Fibreboard); PP (Pulp and Paper)

Key Bamboo Product Clusters

Value chain	Geographic clusters	Bamboo species
Bamboo poles	Amhara (Awi Zone, East Gojjam, Mirab Gojjam) Oromia (Arsi, Bale, West Shewa, Guji, East Shewa, South West Shewa) SNNPRS (Sidama, Sheke, Gedeo)	*Y. alpina*
	Amhara: North Gondar Benishangul Gomuz (Assosa, Kamashi, Metekel) Oromia (East Wallega, West Wallega) Tigray (Wolqayt Tsegede)	*O. abyssinica*
Bamboo mats	Amhara (Awi, East Gojjam, Mirab Gojjam) Oromia (Arsi, Bale, East Shewa, West Shewa, South West Shewa) SNNPRS(Sidama, Sheka, Gedeo,)	*Y. alpina*
Bamboo basketry/crafts	Amhara (Awi, Mirab Gojjam) Oromia (Arsi, Bale, East Shewa, Western Shewa, Guji, SW Shewa) SNNPRS (Sidama, Sheka, Gedeo)	*Y. alpina*
	Benishangul Gomuz (Metekel) Oromia (East Wallega, West Wallega)	*O. abyssinica*
Bamboo furniture	Addis Ababa Amhara (Awi, Bahir Dar, North Gondar (Debratabor) Oromia (Arsi, Bale (Goba), West Shewa(Ambo)) SNNPRS (Sidama (Hawassa), Sheka (Masha), Gedeo (Dila), GamoGofa (Arbaminch)	*Y. alpina*
	Benishangul Gomuz (Assosa, Kamashi, Guba) Tigray (Wolqayt Tsegede [Shere and Tsegede]); Mehakelegnaw (Axum)	*O. abyssinica*
Bamboo construction (modern and traditional)	Addis Ababa Amhara (Bahir Dar), South Gondar (Debratabor) Oromia (Bale) SNNPRS (Sidama, Sheka, Goma Gofa)	*Y. alpina*
	Benishangul Gomuz (Assosa, Kamashi and Metekel) Tigray (Mehakelegnaw)	*O. abyssinica*
Bamboo Industrial Product		

Value chain	Geographic clusters	Bamboo species
Bamboo parquet flooring and roofing	Addis Ababa Amhara (Awi [Injibara locality]) Oromia (Bale, West Shewa [Dare Enchini]) SNNPRS (Sidama, Sheka)	*Y. alpina*
Laminated bamboo lumber	Addis Ababa Amhara (Awi [Injibara locality]) Amhara (North Gondar) BenishangulGomuz (Assosa, Kamashi, Metekel) Oromia (Bale, East Wellega, West Wallega) SNNPRS (Sidama, Sheka, Gomagofa)	Predominantly *Y. alpina* and *O. abyssinica* (particularly in Benishangul Gomuz)
Bamboo plyboard/mat board	Addis Ababa Amhara (Awi) Oromia (West Shewa [Dare Enchini]) SNNPRS (Sidama)	*Y. alpina*
Stick-based product lines	Addis Ababa Amhara (Awi [Injibara locality]) Oromia (Bale, West Shewa [Dare Enchini]) SNNPRS (Sidama, Sheka, Gomagofa)	*Y. alpina*
Oriented strand board	Amhara (North Gondar) Benishangul Gomuz (Assosa, Kamashi, Metekel) Oromia (Bale, East Wellega, West Wellega) SNNPRS (Goma Gofa)	*Y. alpina* and *O. abyssinica*
Medium-density fibreboard	Amhara (Awi [Injibara locality]) Amhara (North Gondar) Benishangul Gomuz (Kamashi, Metekel) Oromia (Bale, East Wellega and West Wellega) SNNPRS (Goma Gofa)	*Y. alpina and O. abyssinica*
Pulp and paper	Amhara (North Gondar) Benishangul Gomuz (Kamashi, Metekel)	*O. abyssinica*
Bamboo Energy		
Waste-based pellets and briquettes	Addis Ababa	Waste generated from industrial processing
Biomass chips and pellets and charcoal briquettes	Amhara (North Gondar) Benishangul Gomuz (Assosa, Kamashi and Metekel) Oromia (East Wellega and West Wellega) SNNPRS (Goma Gofa)	*O. abyssinica*