

INBAR Working Paper



*Policy Brief*

# Bamboo Policy Integration Analysis

## *Cameroon*

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The International Bamboo and Rattan Organisation, INBAR, is an intergovernmental organisation dedicated to the promotion of bamboo and rattan for sustainable development. For more information, please visit [www.inbar.int](http://www.inbar.int).

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## List of Abbreviations

ANAFOR	National Forest Development Agency
CAB	Cabinet
CIFOR	Centre for International Forestry Research
FEICOM	Special Council Support Fund for Mutual Assistance
FODER	Forest and Rural Development
GEF	Global Environment Facility
ICRAF	International Centre for Research in Agroforestry
IFAD	International Fund for Agricultural Development
INBAR	International Bamboo and Rattan Organisation
IRAD	Institute for Research in Agricultural development
IUCN	International Union of Nature Conservation
KFW	German Development Bank
MINADER	Ministry of Agriculture and Rural Development
MINAT	Ministry of Territorial Administration
MINCAF	Ministry of land Tenure and State Property
MINDEVEL	Ministry of Decentralisation and Rural Development
MINEE	Ministry of Water and Energy
MINEPAT	Ministry of Economy and Regional Planning
MINEPDED	Ministry of Environment, Nature Protection and Sustainable Development
MINFOF	Ministry of Forestry, Wildlife and Fishery
MINFOP	Ministry of Employment and Vocational Training
MINJEC	Ministry of Youth and Civic Education
MINMIDT	Ministry of Mines, Industry and Technological Development
MINRESI	Ministry of Scientific Research and Innovation
MINREX	Ministry of External Relations
MINSME	Ministry of Small and Medium Size Enterprises
MIPROMALO	Local Materials Promotion Services
SME	Small and Medium Size Enterprises

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## Executive summary

Bamboo is an important Non-Timber Forest Product (NTFP) and a vital resource that can be used to achieve multiple goals including socio-economic, livelihood, energy security, climate change and environmental sustainability. For the bamboo sector to achieve these lofty goals, bamboo must be integrated into the national policy and legal framework. Although the bamboo sector can contribute enormously towards ensuring sustainable development in Cameroon, information on the policy and legal framework governing the bamboo sector are limited. This paper analyses the current policies and/or programmes on thematic areas such as forestry, environment, landscape restoration, bio-energy, and rural employment, relevant to the development of the bamboo sector in Cameroon.

Two main methods were used for data collection: (1) desk study which included content analysis and review of existing information from diverse sources and; (2) field survey (primary data collection) through interviews with relevant primary, secondary and tertiary stakeholders involved in bamboo development in Cameroon. The study revealed that there is no policy governing the bamboo sector development in Cameroon. The 1994 forestry law of Cameroon has no provision for bamboo development. The Ministry of Forestry and Wildlife (MINFOF), responsible for the sustainable management and protection of forest and wildlife in Cameroon makes provisions for bamboo development in the country. According to MINFOF's Decision No. 0209/D/MINFOF/CAB of 26 April 2019 classifies bamboo as NTFP; Decision No. 0210/D/MINFOF/CAB of 26 April 2019 lays down the modalities for collection and utilisation of NTFPs including bamboo while Decision No. 0034/D/MINFOF/CAB of 05 February 2020, lay down the modalities of harvesting and utilising NTFPs from Plantations.

Three stakeholder groups were identified in the bamboo sector of Cameroon - primary (those directly involved in bamboo activities, e.g. craftsmen), secondary (not directly involved but can take and influence decisions in the sector, e.g. state institutions) and tertiary (cannot take decision but can influence them, e.g. development partners). The paper identified three major constraints to the development of the bamboo sector in Cameroon - the absence of a stand-alone bamboo policy, the lack of funds and the poor organisation of activities in the bamboo sector. The strong political will and the willingness of stakeholders were identified as opportunities to promote the development of the bamboo sector in Cameroon. The integration of bamboo development into

