

GHANA BAMBOO AND RATTAN DEVELOPMENT STRATEGIC PLAN, 2020-2024



SUSTAINABLE
DEVELOPMENT
THROUGH BAMBOO
AND RATTAN
CONSERVATION

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Within the framework of the Forest and Wildlife Policy and in line with the ongoing Bamboo and Rattan sector development interventions, a five (5) year Bamboo and Rattan Development Strategic Plan has been developed under the auspices of the Forestry Commission as a first step towards efforts being made to provide impetus for the identification and management of natural stands as well as Bamboo and Rattan plantations development, processing and utilization of bamboo and rattan, and promoting sustainable development through the encouragement of bamboo sector activities. This strategic document is the product of several consultative engagements with experts and technocrats in the forestry and Bamboo and Rattan sub-sectors.

The vision, mission and objectives of the strategic plan are well schaled within the Forestry Development Master Plan, National Development Agenda, National Climate Change Action Plan and Sustainable Development Goals (SDGs) of the United Nations. Again, the plan seeks to contribute to reducing Green House Gas (GHG) emissions from deforestation and forest degradation, climate and temperature regulation, sustainable supply of Bamboo and Rattan resources as a compliment to timber and wood fuels, reducing poverty and helping to conserve biodiversity.

The plan has taken full recognition of the need to improve the state of the environment and the importance of appropriate and efficient land use. It is also about people, their beliefs and the forest environment, their working conditions and their livelihoods. It also recognizes the International Guidelines and Conventions which Ghana has ratified.

The full implementation of the Bamboo and Rattan strategic plan will bring about transformation in the bamboo and rattan industry through effective and efficient policy and programs coordination. It will respond to climate change issues and ensure improvement in the livelihoods of the forest dependent communities and individuals. The plan will achieve technology-led bamboo and rattan management systems through the rehabilitation and management of natural bamboo and rattan resources and massive plantations development. It has potential to propel the development of viable domestic bamboo and rattan market and stakeholders' participation in bamboo and rattan resources management.

It is my greatest anticipation that, all the relevant stakeholders in the Bamboo and Rattan industry will put their shoulders to the wheel in our collective resolve to ensure that, the laudable objectives of the strategic plan are achieved to facilitate the sustainable development agenda of the country.

A handwritten signature in black ink, appearing to read 'Kwaku Asomah Chereameh'. The signature is stylized and includes a flourish at the end.

HON. KWAKU ASOMAH CHEREAMEH,
MINISTER FOR LANDS AND NATURAL RESOURCES



**Dignitaries and Participants at the 2019
Overseas Training on Bamboo and Rattan Product Development
Technology for Ghana at FCTC Ejisu, Kumasi.**

ACRONYMS

B&R	Bamboo and Rattan
BARADEP	Bamboo and Rattan Development Programme
BRU	Bamboo and Rattan Unit
CBD	Convention on Biological Diversity
CE	Chief Executive
EPA	Environmental Protection Agency
FC	Forestry Commission
FCTC	Forestry Commission Training Center
FORIG	Forestry Research Institute of Ghana
FSD	Forestry Services Division
HR	Human Resources
IGF	Internally Generated Funds
INBAR	International Network for Bamboo and Rattan Organization
KNUST	Kwame Nkrumah University of Science and Technology
M&E	Monitoring and Evaluation
MLNR	Ministry of Lands and Natural Resources
PR&CA	Public Relations and Cooperate Affairs
MoPs	Manual of Procedures
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RMSC	Resource Management and Support Center of the FC of Ghana
RRT	Rapid Response Team of the Forestry Commission of Ghana
SDG	Sustainable Development Goals
TIDD	Timber Industry Development Division
UNFCCC	United Nations Framework Convention on Climate Change
UNCCD	United Nations Convention to Combat Desertification
UENR	University of Energy and Natural Resource
VRA	Volta River Authority of Ghana
WD	Wildlife Division of FC, Ghana



Evolving socio-economic, political, environmental and technological conditions in both the domestic and global domains offer ripe opportunities for the development, protection and utilisation of our natural resources which are threatened by different factors. Adapting to this volatile and uncertain global economy requires education, flexibility, resilience, and innovation.

Natural resource wealth has a critical role in contributing to sustainable growth and continued poverty reduction efforts. Renewable natural resources, such as forests and fisheries, which could contribute to revenues and sustainable economic development, are being depleted. Forest resources are critically important for jobs creation, income generation and livelihood enhancement, particularly for poor communities and women. Over the last three decades, the forest resources have been characterized by deforestation and forest degradation. The driving forces of deforestation and forest degradation have been agricultural expansion, illegal logging (chainsaw operation) and unauthorized mining (galamsey) operations in the forest areas, illicit and uncontrolled exploitation of wildlife, unsustainable production of wood-fuel especially in the fragile ecological areas of the savannah regions and wildfires. The extent to which trees and timber resources are currently under enormous pressure, calls for the need to explore the promotion and utilization of alternatives and/or lesser used species to support conservation efforts. Bamboo and rattan are among the fastest growing woody plants in the world. Bamboo and rattan have proven potential for soil erosion control, water recharge, climate change mitigation and adaptation.

This B&R Strategic Plan is intended to address the uneven economic landscape, demographic shifts, as well as unprecedented challenges in the environment and natural resources sector. The BR strategic plan seeks to recognize the current realities while building on the existing strengths to better adapt to innovative strategies and new technologies in harnessing bamboo and rattan resources, while also fostering collaboration at all levels (regional, national and district). In implementing the plan, 10000ha (in aggregate) of bamboo plantation is estimated to be planted for environmental conservation purposes. This includes restoration of degraded mangroves, watersheds, slope stabilization and biodiversity offsets.

In June, 2002, Cabinet approved the adoption of Bamboo and Rattan Development Programme (BARADEP) as a national programme to complement the President's Special Initiative on Forest Plantation Development in Ghana. Subsequently, the Bamboo and Rattan Development Secretariat was established under the then Ministry of Lands, Forestry and Mines to coordinate the activities under the programme. It was noted that, the Forestry Commission's technical role for implementing the activities of BARADEP across the country could not be achieved when the then BARADEP was directly under the supervision of the Ministry of Lands and Natural Resources. In order to ensure practical implementation of bamboo and rattan conservation activities across the country to enable the Ministry pay more attention to policy-related issues, the Bamboo and Rattan Unit (BRU) was created under the Forestry Commission

to enable the Commission to have full control over its productive implementation activities in Ghana.

The proposed interventions are expected to support the development of sustainable resource base of Bamboo to compliment timber in satisfying future demand for industrial timber and enhance environmental quality whiles providing optimum income generation opportunities for investors, fringe communities, bamboo industry and the national economy.

This strategy will be subjected to a final completion reviewed after the fifth year to evaluate and adapt the strategic objectives and necessary actions to prevailing conditions and priorities, thus ensuring the development of a medium-term to long-term strategic document to regulate the activities of the infant bamboo industry.

Strategic Goal

The overall goal of the Government is to ensure scientific management, utilization and development of the country's bamboo and rattan resources in order to contribute to socio-economic development, employment generation, poverty alleviation and improve bio-diversity of the natural environment.

Vision

The long-term status and health of Ghana's bamboo and rattan resources will be maintained and enhanced for the cultural, environmental and socio-economic well-being of current generation of Ghanaians and posterity.

Mission

Promote bamboo and rattan resource and industry development as a complement to the wood industry so as to reduce the pressure on the natural forest for timber and increase income and employment opportunities for the populace.

Bamboo and Rattan Strategic Plan 2020 - 2024

The plan seeks to take advantage of the high potential of bamboo and rattan for socio-economic development and environmental conservation to revamp the bamboo and rattan (B&R) sub-sector which is hugely underdeveloped. Key barriers impeding the development of the bamboo and rattan sub-sector such as inadequate supply of quality planting materials and the related high price of bamboo seedlings; lack of coordinated resource development and allocation efforts; inadequate research emanating from low funding; low level of technology adoption; weak marketing systems and limited information for guiding decision making at both national and local government levels have been addressed in the B&R Strategic Plan.