appropriate national strategic papers, programmes and projects like the Growth and Employment Strategic Paper, National REDD+ Strategy, Forest Investment Plan, National Climate Change Adaptation Plan, Rural and Urban Youth Support Fund, National Community Driven Development Programme, Global INBAR Programme will go a long way to boost the development of the bamboo sector in Cameroon. Local councils were proposed as indispensable partners to lead all bamboo development initiatives so that they have direct impact and contact with local communities. Although there is no bamboo policy in Cameroon, several regulatory instruments governing the use of bamboo as a Non-Timber Forest Product exist. The government in collaboration with bamboo stakeholders are making the effort to develop a policy framework that will guide and boost the development of the bamboo sector in Cameroon.

### **Key Recommendations**

- There is a need for the amendment of the 1994 forestry and 1974 land tenure laws to make integrated bamboo development, land ownership and users' right which making provision for incentives for investments in the bamboo sector;
- The Government of Cameroon should develop a resource mobilisation strategy in liaison with national, and international development partners (FAO, IUCN, GEF, IFAD etc.) and financial institutions (IMF, World Bank, African Development Bank) for large scale bamboo plantation, industrial bamboo development and bamboo technology transfer and development.
- Non-governmental and Civil society organisations could play a critical role in advocacy, sensitisation and capacity building to support the government's efforts towards bamboo sector development;
- Develop and integrate bamboo development actions into municipal development or management plan with financial support from funding agencies such as the Special Council Support Fund for Mutual Assistance (FEICOM) etc;

## 1. Introduction

Forest resources and especially Non-Timber Forest Products (NTFPs) have long contributed to the subsistence needs of the rural people in Cameroon through the provision of goods and services such as food, medicines, materials, tools, fodder, cosmetics, and cultural objects (Ngansop *et al.*, 2019). Bamboo was recently classified in Decision No. 0209/D/MINFOF/CAB of 26 April 2019, as a Non-Special Forest Product (NSFP) under NTFPs in Cameroon with no threatened status. It is an important NTFP catering to the diverse consumer demands for natural, environmentally friendly products, providing income and livelihoods in developing countries, contributing to reforestation and climate change mitigation (Perez *et al.*, 2004). The bamboo sector has huge potentials to contribute to the development of Cameroon, as it is providing up to 2 million FCFA per year to some harvesters (Ingram and Tieguhong, 2013). Bamboo is found across Cameroon's diverse ecosystems from dry to humid tropical and Afromontane forests (Ingram and Tieguhong, 2013). In countries such as China and India where the bamboo sector is active and regulated by policies and programmes, the sector contributes significantly to economic growth. Thus, strong bamboo policies, strategies and programmes can enhance environmental and socio-economic resilience, which go a long way to foster the livelihood of local populations.

In Cameroon, despite the socio-economic and ecological importance bamboo presents, policies directly regulating the bamboo sector remain absent. Thus, the main objective of this study was to analyse relevant complementary policies, strategies or programmes on thematic areas such as forestry and environment, landscape restoration, bio-energy and rural employment to ensure that newly drafted or existing bamboo policies/programmes are fully linked to national sustainable development planning to leverage increased investment in bamboo development in Cameroon.

### 1.1 Objectives

The specific objectives of the study were to:

- (1) Provide an understanding and analysis of various sectors, including among others, forestry and environment, energy, biodiversity conservation, and climate change, that have implications on bamboo development in Cameroon;
- (2) Identify relevant legislation, complementary policies and programmes that directly or indirectly support bamboo development in Cameroon;

- (3) Map out key stakeholders (including their roles, responsibilities, interests) in the development of the bamboo sector in Cameroon;
- (4) Assess the opportunities and incentives, including marketing and investment in bamboo development in Cameroon;
- (5) Define a framework of bamboo policy integration for sustainable development in Cameroon.