INTRODUCTION

The need to place emphasis on bamboo as a substitute for timber has become imperative as a result of the dwindling wood resource situation in the timber sector. The promotion and development of bamboo will ameliorate the environment, create wealth and provide a balance between wood production and marketing to satisfy both domestic and international demands. Currently, bamboo resource in the country is estimated to be 400,000ha (Ebanyenle et. al, 2005).

There are Seven (7) indigenous species of bamboo in Ghana. They are, *Oxythenanthera abyssinica*, *Bambusa vulgaris*, *Bambusa vulgaris var tata*, *Bambusa pervariabilis*, *Dendrocalamus strichus* and *Bambusa multiplex*. The *Oxytenanthera abyssinica* is mostly found in the Northern part of the country while the other six (6) species are concentrated in the Southern sector (Ebanyenle and Oteng-Amoako, 2007).

In addition, the Ministry of Lands and Natural Resources (MLNR), International Network for Bamboo and Rattan Organization (INBAR) and other development agencies have introduced more than eighteen (18) species of bamboo, some of which have proven very well and others are being piloted in selected ecozones to monitor their growth, performance and yield.

Although, bamboo as a renewable natural resource has the potential to provide social, economic and environmental benefits with proven technologies for high value addition, its development in the country has been at snail's pace over the period.

However, a lot of interest is being developed in the resource of late by various stakeholders. Indeed, if the interest being expressed by Civil Society Organizations, both local and multinational investors in the sub-sector materializes, the pace of transformation will be overwhelming. In recognition of the potential role of the resource to contribute to economic transformation and in order to satisfy the aspirations of a multiplicity of stakeholders in the bamboo and rattan industry, a fully functional administrative unit has been created by the Forestry Commission and staffed with personnel with the requisite expertise and technical know-how to see to the implementation of this strategic document.

An estimated 50,000ha of the resource was captured in the Ghana Forest Plantation Development Strategy (2016-2040) to be developed over the period. However, with the level of interest being shown, the estimated target is most likely to be exceeded.

1.2 Justification for the Development of a Strategic Plan

The need for a strategic plan had become an issue of paramount importance to serve as the blueprint for guiding bamboo and rattan conservation activities in Ghana.

Until 2002, there had been minimal effort by governments and the private sector to promote the development and management of bamboo in the country. Even after the approval by Cabinet for the adoption of the resources as part of the presidents' special initiative in 2002, development of the sub-sector had been at a snails' pace. There is an increasing pressure on our forest due to diverse factors, including population growth, resulting in huge gap between demand for and supply of timber. This resultant imbalance between the production and utilisation of timber has led to the

depletion of our forest and hence, scarcity of wood products.

Bamboo is an important natural substitute for a number of forest products and services. It is a very fastest growing plant and highly versatile material with possibilities of it being harvested annually. Globally, the annual production and consumption of bamboo products is valued at USD 60 billion, and global import and export is valued at USD 2.5 billion (INBAR, 2018b). In fact, there is a large market opportunity for Ghana to tap into.

Large range of products ranging from household to micro-enterprise, small to medium enterprise (SME) and macro-scale industrial products can be made from bamboo, which makes it possible for its inclusion in development.

Additionally, Bamboo can significantly contribute to environmental management (soil and water conservation), habitat for wildlife and mitigation of climate change. It can be used as a tool to achieve international protocols that Ghana is signed unto, including the Bonn Challenge, Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), among others.

This notwithstanding there has been a general lack of awareness, coupled with poor perception of bamboo as a poor man's timber and less durable product with no market opportunity.

1.3 Guiding Principles

The strategic plan will be implemented within the framework of the under-listed principles and institutional arrangements:

1. Private sector-led market-driven industry: It is expected that the private sector shall lead in the development of the bamboo sub-sector. The relevant Government institutions will coordinate the private sector-led market-driven sub-sector development by way of providing the necessary support and regulatory frameworks. It is also expected that a level playground will be provided for bamboo products at the local level.
2. Build Harmony and Convergence: Concerted efforts from government, development partners, investors (multinationals) and local private sector stakeholders to be made to propel the development of the sub-sector.
3. Reducing Pressure on Forests and Enhancement of Ecosystem Services: Considering the reduction in forest coverage and the government's efforts to increase the forest cover, there is the need for an alternative. The unique biological and ecological characteristics of bamboo coupled with the wide range of value-addition possibility with high economic potential makes it an ideal substitute to timber.
4. Enhancement of Climate Resilience and Green Economy: Bamboo is a renewable raw material for producing low-carbon circulation and environmentally friendly resource efficient products.

5. Bamboo and Rattan ecosystems must be sustained to enable them simultaneously meet environmental, economic and community aspirations and needs.
6. Bamboo and Rattans are fundamental sources of medicinal plants to cater for global health and human welfare
7. Bamboo and Rattan plantations have the capacity to generate employment and, in the process, alleviate poverty
8. The structure of BRU has been fully implemented. Its Achimota office is managed by professionally and technically qualified staff. Its mandate includes creating, capturing, sharing, disseminating relevant information and to promote learning
9. The unit is committed to serving stakeholders and society by providing sound knowledge, innovation, continuous learning, sound science and professional management skills
10. The unit is committed to building the capacities of relevant stakeholders in order to ensure that they can effectively play potential roles for the overall implementation of the strategic plan.

2.0 ANALYSIS OF STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (SWOT)

In order to identify and understand key issues affecting the bamboo and rattan sub-sector, a SWOT analysis was used as one of the effective tools to analyse environmental data and information – for both, internal (strengths, weakness) and external (opportunities, threats) factors. Undertaking this analysis will help to minimize the effect of weaknesses in the management, utilization and development of bamboo and rattan, while maximizing its strengths guarding against negative externalities and exploring opportunities for enhancement.

2.1 Strengths

- The structure of Bamboo and Rattan Unit (BRU) has been fully implemented and has competent and technically skilled staff to execute the mandate of the Unit.
- The Unit has a permanent and well refurbished office space. There is a relatively large number of stakeholders in the bamboo and rattan industry.
- There is a stable and relatively peaceful political and economic environment.
- The Forestry Commission has readily available degraded sites for bamboo and rattan plantations development.
- Forestry Commission Training Center (FCTC) has a well-endowed training center with the requisite expertise for training artisans

- The government of Ghana is committed to the development of the bamboo and rattan sector to alleviate poverty and protect the environment.

2.2 Weaknesses

- Inadequate funding for research, development and logistics for operational activities.
- Inadequate technology and skill in the bamboo and rattan industry in the country.
- Inadequate raw materials.
- The relatively large unmanaged natural stands of bamboo pose a limitation to their commercial or industrial processing.
- Diversification of bamboo and rattan products is hindered by inadequate bamboo and rattan germplasm.
- There is currently no dedicated policy on bamboo and rattans.
- No scientific inventory has been conducted for the bamboo resources in Ghana.

2.3 Opportunities

- The global bamboo economy is now valued at USD 60 billion, and it is a potential source of income for rural communities. The largest markets are handicrafts (USD 3 billion), bamboo shoots (USD 1.5 billion) and traditional furniture (USD 1.1 billion). Emerging bamboo markets are timber substitutes, such as flooring, panels and non-traditional furniture.
- Ghana has favorable international relations with such countries as China, India, and Ethiopia for promoting exchange of knowledge and expertise for bamboo and rattan development.
- There is a whole unit dedicated to sound administration and committed to building the capacities of relevant stakeholders in order to ensure that they can effectively play potential roles for the overall implementation of the strategic plan
- There is an existing vibrant wood processing industry flexible enough to allow for integration of bamboo and rattan processing.
- Climatic conditions and soil properties of the country support most bamboo species both indigenous and exotic thus making prospects for plantation establishment very viable
- Raw bamboo culms and processed bamboo products have both local and international markets which are yet to be fully exploited.

- The relatively short gestation period of bamboo and rattan resources coupled with their multipurpose uses make them suitable substitutes for wood products.
- Existing opportunity for carbon market and payment for environmental services.
- There is an emerging interest in private commercial plantation development.
- The International Network for Bamboo and Rattan Organization (INBAR) is a key role player in the development of bamboo and rattan. Ghana is a member of INBAR and the existence of INBAR office in Ghana is an opportunity to leverage upon.

2.4 Threats

- Importation of bamboo and rattan products poses a threat to the industry.
- Deforestation is a threat to rattan germplasm.
- Stiff competition for international markets exists.
- The level of social acceptance of bamboo and rattan is low.
- Unregulated exploitation poses a threat to resource sustainability.
- Influx of cheap rubber products which are substitutes to bamboo products in Ghana

2.5 Gaps Identified in the Bamboo and Rattan Sub-sector

Analysis of the external and internal environments in relation to the desired vision identified the following gaps:

1. Lack of policy framework for the development and sustainable utilization, marketing and financing of the bamboo and rattan sub-sector
2. Inadequate funding for research, development and logistics for operational activities.
3. Inadequate technology and skill in the bamboo and rattan industry in the country
4. No scientific inventory has been conducted for the bamboo resources in Ghana.
5. Inadequate raw materials
6. The relatively large unmanaged natural stands of bamboo pose a limitation to their commercial or industrial processing.
7. Diversification of bamboo and rattan products is hindered by inadequate germplasm.
8. Social acceptability for bamboo and rattan resources and products is low.

2.6 Gaps Assessment and Mitigation Measures

Based on the SWOT analysis, key gaps in the bamboo and rattan subsector were identified and analysed in 2.5 above. Accordingly, the corresponding strategic objectives have been designed to sustain the identifiable strengths, address the related weaknesses, mitigate the threats and explore the available opportunities.

Also, in the implementation of the strategy and based on the SWOT analysis, key risk factors in the area of investment for the development and management of the resources have been identified and analysed. A schedule of mitigation measures has been proposed to address these risks depending on prevailing conditions and available capacity (Appendix 1).

3.0 STRATEGIC OBJECTIVES

3.1 National Policy and Strategy Alignment

This Strategy was developed through a consultative process led by the Bamboo and Rattan Unit, a key unit under the Forestry Commission charged with the regulation, conservation and sustainable management of Ghana's Bamboo and Rattan resources. It is consistent with the Sustainable Development Goals (SDGs) and Ghana's Medium to Long-term Development Agenda.

Interventions proposed under this strategy will contribute positively to the sustainable development with its concomitant reduction in rural poverty levels and rural - urban migration. The bamboo and rattan sub-sector developmental efforts in Ghana continue to be fragmented with lack of strong communication channels and structures. Planning and coordinated implementation are crucial to developing a vibrant bamboo and rattan sector.

The Bamboo and Rattan Strategic document aligns itself with the Forestry Development Master Plan (2016 – 2036), Ghana Plantation Strategy (2016 – 2040), Ghana's REDD+ Strategy 2016, and takes its source from the National Medium-Term Development Policy Framework objectives of Ghana.

Government Policy	SDGs	Ministry of Lands & Natural Resources Policy Objectives	Forestry Commission Strategic Imperatives	Bamboo & Rattan Unit
Accelerated Agricultural Modernization and Sustainable Natural Resource Management	15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	1. Manage and enhance permanent forest and wildlife estates	Implement the framework for the sustainable management, development and protection of forest and wildlife resources;	Promote bamboo and rattan resources and industry development as a complement to the wood industry
		2. Promote development of viable wildlife and forest-based industries	Secure and enforce a policy and legal framework that ensures a liberated Forestry Commission; Activate a diversified portfolio of sustainable revenue sources without compromising the integrity of the resource;	Increase income and employment opportunities for the rural
		3. Promote public awareness and involvement in resource conservation	Create an enabling environment for forest and wildlife stakeholders (especially industries, communities and landowners) to thrive	Contribute to forest bio-diversity conservation and resources sustainability
		4. Promote relevant research for improved sustainable management	Implement the framework for the sustainable management, development and protection of forest and wildlife resources.	Facilitate capacity building of all key and relevant stakeholders on Bamboo and rattan sub-sector.
	13. Take urgent action to combat climate change and its impacts.	5. Develop effective capability for sustainable resource development	Attract, develop and retain well motivated, skilled and efficient workforce;	
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.		Develop and implement an efficient and effective organisational infrastructure and culture		

3.2 STRATEGIC OBJECTIVE 1

Promote Bamboo and Rattan Resources Development and Management as an alternative to timber.



Community Sensitization on Natural Stands Management (Bowiri, Jasikan Forest District, Oti Region).

Determination of strategic targets:

Strategic targets for plantation development are based on several factors. But for the purpose of this strategy, the scope is limited to end usage and species. The type of product is critical in this consideration. For instance, a medium to large scale pulp producing facility requires about 260,000 tonnes of bamboo to enable it produce to capacity per annum. A well-managed bamboo plantation can yield between 3.5-4.5 tonnes of bamboo (with planting distance of 5m x 5m and depending on the species). This implies that, a facility of a capacity of 260,000 tonnes per annum requires about 75,000ha plantation to produce to full capacity per annum. For the purpose of investors decision making, below is a table of priority species and their end usage:

Table of priority species available in Ghana and their end use

Species	End usage
<i>Dendrocalamus membranaceus</i> (EX)	Furniture, Paper pulp, Construction light
<i>Thyrostachis siamensis</i> (EX)	Weaving, Handicraft, Shoots, Paper pulp
<i>Dendrocalamus latiflorus</i> (EX)	Weaving, Shoots, Furniture, Boards
<i>Bambusa edulis</i> (EX)	Weaving, Boards, Furniture, Shoots, Roof purling
<i>Dendrocalamus brandisii</i> (EX)	Construction
<i>Bambusa oldhamii</i> (EX)	Furniture, Shoots, Construction, Windbreak
<i>Dendrocalamus asper</i> (EX)	Shoots, Furniture, Panel
<i>Guadua angustifolia</i> (EX)	Construction
<i>Dendrocalamus strictus</i> (IN)	Weaving, Boards, Furniture, Shoots, Roof purling
<i>Guadua chacoensis</i> (EX)	Construction
<i>Dendrocalamus latiflorus</i> (EX)	Weaving, Shoots, Furniture, Boards
<i>Bambusa textilis</i> (EX)	Weaving, Shoots
<i>Bambusa ventricosa</i> (EX)	Ornamental
<i>Bambusa burmanica</i> (EX)	Construction (light)
<i>Bambusa multiplex</i> (IN)	Furniture, hedging
<i>Bambusa vulgaris</i> (the green type) (IN)	Paper pulp, energy,
<i>Bambusa arundinacea</i> or <i>Bambusa bambos</i> (EX)	Paper pulp, Energy
<i>Bambusa pervariabilis</i> (IN)	Furniture
<i>Bambusa vulgaris</i> var <i>vitata</i> (the yellow type) (IN)	Paper pulp, energy,
<i>Oxythenthera abyssinica</i> (IN)	Energy, paper pulp, Basketry
<i>Dendrocalamus strictus</i> (IN)	Energy, paper pulp, Laminated boards
<i>Bambusa balcoia</i> (be ema bamboo) (EX)	Energy, paper pulp

Key: IN= Indigenous, EX= Exotic

Action Items

1. Sensitize the populace on the benefits of bamboo and rattan
2. Undertake inventory of the existing bamboo and rattan resources in the country.
3. Develop and publish guidelines to control the unregulated exploitation of Bamboo and Rattan resources, both in and outside the reserves.
4. Develop and publish Manual of Procedures (MoPs) for bamboo and rattan plantation development and their sustainable management in Ghana

5. Develop and publish manual of procedures (MoPs) for the management of natural stands
6. Facilitate the development of commercial plantations of bamboo and rattan to promote medium to large scale bamboo and rattan industry in Ghana.
7. Increase the bamboo and rattan germplasm
8. Submit monthly and quarterly reports relating to bamboo, by all regional and district offices of the Forest Services Division to BRU. This will then be followed up to conduct ground truthing based on reports received on the resource situation.
9. Establish bamboo plantation demonstration plots in the country. This is to demonstrate best practice

3.3 Strategic Objective 2

Promote Investments in the Bamboo and Rattan Sector



Bilateral conversation between Ghana and China on possible areas of investment in the Bamboo and Rattan sub-sector.