## **2. Methodology**

Two main methods of data collection were employed in this study. These were content analysis of various literature, policies, programme documents, plans and declarations of the government; and field survey. Information was collected from the field through interviews of key resource persons from the Ministry of Forestry and Wildlife (MINFOF), the Ministry of Environment, Nature Protection and Sustainable Development (MINEPDED), Ministry of Small and Medium-Sized Enterprises, Social Economy and Handicrafts, development partners (FAO, IUCN, INBAR), technical support agencies (IRAD, ANAFOR, University Researchers), Civil Society (CSO) Organisations (FODER) and bamboo primary stakeholders such as harvesters, sellers, craftsmen. The data was then analysed to understand the policy gaps as well as opportunities for bamboo policy integration in Cameroon.

## 3. Key Findings

### 3.1 Relevant sectors for bamboo development in Cameroon

#### 3.1.1 *Forest and environment*

According to the Forest Policy of Cameroon, the principal objective is to maintain at least 30% of the national territory as Permanent Forest Estate (PFE) to manage and protect especially the national biodiversity. Cameroon has many forest types: mangroves, less dense forests, dense rainforests, woodland savannah that can accommodate bamboo stocks.

#### 3.1.2 *Bio-energy*

Bamboo serves as firewood in certain communities of Cameroon and shall be very important for the same purpose in the Guinea Savannah and Sudano-Sahelian zones of Cameroon. The level of poverty in the Guinea Savannah and Sudano-Sahelian zones of Cameroon is high making access to varied energy sources difficult. Over 95% of the population rely on fuelwood. Bamboo (*Oxytenanthera abyssinica*) which is very adapted in these zones presents itself as a rapid and suitable biofuel feedstock resource for the local populations.

#### 3.1.3 *Restoration of degraded lands*

Currently, bamboo is being planted (3500 planted) on the banks of River Benue for restoration and fight against desertification. The Bonn Challenge Restoration project in Cameroon aims to restore three landscapes: Waza, Mbalmayo and Douala-Edea using bamboo and bush mango.

#### 3.1.4 *Carbon sequestration capacity*

INBAR in 2019 evaluated and reported that the carbon storage capacity of *Bambusa vulgaris* was 29.62 tCha-1 and 61.65 tCha-1 in agro-ecological zone 4 (Tropical evergreen rain forest or Monomodal rainfall forest) and zone 5 (semi-deciduous humid forest or bimodal rainfall forest) respectively in Cameroon.

#### 3.1.5 *Biodiversity conservation*

In Cameroon, fifteen species of bamboo exist including *Bambusa vulgaris green*, *Bambusa vulgaris var. striata*, *Bambusa longinternode*, *Bambusa arundinacea*, *Yushania alpina*,

*Phyllostachys aurea*, *Phyllostachys atrovaginata*, *Phyllostachys sp.*, *Oxytenanthera abyssinica*, *Microbambus macrostachys*, *Dendrocalamus strictus*, *Ochlandra travancorica*, and *Oreobambos buchwaldi* etc. (MINFOF, 2018; Ingram *et al.*, 2010). Bamboo serves as fodder for elephants and other animals in biodiversity hot spots such as the National Park of Lobeke (Ingram *et al.*, 2010). Each agroecological zone has a prominent species of bamboo. *O. abyssinica* is the dominant species in Guinea Savannah and Sudano-Sahel zones and highly used for beehive construction. *Phyllostachys sp.*, *B. vulgaris* and *Y. alpina* are prominent species in the Western Highland zone of Cameroon, and highly used in market gardening; landslide stabilization and house constructions; and bars and jars constructions respectively. *B. vulgaris* is a dominant species in the bimodal and monomodal rainfall forests zones and is widely used in palm and banana plantations as support, road and water banks and soils stabilization.

### 3.1.6 Socio-cultural values

Bamboo holds a high cultural value in the Bamileke tradition (West Region) where bamboo is used during funerals and are highly protected in the sacred forests.

### 3.1.7 Socio-economic values

Bamboo provides up to 2 million FCFA to an individual bamboo harvester for livelihood in Cameroon per year, with a plethora of uses within the national territory (Ingram *et al.* 2010).