Bamboo has a very short gestation period compared with timber species and the related investments have short payback periods with relatively low risks. This is expected to attract financial institutions to extend credit facilities to potential investors. The economic viability of commercial forest plantations depends on yield (largely depends on suitable species, lands management, etc.) and access to suitably packaged short-to-medium-term financing. This has the potential to motivate the Government to introduce some general incentives and benefits to

attract investments in commercial bamboo forest plantations development such as:

- Establishment of a National Bamboo and Rattan Development Fund.
- Inclusion of Bamboo and Rattan to attract funding from the Forest Plantation Development Fund (Amendment Act 2000, Act 583), to provide financial assistance to private sector for development of plantations, provide funds for research and technical advice.

The Forestry Commission (FC) may decide to lease/allocate land in degraded forests (illegally mined areas) reserves to the private sector and the public sector for reclamation through bamboo plantation development.

Action Items:

1. Facilitate the generation of inputs for the enactment of an Act to provide a legal framework for the regulation of bamboo forest plantation. The Act will also provide innovative financing mechanisms (e.g. through the introduction of environmental levies/taxes, carbon credit revenue to support bamboo forest plantation establishment, management, harvesting, processing, marketing and research and other related areas).
2. Develop and publish a bamboo investor handbook to guide potential local and foreign investors.
3. Facilitate and establish investor fora for periodic meetings and information dissemination among commercial and private Bamboo plantation developers.
4. Establish and operate a state-of-the-art nursery with a capacity of 1 million seedlings

3.4 STRATEGIC OBJECTIVE 3

Promote Processing and Utilization of Bamboo and Rattan Resources Nationwide.



Participants in an overseas training on Bamboo and Rattan Product Development Technology at FCTC.

Action Items

1. Liaise with MLNR and other relevant stakeholders to continue the yearly local/or international training of artisans.
2. Liaise with TIDD and other relevant stakeholders to carry out a survey to collate information on all bamboo and rattan processing factories and craft industries in Ghana to serve as a basis for the development of the sub-sector.
3. Engage relevant key stakeholders in sensitizing actors in the bamboo and rattan sub-sector to regularize their businesses to attract the necessary support.
4. Collaborate with the Ministry and relevant Divisions/Department/Units of FC to organize and participate in local and international trade fairs and exhibition of bamboo and rattan products

3.5 STRATEGIC OBJECTIVE 4

Governance



Administrative Block of Bamboo and Rattan Unit of the Forestry Commission (Achimota Depot)

In the promotion of the industry, the following guiding principles with regards to good governance in Bamboo and Rattan development will be very necessary:

- Facilitate the promulgation and/or enforcement of laws, policies and regulations to sustain investor confidence
- Prompt and efficient law enforcement and conflict resolution, especially with regards to land ownership and lease disputes
- Transparency and regular disclosure of information through agreed channels to stakeholders at nationwide, regional, district and community levels
- Conflict management mechanisms

Institutional Structures for Strategy Implementation

- The Forestry Commission Act, 1999 (Act 571) mandates the FC, among other things to oversee the implementation of policies and programs related to forestry in the country.
- In view of the growing importance for the development and utilization of Bamboo and Rattan as an alternative to timber in the country, a Bamboo and Rattan Unit has been created under the FC to oversee the development and utilization of Bamboo and Rattan as an alternative to timber.
- This strategic document will serve as a blue print to enhance effective and efficient coordination of planned actions and manage the expectations of the many stakeholders; especially the private sector investors.
- The FC fulfills its mandate in collaboration with the Ministry of Lands Forestry and Natural Resources and other stakeholder institutions such as MoFEP, EPA, MOFA, Media, Civil Society groups, Research and Academic institutions. Stakeholders and their respective areas where their roles will be played have been indicated in subsequent pages in the document.

It is also proposed that a broader-stakeholder advisory body to be known as Bamboo and Rattan Development Technical Steering Committee (BRDTSC) be constituted to guide the implementation of this Bamboo and Rattan Development Strategy.

Action Items

1. Set up and operationalize the BRDTSC to oversee the implementation of the strategy
2. Ensure adherence to social and environmental safeguard measures
3. Liaise with plant protection department of MoFA to regulate the importation of bamboo planting materials

3.6 STRATEGIC OBJECTIVE 5

Investments in Research and Development, Extension, Training and Capacity Building for Bamboo and Rattan Resource Development, Management, Processing and Utilization

The success of the development of the sub-sector largely depends on research and development in key areas of the industry to enhance quality and standards. For instance, the success of commercial bamboo plantation establishment depends on factors such as;

- a. selection of suitable species,
- b. use of high-quality genetic propagation materials,
- c. site-species matching application of improved agronomic practices
- d. availability of technical capacity and adoption and application of appropriate business models.

The Strategy identifies these factors as very relevant and subsequently propose the relevant steps in connection with research in the priority areas; provision of extension services and capacity building as described below:

Capacity Building

Human capital development is an essential consideration for the development of the industry. Appropriate categories of manpower for resource development and management, processing, utilization and marketing would be provided with the required technical supervisory and managerial skills to enhance effective and efficient application of best practices for rapid development of the industry.

Measures to upgrade and develop capacity are as follows:

- Conduct training need assessment of key and relevant stakeholders including FC staff as a basis for curriculum development for training
- Identify potential collaborating training institutions and B&R model sites both locally and internationally
- Pursue the implementation of professional development programs at the local and international levels to strengthen institutional capacity. This will be done in collaboration with local and international universities and training institutions with programs in Bamboo and Rattan and to regularly review curricular in line with the demands of the Bamboo and Rattan industry.
- Facilitate the upgrading of bamboo and rattan training infrastructure in Ghana
- Liaise with FSD, FCTC, FORIG, KNUST, UENR FC and other relevant stakeholders to organize short-term and fresher courses for targeted technical level BRU/FSD staff as well as fresher training of trainers' courses in hands-on bamboo plantation development, management etc.

- Liaise with FC and other stakeholders to organize study tours and exchange programs with foreign public and private institutions implementing best practices in Bamboo and Rattan development (China, Japan India, Ethiopia etc.)
- Sponsorship for priority advanced degree programs in disciplines such as genetics and culm breeding, plantation agronomy and management, bamboo forest economics, engineering, pests and disease management and control.
- Support group formation in the areas of nursery, plantations development, product development and marketing. Their capacities will be built in the form of provision of technical support and administration.
- Community and field schools and demonstrations on best practices and integrated nature-base livelihoods

Extension Services

The Private sector and community efforts will be supported with education and extension services to promote the adoption of best practices.

Actions Items

1. Develop IPMSs and training personnel to implement the systems for monitoring, detecting and managing outbreaks of pests and diseases within nurseries and plantations of bamboo.
2. Undertake trials of selected exotic and indigenous bamboo species to determine their suitability for plantation establishment and agro-forestry systems
3. Build the capacity of BRU/front line FSD staff in extension services
4. Organize training in site productivity management for bamboo nursery and plantation development
5. Build capacity of bamboo processing industry to improve efficiency and utilization of bamboo
6. Identify and build capacity of culm grower associations in nursery and plantations management advocacy and marketing of their produce.
7. Under take mass production of improved genetic material
8. Undertake international educational tours to model plantation sites.
9. Collaborate with FCTC and other relevant institutions to develop training manuals as a guide for training artisans.
10. Liaise with ML&NR and other stakeholders for a continuous local and international training of artisans to broaden their knowledge on product development
11. Community and field schools and demonstrations on best practices and integrated nature-base livelihoods.

3.7 STRATEGIC OBJECTIVE 6

Employment Creation and Sustainable Livelihoods.



Providing livelihood to communities in Ghana (Kyebi Apapamu, Kyebi Forest District, E/R)

This strategic objective seeks to offer various social and economic benefits to the key stakeholders that will be involved in the implementation of the strategy, especially the local communities.

The benefits include skills development and the creation of direct job such as, operating commercial bamboo nurseries, plantation establishment (such as site clearing, preparation, and planting), management (i.e. weeding, pruning, thinning out and fire protection), beekeeping as well as culm harvesting and processing.

In the area of employment generation, it is estimated that one person's labour would be employed to establish a hectare of bamboo forest plantation. Therefore, per the projection of a maximum of 75,000ha per annum, 375000ha of bamboo plantations is estimated to be established within the five-year duration of the strategy, implying that a total of 375000 direct jobs (in the aggregate) will be created over the same period (with a planting diameter of 5mx5m).

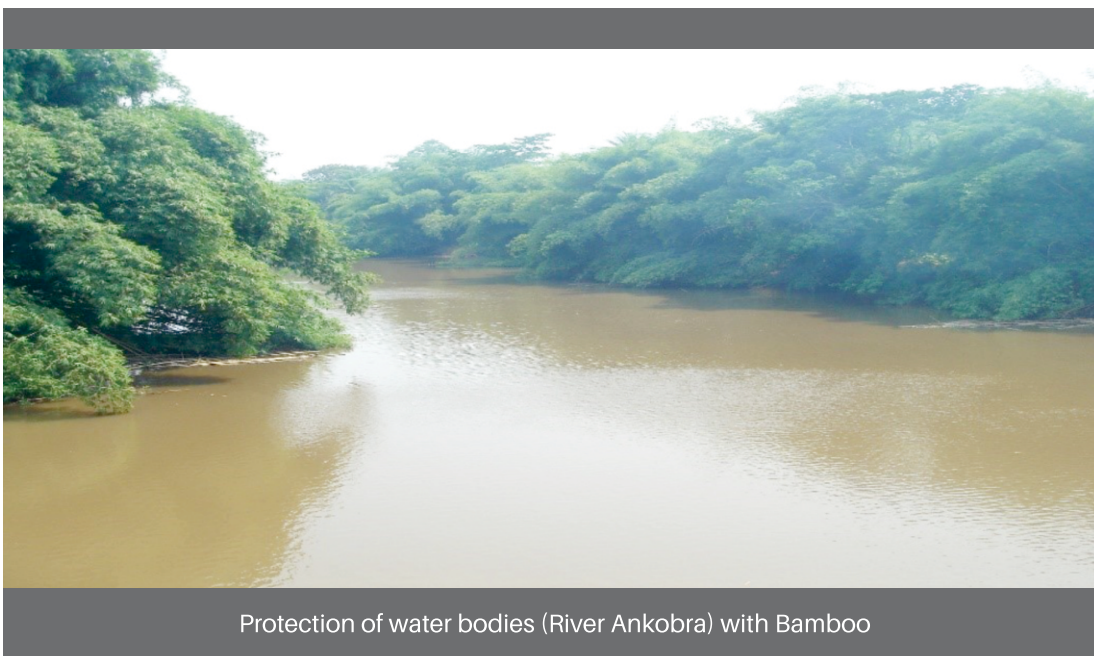
An estimated 206.5 million seedlings will be required for establishing 375,000 ha of bamboo forest plantations. The production of seedlings will also be a source of employment for the fringe communities. Indirect jobs are expected to emanate from the development of the plantations as well as harvesting, sale and processing of the harvested bamboo culms from natural and planted stands.

Action Items

1. Undertake skills and enterprise development for men and women (train communities on how to process bamboo, nursery development, beekeeping using bamboo to construct beehives etc.)
2. Promote out-grower bamboo forest plantation schemes and establishment of nurseries
3. Liaise with Forest Services Division (FSD), RMSC and WD to demarcate specific areas in the reserves, especially the illegally mined areas to be dedicated for bamboo plantations development.

3.8 STRATEGIC OBJECTIVE 7

Management of Bamboo for Environmental Benefits



Bamboo does not only play important role in rural industrial development, but also makes increasingly large contributions to environmental protection. Some of the important environmental role bamboo can play includes:

1. Protective function of bamboo plantations (planted and natural): Management of natural bamboo forests and establishment of bamboo plantations help reduce deforestation which is one of the main causes of land degradation. This is partly because bamboo provides a

substitute for the forests that are over harvested for fuel-wood and partly because it provides alternative sources of income to limit the conversion of wood land for crop production. The uniqueness of bamboo for preventing degradation and rehabilitating degraded lands are as follows:

- one of the fastest growing plants world over
- Rapidly renewable
- Well-developed rhizomes and roots that binds soil
- Perennial crop, annually harvested on selective harvesting scheme maintaining perennially green canopy
- High capacity for water catchment and conservation

2. Bamboo for Carbon storage: Bamboo is one of the fastest growing plant, growing to a height of about 1.2m a day. This unique capacity makes it a valuable sink for carbon storage.

Bamboo Carbon for development: Bamboo can play a significant role in linking climate change mitigation to sustainable economic development. Carbon credits can trigger otherwise marginal bamboo plantations for processing, jobs and wealth creation.

Bamboo forests for biodiversity conservation, purification and regulation of the environment.

Action Items

1. Liaise with FSD, WD, Water Resource Commission, VRA and other relevant stakeholders to identify degraded watersheds, degraded mangroves, slopes etc. both in the reserves and off reserves.
2. Establish 2000ha plantation of bamboo annually for environment improvement purposes. Target areas includes restoration of mangroves, watershed plantings, slope stabilization, rehabilitation of mined sites, biodiversity offsets.

4.0 SUSTAINABLE SOURCES OF FUNDING

In order to implement the Bamboo and Rattan (BR) Strategic Plan, financial, human and physical resources will be required. The financial requirement for the year 2020 is estimated at GHC 52,667,944.00 that is projected to grow to GHC 193,324,175.33 by 2024. To ensure sustainable sources of funding, the BRU will mobilize resources from: (a) Central Government; (b) internally Generated Funds (c) Private Sector Investments (d) Development Partners and (e) other sources such as Carbon and Green Funds.

4.1 Central Government

Funding for the Strategy will be sourced from government which is expected to come from direct budget support. In addition, existing and new government policies and programs especially agriculture, forestry, renewable energy, industrialization, land, social entrepreneurship, environment and climate change, which are relevant to B&R sector development would be leveraged upon.

4.2 Development Partners

Financial resources from development partners would be in the form of loans, grants and direct budgetary support. A database of possible funding partners and their funding cycles will be established. As part of the resource mobilization efforts, attempts will be made to explore the possibility of co-ordinating joint development of concepts and proposals with research institutions. The Institute will regularly revise its resource mobilization strategies through proactive approaches such as benchmarking with similar successful local and international agencies.

4.3 Internally Generated Funds (IGF)

Some of the targeted internal revenue generation sources include stumpage on harvesting and transport of bamboo, sale of B&R seedlings and consultancy services and training.

4.4 Private Sector

Private sector funds are expected to be sourced from debt and /or equity financing and grants. The BRU will collaborate with interested private companies, groups and individual entrepreneurs to pilot viable business models (Ghana Forest Plantation Strategy 2016 – 2040) in line with Ghana plantation strategy.

4.5 Other Sources

Carbon and green financing sources will be explored and pursued in this regard.

5.0 MONITORING, EVALUATION AND REPORTING

Monitoring and Evaluation (M&E) is an important management tool that will be used by Bamboo and Rattan Unit (BRU) to track implementation of targets and monitor performance indicators outlined in the Bamboo and Rattan Strategic plan. Monitoring and evaluation activities will be conducted in line with existing country systems such as the national M&E Framework and in accordance with established Forestry Commission M&E system. The BRU M&E Framework will take into account emerging issues, and changes in the environment that may affect implementation of the Bamboo and Rattan Strategic Plan.

The BRU M&E Framework (detailed in 6.0) will be used to measure achievements, detect any deviations, and where there is need for adjustment, appropriate and timely action will be taken. The BR Strategic plan will be subjected to a post implementation evaluation (Summative Evaluation).

The process of developing a new strategy should commence at least a year prior to the expiration of this strategy.

5.1 Monitoring

Monitoring will involve recording, analysing and reporting on data/information leading to corrective action at the operational level. Monitoring will focus on outputs to determine achievement of set targets. Periodic monitoring of activities will be undertaken by BRU in collaboration with Corporate Planning, Monitoring and Evaluation of the Forestry Commission. Findings of periodic monitoring will be reflected in quarterly progress reports.

5.2 Indicators for Monitoring

Monitoring of the strategy's indicators will be undertaken by the Unit Head with support from Bamboo and Rattan Development Technical Steering Committee (BRDTSC).

Performance indicators to be used in monitoring the implementation of the strategy will include:

- Extent of existing natural stands that have been managed (hectares).
- Number of jobs created.
- Number of investments in the bamboo industry (development, processing and utilization).
- Extent of lands in hectares planted annually.
- Number of beneficiaries (male/female) trainees who have established themselves with skills and are in business, two years after training.
- Number of beneficiaries who attended and completed the various training courses organized under the strategy (formal, short-term and fresher courses).
- Area of land demarcated, both in and off reserves for bamboo plantations.