### 3.1.8 Valorisation of bamboo

Bamboo products in Cameroon have not yet gained recognition. This sector is still under-developed with the weak value chain and poor private investment. Due to the poor finishing and quality of the product made locally, consumers prefer imported manufactured bamboo products like chairs, beds, tables, wood etc. Bamboo products in Cameroon is yet to gain national accreditation from the National Standard Authority. This means it is likely to take a very long time before we can hope to attain accreditation from the International Standard Organisation.

### 3.2 Legislation, policies and programmes supporting bamboo development

The Ministry of Forestry and Wildlife (MINFOF) has the mandate to enforce Law No. 94/01 of 20 January 1994, to lay down forestry, wildlife and fishery regulations in Cameroon. The forestry law in section 34 makes provision for non-permanent forests domain thus: a) communal forests and b) private forests. In section 39 (1) private forest is forest planted by a person or corporate bodies on land they acquired in accordance with the laws and regulation in force. Owners of such forests draw up a simple management plan with the assistance of the services in charge of forests, in order to ensure sustained and durable yield. This law in section 9(1) recognises forest products as non-wood and woods. Section 9(2) recognises some products as special. This law empowers MINFOF to fix a list of special products. In accordance with this law, the decision of MINFOF (Decision No. 0209/D/MINFOF/CAB of 26 April 2019) classifies special forest products and Non-Timber Forest Products (NTFPs), includes bamboo as an NTFP whose conservation status is not threatened. In Decision No. 0210/D/MINFOF/CAB of 26 April 2019, MINFOF lays down modalities for the collection and utilisation of NTFPs including bamboo. Decision No. 0034/D/MINFOF/CAB of 05 February 2020, lay down the modalities of utilising NTFPs from Plantations. The utilisation of bamboo is also regulated by this decision since it is an NTFP.

MINFOF has developed the National Development Plan for Non-Timber Forest Products. The objective is to contribute to the economic and social development in Cameroon. MINFOF also has the mandate to implement the National Plan for Bamboo Development of 2018. It has as one of its main objectives to plant bamboo in degraded areas in 4 regions of Cameroon (South, South West, Centre and Littoral regions of Cameroon). Currently, MINFOF is developing the Bamboo and Rattan Development Strategy in Cameroon.

Some legal instruments that indirectly support bamboo development include:

- Law No. 96/12 of 5 August 1996, on environmental management is under the mandate of the Ministry of Environment, nature protection and Sustainable Development (MINEPDED). The law lays down the general legal framework for environmental management in Cameroon. Chapter 5, Article 68 makes provisions for the protection of land against erosion and the prevention and fight against desertification. These actions

are taken particularly through the land use planning and zoning, reforestation as well as the dissemination of ecologically efficient methods of land use. The planting of bamboo can very much protect the land against erosion and desertification. In land-use planning and zoning for reforestation, bamboo can be considered as a potential plant for reforestation.

- The Ministry of State Property and Land Tenure (MINCAF) has the mandate to enforce the land laws. Cameroon's primary land law, Ordinance No. 74-1 of 6 July 1974, establishes land tenure rules following the 1972 unification of the country. A companion law, Ordinance No. 74-2 of 6 July 1974, addresses the governance of state land. These laws create a tenure system based on land registration: all privately-owned land must be registered and titled to retain its character as private land. All unregistered lands are deemed to be either public land, which is held by the state on behalf of the public, or national land, which includes unoccupied land and land held under customary law. Rural land is generally subject to customary law, which is based on an evolving set of accepted principles, with some local variations. Under customary law, traditional local leaders (*Fon, lamido*) serve as trustees and land administrators. Individual families receive rights to use the land, and rights are heritable generally through the male line. Although land has become highly individualised in many areas, customary law generally prohibits individuals from selling their land outside the community. Landowners have rights to exclusive possession and use of their land, the right to mortgage the land, and the right to transfer the land. All ownership rights in land must be registered. Most land privately-owned, registered land is in urban areas. Large commercial farms are also usually registered (GOC Land Law 74-1 1974; GOC Land Law 74-2 1974). The laws intended to encourage foreign investment in Cameroon as they effectively clarify private property rights and make all unregistered land available for investment. Investors in the bamboo sector have the opportunity to acquire, own and invest on pieces of lands in Cameroon without prejudice.
- The Ministry of Decentralisation and Local development (MINDEVEL) has the mandate to enforce law No. 2019/024 of 24 December 2019 to institute the general code of Regional and Local Authorities in Cameroon. This law in section 157 devolves power to local councils' authorities to manage the environment and natural resources, among others are