5.3 Evaluation

Independent evaluations would be carried out as and when necessary during implementation of the BR Strategic Plan as well as conducting impact evaluation. The evaluations will focus on delivery of the results against targets and also include impact and sustainability of the strategic outcomes of the plan. It will include recommendations for any follow-up activities and lessons learnt.

5.4 Field Visits

Field visits serve the purpose of results validation and should provide latest information on progress for report preparation. BRU staff field visits shall be documented through brief and action-oriented reports, submitted within one week of return to the office. Monitoring site visits will be scheduled in the annual work plan.

5.5 Reporting

Bamboo and Rattan Unit (BRU) shall report on progress which is essential for keeping stakeholders informed in relation to implementation of activities outlined in the BR Strategic Plan. It will also provide basis for assessing the achievement of the objectives outlined in the Strategic Document and inform decision making on direction for implementation in the subsequent years. The BRU will submit quarterly progress reports to the Corporate Planning, Monitoring and Evaluation Department of the Forestry Commission. Annual report will be prepared by the BRU team documenting progress towards objectives and outcomes according to the agreed indicators as stated in the B&R Strategic Plan.

6.0 IMPLEMENTATION OF BAMBOO AND RATTAN DEVELOPMENT STRATEGY (2020-2024)

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
1. Promote Bamboo and rattan resources development and management as an alternative to timber	1. Sensitization on benefits of bamboo in the country	BRU, FC and all relevant stakeholders	2020	2024	Number of sensitization workshops/ meetings held	Personnel, transport, other logistics and funds	Reports on sensitizations, Media coverage etc.
	2. Develop and publish Manual of Procedures for bamboo and rattan plantation development and their sustainable management in Ghana	BRU, FSD, RMSC, FC, INBAR, MOFA, and all relevant stakeholders	2020	2020	Draft MoPs for B & R published	Personnel, transport, other logistics and funds	Manual of Procedures published report
	3. Develop and publish a guide for the management of natural stands	BRU, FSD, RMSC, INBAR, MOFA, UENR, KNUST and all relevant stakeholders	2020	2021	Draft MoPs for management of natural stands published	Personnel, transport, other logistics and funds	Manual of Procedures published report
	4. Undertake inventory of the existing bamboo and rattan resources in the country.	RMSC, FSD, Consultant facilitated by BRU, INBAR and other relevant stakeholders	2020	2021	Bamboo and rattan inventory report	Personnel, consultant, vehicles and funds	Terms of reference developed, consultant hired and inventory conducted
	5. Submit monthly and quarterly reports on bamboo and rattan activities by all Regional and District offices of the Forest Services Division to BRU	BRU, FSD, TIDD, FC, WD and all relevant stakeholders	2020	2024	Quarterly reports from district documented	Logistics, personnel, vehicles and funds	Quarterly report filed at BRU

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
	6. Establish bamboo and rattan germplasm centers in the country	BRU, FSD, FORIG, Private sector, Other relevant stakeholders	2020	2024	At least Five Bamboo and rattan germplasm centers established in the ecological zones of the country.	Logistics, personnel, vehicles, funds	Reports, established germplasm centers.
	7. Increase the number of species of bamboo and rattan in the country	BRU, INBAR, FSD, FORIG, Private sector, Other relevant stakeholders	2020	2024	Bamboo and rattan species in Ghana increased by 10percent	Logistics, personnel, vehicles, funds	Reports, new bamboo and rattan species added to the existing ones
	8. Facilitate the development of commercial plantations of bamboo and rattan to promote medium-large scale bamboo and rattan industry	BRU, INBAR, FSD, Private sector, Other relevant stakeholders	2020	2024	Commercial plantations of bamboo /rattan developed	Logistics, personnel, vehicles, funds	Reports / Minutes of meetings
	9. Establish bamboo plantation demonstration plots in the country to demonstrate best practices	BRU, FORIG, UENR, FSD, INBAR, KNUST, Other relevant stakeholders	2020	2024	At least five species-site-match bamboo demonstration plots established	Funds, logistics, personnel, vehicles	Demonstration plots established

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
2. Promote investments in the Bamboo and Rattan Sector	1. Facilitate the generation of inputs (Conduct studies and stakeholder consultations) for the enactment of an Act to provide a legal framework for the regulation of the bamboo industry. The act will provide innovative financing mechanisms (e.g. through the introduction of environmental levies/taxes, carbon credit revenue to support bamboo forest plantation establishment, management, harvesting, processing, marketing and research and other related areas).	BRU, ML&NR, MESTI, FSD, FC, INBAR, AGI, Civil Society Groups, MoFEP, Parliamentary Select Committee on Forestry, Other relevant stakeholders	2020	2024	Draft Bill	Funds, logistics, personnel, vehicles	Reports on stakeholder consultations
	2. Develop and Publish a bamboo industry (for both development and processing) investor handbooks to guide potential local and foreign investors.	BRU, FSD, TIDD, INBAR, GSA, Other relevant stakeholders	2020	2024	Investor handbooks for development and processing developed	funds, personnel, logistics	Published handbooks
	3. Facilitate and establish investor fora for periodic meetings and information dissemination among commercial and private Bamboo plantation developers and processors	BRU, GEPA, INBAR, Other relevant stakeholders	2020	2024	Number of meetings and /or fora held	funds, personnel, logistics and vehicles	Reports, media coverage

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
3. Promote processing and utilization of bamboo and rattan resources nationwide	4. - Establish and operate a state of the-art nursery with a capacity of 1million seedlings	BRU, INBAR, TIDD, CONSULTANT, MOTI, MoFEP, Other relevant stakeholders	2020	2024	A state of- the -art nursery established with a capacity of 1million seedlings	Funds, personnel, logistics	Reports, Nursery available
	1. Document and promote investment opportunities in the bamboo and rattan sector.	BRU, TIDD, RM/SC, INBAR, FCTC, Other relevant stakeholders	2020	2022	and website updated	funds, personnel, logistics	published and disseminated
	2. Liaise with TIDD and other relevant stakeholders to Carry out a survey to collate information on all bamboo and rattan processing factories in Ghana to serve as a basis for the development of the sub-sector.	BRU, TIDD, FSD, INBAR, Other relevant stakeholders	2020	2024	Bamboo and rattan processing factories in Ghana documented	funds, personnel, logistics and vehicles	TIDD submitting regular quarterly report to BRU and data base of all bamboo and rattan processors in Ghana
	3. Engage relevant key stakeholders in sensitizing actors in the bamboo and rattan sub-sector to regularize their businesses to attract the necessary support.	BRU, TIDD, FSD, WD, Corporate PR & CA, INBAR, Other relevant stakeholders	2020	2024	Relevant stakeholders engaged and sensitized	funds, personnel, logistics	Number of bamboo and rattan business entities regularized

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
4. Governance	4. Liaise with ML&NR and other relevant stakeholders for local and international training of artisans to broaden their knowledge on product development	BRU, ML&NR, MESTI, FC, Other relevant stakeholders	2020	2024	Number of local and international trainings organized	Funds, personnel, logistics	The training featured in both print and electronic media and training reports
	5. Collaborate with the MLNR and relevant Divisions /department/units of FC and other relevant institutions to organize and participate in local and international trade fairs and exhibition of bamboo and rattan products	MLNR, FC, BRU, PR&CA, INBAR, GEPC, GSA, MOTI, Other relevant stakeholders	2021	2024	Two trade fair and exhibition organized	funds, personnel, logistics	The exhibition and trade fair prominently featured in both print and electronic media and report
	1. Facilitate the generation of inputs that will feed into the development of policy framework for the bamboo and rattan sub-sector.	BRU, FC, FSD, WD, TIDD, MLNR, INBAR, GSA MMDAS, Other relevant stakeholders	2020	2024	Marketing, financing and policy framework for bamboo and rattan developed	Funds, personnel, logistics, vehicles	Policy document published
	2. Ensure transparency in the implementation of the Ghana Bamboo and Rattan Strategy by adopting collaborative M&E systems	BRU, FC, ML&NR, GSA, MESTI, MOTI, GEPA, Other relevant stakeholders	2020	2024	Collaborative monitoring system developed	Funds, personnel, logistics, vehicles	Monitoring and evaluation reports from stakeholders