drinking water; reforestation and creation of council woodlands; protection of groundwater and surface water resources; preparing council environmental action plans; creation, maintenance, management of council green spaces, parks and gardens. The Special Council Support Fund for Mutual Assistance (FEICOM) has signed a memorandum of understanding to financially support local councils' investing in the bamboo sector in Cameroon. In accordance with this law's section 157, bamboo can be exploited by local authorities for the management of their environment and natural resources with the support from FEICOM.

- Under the enforcement of the Ministry of Water and Energy (MINEE) in Cameroon, law No. 2011/015 of 15 November 2011, Bill No. 896/PJL/AN governing the electricity sector in Cameroon; makes provision in section 63, considering biomass energy as renewable. Section 64 mentions renewable energy shall help meet requirements of consumers and contribute to environmental protection and securing energy supply. Section 65(2) points out that renewable energy development aims to introduce and promote processing subsectors. In accordance with this law, bamboo can be exploited as feedstock for biomass energy production (burning bamboo organic matter in a fluid to produce steam used to power turbines); fuelwood/biomass, charcoal, briquettes and pellets.

### 3.3 Key stakeholders in the development of the bamboo sector in Cameroon

Bamboo stakeholders were sub-divided into three categories: primary, secondary and tertiary stakeholders. Primary stakeholders (harvesters, producers, craftsmen, retailers and transporters) are directly involved, make decisions and have interests in the bamboo sector. Secondary stakeholders have an indirect interest in the bamboo sector, but also have reasonable influence over the bamboo sector. These are stakeholders such as public institutions whose role is to develop policies, strategies, plans and programmes for the development of the bamboo sector. Tertiary stakeholders are external actors who neither make business decisions nor benefit directly from bamboo operations or products of bamboo but can influence these decisions (Table 1).

Table 1. Summary of bamboo stakeholders in Cameroon

Category	Stakeholder	Role and responsibility in the bamboo sector
Primary	Local community	<ul style="list-style-type: none"> <li>• They own bamboo groves, generate income through the exploitation of bamboos.</li> </ul>
	Harvesters, Producers, Craftsperson and Retailers, SME	<ul style="list-style-type: none"> <li>• Collect bamboo culms from various localities,</li> <li>• produce bamboo products, use bamboo in building and construction,</li> <li>• buy and sell bamboo products,</li> </ul>
	Councils	<ul style="list-style-type: none"> <li>• They own bamboo grooves</li> <li>• Local development and supervision of local farmers,</li> <li>• Responsible for the establishment of forest plantations (bamboo) by their competencies recognised by law</li> </ul>
Secondary	<b>Public institutions</b>	
	Prime minister's Office	<ul style="list-style-type: none"> <li>• Coordinate government action;</li> </ul>
	MINREX	<ul style="list-style-type: none"> <li>• Ensure the implementation of the external relations policy</li> </ul>
	MINFOF	<ul style="list-style-type: none"> <li>• Ensure that the government formulates and enacts a national forest policy;</li> </ul>
	MINEPDED	<ul style="list-style-type: none"> <li>• Develop and implement government policy on environment and nature protection</li> </ul>
	MINSME	<ul style="list-style-type: none"> <li>• Promote and supervise small and medium-sized enterprises and crafts;</li> </ul>
	MINRESI	<ul style="list-style-type: none"> <li>• Develop and implement government's research and innovation policy including the bamboo sector;</li> </ul>
	MINFI	<ul style="list-style-type: none"> <li>• Develop and implement fiscal and monetary policy;</li> </ul>
	MINEPAT	<ul style="list-style-type: none"> <li>• Develop and implement the nation's economic policy and spatial planning with particular attention to the local community's driven development programmes</li> </ul>
	MINADER	<ul style="list-style-type: none"> <li>• Develop, implement and evaluate government policy in the areas of agriculture and rural development with bamboo as a booster</li> </ul>