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
5. Investments in Research and Development, Extension, Training and Capacity Building for Bamboo and Rattan Resource Development, Management, Processing and Utilization.	1. Identify potential collaborating training institutions and B&R model sites both locally and internationally.	BRU, UENR, KNUST, FCTC, INBAR, HR, FORIG, GEPC, Other relevant stakeholders	2020	2021	Training institutions and model sites identified	Funds, personnel, logistics	Training institutions and model site made known in reports
	2. Strengthen capacity of BRU and FC staff.	BRU, FC, HR and other relevant stakeholders	2020	2024	Numerical strength of technical staff increased	Funds, personnel, logistics	Capacity of BRU and FC staff strengthened
	3. Facilitate upgrading of bamboo and rattan training infrastructure in Ghana	BRU, FC, INBAR, HR and other relevant stakeholders	2020	2024	Training infrastructure facilities identified	Funds, personnel, logistics	Bamboo and rattan training infrastructure upgraded
	4. Develop IPMSs and training personnel to implement the systems for monitoring, detecting and managing outbreaks of pests and diseases within nurseries and plantations of bamboo	BRU, FSD, RMSC, INBAR, UENR, KNUST, MOFA and other relevant stakeholders	2020	2021	IPMS developed	Logistics, personnel, funds	Number of training on IPMS conducted, Reports
	5. Liaise with FC and other stakeholders to organize study tours and exchange programs with foreign public and private institutions implementing best practices in Bamboo and Rattan development	BRU, FC, HR and other relevant stakeholders	2020	2024	Number of study tours and exchange programmes organized	Logistics, personnel, funds	Reports on exchange programmes

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
	6. Pursue the implementation of professional development programs at the local and international levels to strengthen institutional capacity	BRU, TIDD, FSD, WD, FORIG, FC, UENR, KNUST, INBAR, Other relevant stakeholders	2020	2020	Number of professionals trained	Logistics, personnel, funds	Certificates available, Reports
	7. Collaborate with FCTC and other relevant institutions to develop training manuals as a guide for training artisans	BRU, FCTC, INBAR, Other relevant stakeholders	2020	2021	Criteria for developing manual established	Logistics, personnel, funds	Training Manuals developed
	8. Conduct community and field schools and demonstrations on best practices and integrated nature-based livelihoods	BRU, FSD, INBAR, other relevant institutions	2020	2024	Number of field schools and demonstrations held	Vehicle, Logistics, Personnel, Funds	Training reports
	9. Undertake trials of selected exotic and indigenous bamboo species to determine their suitability for plantation establishment and agro-forestry systems	BRU, FSD, FORIG, INBAR, UENR, KNUST, Other relevant stakeholders	2020	2024	Number of trials on species conducted	Vehicle, Logistics, Personnel, Funds	Reports
	10. Facilitate the procurement and stocking of the FCTC library with reference materials	BRU, FCTC, Other relevant stakeholders	2020	2024	Relevant reference materials identified	Logistics, personnel, funds	Relevant reference materials procured and library stocked.

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
6. Employment Creation and Sustainable livelihoods	1. Undertake skills and enterprise development for men and women (train communities on how to process bamboo, nursery development, beekeeping using bamboo to construct beehives etc.)	BRU, INBAR, Communities, MMDAs and Other relevant stakeholders	2020	2024	Number of skills and enterprise development trainings held	Funds, personnel, logistics and exhibits	Training reports
	2. Promote out-grower bamboo forest plantation schemes and establishment of nurseries	BRU, INBAR, FSD and Other relevant stakeholders	2020	2024	Number of out grower plantations and nurseries established	Funds, personnel, logistics and exhibits	Reports
	3. Liaise with (FSD) and WD to demarcate specific areas in the reserves, especially the illegally mined areas to be dedicated for bamboo plantations development	BRU, FSD, WD, FC, RMSC and Other relevant stakeholders	2020	2021	Areas dedicated for bamboo plantations development documented	Funds, personnel, logistics and exhibits	Reports
7. Management of Bamboo for Environmental benefits	1. Liaise with FSD, WD and other relevant stakeholders to identify degraded watersheds, degraded mangroves, slopes etc. both in the reserves and off reserves.	BRU, FSD, WD, WRC, MMDAs, VRA, and Other relevant stakeholders	2020	2024	Degraded mangroves, watersheds, slopes etc identified and allocated for plantations establishment	Funds, personnel, logistics and exhibits	Reports

Strategic Objective	Key Action	Actors	Start Time	End Time	Output Target	Resources Required	Performance Indicator
	2. Establish 2000ha plantation of bamboo annually for environment improvement purposes.	BRU, FSD, WD, VRA, EPA, WRC, MMDAS, other relevant stakeholders	2020	2024	10000ha of bamboo plantation established for environmental conservation	Funds, personnel, logistics and exhibits	Reports, Media coverage

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APPENDIX 1: RISK ASSESSMENT AND MITIGATION MEASURES

APPENDIX 1			
RISK ASSESSMENT AND MITIGATION MEASURES			
Source of Risk	Risk Evaluation		Mitigation Measures/Recommendation
	Probability	Consequence	
OVERALL RATING			
NATURAL/ENVIRONMENT			
Prolonged Drought	Low	High	1. Analysis of climate data for good weather prediction 2. Planting at the outset of major rains 3. Planting of species to match ecological zones 4. Irrigation 5. Mulching
Flood	Very Low	Moderate	1. Analysis of climate data for good weather prediction 2. Selection of appropriate sites
Disease/pests	Very Low	Moderate	1. Development of integrated pest management system (IPMS) 2. Training of personnel in IPMS to ensure sound implementation 3. Matching species with site 4. Good agronomic management systems
Wind damage	Very Low	Moderate	1. Avoid extremely vulnerable sites 2. Proper orientation of field and planting 3. Matching species with site 4. Engaging the services of professional bamboo foresters 5. Provision of concessionary loans/grants for plantation maintenance by government/donors 6. Payment for Environmental services

RISK ASSESSMENT AND MITIGATION MEASURES

ANTHROPOGENIC/SOCIAL				
	Risk Evaluation		Overall Rating	Mitigation Measures/Recommended Activities
	Probability	Consequence		
Wild Fires	Moderate	Extreme	High	<ol style="list-style-type: none"> 1. Sensitization and training of Forest fringe communities in fire prevention, pre-suppression and suppression 2. Empowerment of existing fire protection crew 3. Construction of firebreaks 4. Fire patrols 5. Deployment of RRT to flash points 6. Strengthen capacity of front line staff in forest protection 7. Prosecute offenders
Low social acceptance, thus culminates in deliberate destruction of the resource	High	Extreme	High	Sensitization and training of Forest Fringe Communities of on the benefits of the resource
Preference to alternative land use to bamboo cultivation	Moderate	Extreme	High	<ol style="list-style-type: none"> 1. Sensitization and training of Forest Fringe Communities of on the benefits of the resource. 2. Practice agro-forestry

RISK ASSESSMENT AND MITIGATION MEASURES

ECONOMIC				
Low culm price	Very Low	Moderate	Low	1. Indepth market analysis of species 2. Diversification of species planted
Poor management of plantation leading to low yields and returns	Moderate	Moderate	Medium	1. Implementation of training and extension services on best practices
Political				
	Risk Evaluation		Overall Rating	Mitigation Measures/Recommended Activities
	Probability	Consequence		
Change in Government policy on forest plantation investments by private sector (possibly through Change in regime)	Very Low	Moderate	Low	1. Encourage wider multi-stakeholder consultations in policy and strategy development
Change in Government policy on forest plantation investments by public sector (possibly through Change in regime)	Moderate	Moderate	Medium	2. Encourage wider multi-stakeholder consultations in policy and strategy development

Legal/Policy				
Insecure land tenure especially in off-reserves	Moderate	High	Medium	1. Investors are encouraged to verify land titles and other ownership documents, especially in the off-reserve areas before forest plantation establishment.
Illegal Harvesting (mainly public forest plantation)	Moderate	Moderate	Medium	1. Collaborate with the FSD/WD/TIDD, MMDAs, Communities to empower the existing structure to control illegal harvesting

BUDGET SUMMARY

STRATEGIC OBJECTIVE	KEY ACTIONS	UNIT COST	AMOUNT GHC					GHC TOTAL
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
1. PROMOTE BAMBOO AND RATTAN RESOURCE DEVELOPMENT AND MANAGEMENT AS AN ALTERNATIVE TO TIMBER	1. SENSITIZATION AND AWARENESS CREATION ON BAMBOO AS AN ALTERNATIVE TO TIMBER		4,353,150.00	4,701,402.00	5,077,514.00	5,483,715.00	5,922,412.00	25,538,193.00
	2. DEVELOP MANUAL OF PROCEDURES FOR BAMBOO AND RATTAN PLANTATION DEVELOPMENT AND THEIR SUSTAINABLE MANAGEMENT IN GHANA		165,000.00	-	50,000.00	50,000.00	100,000.00	365,000.00
	3. UNDERTAKE INVENTORY OF BAMBOO AND RATTAN RESOURCES IN THE COUNTRY		14,105,194.00	-	-	-	-	14,105,194.00
	4. ESTABLISH BAMBOO AND RATTAN GERMPLOASM CENTERS IN THE COUNTRY		450,000.00	450,000.00	495,000.00	594,000.00	653,000.00	2,642,000.00
	5. INCREASE BAMBOO AND RATTAN SPECIES IN THE COUNTRY		250,000.00	-	-	180,000.00	-	430,000.00
	6. ENSURE CONTINUOUS UPDATING OF BAMBOO AND RATTAN INVENTORY DATA		-	-	200,000.00	200,000.00	200,000.00	600,000.00

2. PROMOTE INVESTMENTS IN THE BAMBOO SUB-SECTOR	7. FACILITATE THE DEVELOPMENT OF COMMERCIAL PLANTATIONS OF BAMBOO AND RATTAN TO PROMOTE MEDIUM TO LARGE SCALE BAMBOO AND RATTAN INDUSTRY	200,000.00	200,000.00	200,000.00	200,000.00	200,000.00	200,000.00	1,000,000.00
	8. ESTABLISH BAMBOO PLANTATION DEMONSTRATION PLOTS TO DEMONSTRATE BEST PRACTICES	120,000.00	120,000.00	135,000.00	140,000.00	140,000.00	140,000.00	655,000.00
								45,335,387.00
2. PROMOTE INVESTMENTS IN THE BAMBOO SUB-SECTOR	1.CONDUCT FEASIBILITY STUDIES AND STAKEHOLDER CONSULTATIONS TO GENERATE INPUTS FOR AN ACT TO PROVIDE LEGAL FRAMEWORK FOR THE REGULATION OF BAMBOO INDUSTRY	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	2,750,000.00
	2. DEVELOP AND PUBLISH BAMBOO PLANTATION DEVELOPMENT INVESTOR HAND BOOK TO GUIDE POTENTIAL INVESTORS.	250,000.00	-	-	180,000.00	-	-	430,000.00

	3. ENGAGE RELEVANT KEY STAKEHOLDERS IN SENSITIZING ACTORS IN THE BAMBOO AND RATTAN SUB-SECTOR TO REGULARIZE THEIR BUSINESS TO ATTRACT SUPPORT	250,000.00	78,750.00	82,688.00	86,823.00	91,164.00	589,425.00
	4. COLLABORATE WITH MILFNR AND OTHER RELEVANT DIVISIONS/DEPARTMENTS/UNITS OF FC TO ORGANIZE AND PARTICIPATE IN LOCAL AND INTERNATIONAL TRADE FAIRS AND EXHIBITIONS OF BAMBOO AND RATTAN PRODUCTS	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	2,750,000.00
							6,299,405.29
4. GOVERNANCE	1. CONFLICT MANAGEMENT MECHANISMS		200,000.00	200,000.00	200,000.00	200,000.00	800,000.00
	2. ENSURE ADHERENCE TO SOCIAL AND ENVIRONMENTAL SAFEGUARD SYSTEMS	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	200,000.00
	3. LIAISE WITH PLAINT PROTECTION UNIT OF MoFA TO REGULATE THE IMPORTATION OF ALL BAMBOOPLANTING MATERIALS	-	80,000.00	-	-	60,000.00	140,000.00
	4. SET UP A BROADER STAKEHOLDER ADVISORY BODY TO OVERSEE THE IMPLEMENTATION OF THE STRATEGY	350,000.00	350,000.00	350,000.00	350,000.00	350,000.00	1,750,000.00
							2,090,000.00

5. INVESTMENT IN RESEARCH AND DEVELOPMENT, EXTENSION, TRAINING AND BUILDING OF CAPACITY FOR BAMBOO AND RATTAN RESOURCE DEVELOPMENT, MANAGEMENT AND PROCESSING	1. BUILD CAPACITY OF BAMBOO PROCESSING INDUSTRY TO IMPROVE EFFICIENCY	240,000.00	240,000.00	240,000.00	240,000.00	240,000.00	240,000.00	1,200,000.00
	2. BUILD CAPACITY OF BRU/FRONT LINE FSD STAFF IN EXTENSION	160,000.00	180,000.00	200,000.00	235,000.00	256,000.00	1,031,000.00	
	3. DEVELOP INTEGRATED PEST MANAGEMENT SYSTEMS		200,000.00			250,000.00	450,000.00	
	4. FACILITATE UPGRADING OF BAMBOO AND RATTAN INFRASTRUCTURE IN THE COUNTRY	80,000.00	-	80,000.00	-	80,000.00	240,000.00	
	5. CONDUCT COMMUNITY AND FIELD SCHOOL AND DEMONSTRATION ON BEST PRACTICE AND NATURE BASED LIVELIHOODS	120,000.00	150,000.00	150,000.00	150,000.00	150,000.00	720,000.00	
	6. ORGANIZE TRAINING IN SITE PRODUCTIVITY MANAGEMENT FOR BAMBOO NURSERY AND PLANTION DEVELOPERS	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	600,000.00	
	7. UNDERTAKE TRIALS OF SELECTED INDEGENEOUS AND LOCAL SPECIES	120,000.00	150,000.00	150,000.00	150,000.00	150,000.00	720,000.00	
	8. COLLABORATE WITH FCTC AND OTHER RELEVANT INSTITUTIONS TO DEVELOP TRAINING MANUALS AS A GUIDE FOR TRAINING ARTISANS	180,000.00	-	80,000.00	-	-	260,000.00	

	9. ORGANIZE STUDY TOURS /EXCHANGE PROGRAMMES WITH FOREIGN PUBLIC AND PRIVATE INSTITUTIONS	280,000.00	280,000.00	280,000.00	280,000.00	280,000.00	280,000.00	280,000.00	1,400,000.00
									6,621,000.00
6. CREATION OF EMPLOYMENT AND LIVELIHOODS	1. UNDERTAKE SKILLS AND ENTERPRISE DEVELOPMENT FOR MEN/WOMEN (TRAIN COMMUNITIES ON BAMBOO NURSERY DEVELOPMENT AND BEEKEEPING USING BAMBOO TO PRODUCE BEE HIVES	500,000.00	540,000.00	583,200.00	629,856.00	680,244.48	2,933,300.48		
	2. PROMOTE OUGROWER BAMBOO FOREST PLANTATION DEVELOPMENT	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	600,000.00		
	3. DEMARCATION OF RESERVES FOR DEDICATION TO BAMBOO PLANTATION DEVELOPMENT	250,000.00	250,000.00	150,000.00	150,000.00	150,000.00	950,000.00		
									4,483,300.48
7. MANAGEMENT OF BAMBOO FOR ENVIRONMENTAL BENEFITS	1. IDENTIFY DEGRADED WATERSHEDS, MANGROVES, SLOPES, ETC BOTH IN THE RESERVES AND OFF-RESERVES								
	2. ESTABLISH 2000HA PLANTATION OF BAMBOO ANNUALLY FOR ENVIRONMENTAL IMPROVEMENT PURPOSES.	160,000.00	100,000.00	-	-	-	260,000.00		
		15,834,600.00	17,101,368.00	18,469,477.44	19,947,035.64	21,542,798.49	92,895,279.56		