	MINMIDT	<ul style="list-style-type: none"> <li>• Develop and implement the government's industrial policy and technological development strategies in the various sectors of the national economy with particular attention on bamboo.</li> </ul>
	ANAFOR Etc.	<ul style="list-style-type: none"> <li>• Technically support reforestation and planting activities in different agroecological zones e.g. the Bonn challenge initiatives</li> </ul>
Tertiary	<b>Development partners</b>	
	(FAO, INBAR, IUCN, GEF etc.)	<ul style="list-style-type: none"> <li>• Contribute to the elimination of hunger, food insecurity and malnutrition using the bamboo sector;</li> <li>• Support local actors in the development of the bamboo sector;</li> <li>• Make agriculture, forestry and fisheries productive and sustainable;</li> <li>• Conceptualise and develop appropriate mechanisms for the consumption of local resources.</li> </ul>
	Technical support (INBAR, HIES, CIFOR, ICRAF, Herbarium, Universities, Botanical gardens)	<ul style="list-style-type: none"> <li>• Teaching, research, and training on bamboo;</li> <li>• Development of bamboo transformation technologies.</li> </ul>
	IFAD, KFW, FEICOM	<ul style="list-style-type: none"> <li>• Financial support for the activities of the bamboo sector.</li> </ul>
	Civil Society Organisations, NGOs: FODER, MIPROMALO	<ul style="list-style-type: none"> <li>• Create awareness/ sensitization, fundraising, building capacity of stakeholders in the bamboo sector; Promote the use of local materials like bamboo in building and construction.</li> </ul>

Source: Updated from MINFOF (2018)

### 3.4 Strategies, plans and programmes suitable for bamboo integration in Cameroon

Bamboo development can be significantly integrated into the following listed strategies, plans, and programmes in Cameroon.

- i. The Ministry of Water and Energy enforces the National Energy Efficiency Policy, Strategy and Action Plan in the electricity sector in Cameroon (NEEAP). Under this plan, the strategy for the modernization of the wood-energy value chain in Cameroon is born. It is a strategy whose objectives are to stimulate discussions between key actors in the sector and to serve as a basis for reflection by the ministries concerned, to achieve robust medium- and long-term planning. Bamboo has a good link to this strategy as bioenergy raw material (fuelwood, charcoal, pellet, biogas and electricity generation). The investment of bamboo for this purpose can be very good in the western highlands, Guinea Savannah and Sudano-Sahelian regions of Cameroon. These are regions with most of their territory made of savannah vegetation in Cameroon.
- ii. Cameroon's vision on biodiversity prescribes the reduction and/or stop in biodiversity loss and ecosystem degradation in the short and medium-term through environmentally appropriate, socially beneficial and economically viable biodiversity management systems. The Ministry of Environment, Nature Protection and Sustainable Development (MINEPDED) is the enforcing ministry for this vision. Bamboo contributes to unique biodiversity that could be conserved for prosperity to the local population. It may offer employment to youths and may reduce the level of hunting for commercial purpose. Bamboo also can serve as fodder to wildlife; like the case witnessed in the Lobeke National Park where elephants grazed on the bamboo leaves and shoots found there (Ingram *et al.*, 2010).
- iii. The Growth and Employment Strategy Paper is a multi-ministerial strategy and implemented according to different sectors. The rural sector (rural development strategic paper) is enforced by MINADER, MINEPIA, MINFOF and MINEPDED. This particular strategy is to improve the living environment in rural areas; sustainably manage natural resources and; improve the institutional framework. The recent law No. 2019/024 of 24 December 2019, enforced by MINDEVEL, to institute the general code for Regional and Local Authorities, recommends the devolution of power to the local authorities (local

councils). FEICOM readiness to support councils investing in the bamboo sector is an opportunity for local authorities to use bamboo to contribute to the goal of the rural development strategy. Bamboo is a plant that is easy to cultivate, manage and harvest for diverse uses. It can be exploited easily for wealth compared to timber. Its development will ensure sustainable environmental and resource management.

- iv. Cameroon's effort in reducing forest emissions linked to deforestation and degradation (National REDD+ strategy) enforced by MINEPDED, contributes to mitigating climate change. This strategy has as one of its missions to restore Cameroon's diverse humid and coastal forests, humid Savannas zones, and Sudano-Sahelian zones. MINEPDED has used part of the GEF funds to restore the degraded Benue River Banks in the Sudano-Sahelian zone of Cameroon by planting bamboos, a project that targets 15000 bamboo seedlings for planting.
- v. MINEPDED is currently developing the Rural Sector Development Strategy with the objectives to promote forests, environment, agriculture and fisheries; by ensuring a participatory development process. With law No. 2019/024 of 24 December 2019, to institute the general code of Regional and Local Authorities for decentralization in Cameroon, the local authorities will have the mandate to execute actions of this strategy. FEICOM who is ready to support bamboo initiatives within the local councils makes bamboo a candidate that could easily be integrated into the forest, environment, agriculture and fishery domains to improve livelihoods and fight unemployment in local communities.
- vi. MINEPDED is the promoter of the National Plan on Desertification in Cameroon. This plan supports restoration and biodiversity conservation initiatives in Cameroon. The project intervention sites are the Guinea savannah and the Sudano-Sahelian zones of Cameroon. MINEPDED is currently planting bamboo on the Benue river banks in the North of Cameroon in response to this plan. The Bonn Challenge global landscape restoration initiative in Cameroon has identified amongst others the landscape at Waza National Park and environs for restoration with bamboo. This landscape has a National park; thus, bamboo shall also serve as habitat and fodder for wildlife and contribute to the conservation of biodiversity.
- vii. The Ministry of Agriculture and Rural Development (MINADER) in charge of agricultural development is the promoter of the National Agricultural Investment Plan. This plan offers

development modalities for agricultural sectors (plants, livestock, fisheries and forestry); the modernization of production infrastructure, development of financial access mechanism, sustainable use of natural resources, the reinforcement of operator capacities and the promotion of collaboration among these various entities. Bamboo has served farmers a lot (e.g. drying rags, bins for grains storage, fencing, etc.) at the rudimentary level. This bamboo can be transformed and used to build modern structures in agricultural value chain like (magazine, drying rags, storage utilities etc). This bamboo can serve as feedstock for bioenergy to power turbines for electricity production in remote agricultural areas for food processing.

- viii. MINEPDED developed the National Climate Change Adaptation and Mitigation Plan (NCCAMP) for Cameroon. This plan directs government actions in the fight against the changing climate in accordance with the international convention signed and ratified by Cameroon. This plan has among its objectives to reduce the country's vulnerability to the impact of climate change and strengthen its capacity for adaptation and resilience; facilitate the coherent integration of climate change adaptation and mitigation in relevant policies, plans and programmes, especially in development planning processes and strategies.
- ix. The National Plan for Bamboo Development in Cameroon (PND-FB) under the mandate of MINFOF contributes to this plan, using bamboo for national economic growth, poverty reduction and environmental protection. PND-FB targets the restoration of degraded mangroves of Cameroon's coastline and forests (South, Littoral and South West and Centre regions of Cameroon) with bamboos and *Irvingia gabonensis*.
- x. An GEF project titled The Restoration Initiative (TRI) with the objective of landscapes restoration and sustainable use of local plant species and tree products (*Bambusa* sp., *Irvingia* sp., etc.) for biodiversity conservation, sustainable livelihoods and emissions reduction in Cameroon is implemented by the IUCN and executed by INBAR is responding to the objectives the NCCAMP. Within this project, Bamboo and *Irvingia* are priority species for restoration. The project started with feasibility studies, which identified the Waza National park's landscape, Mbalmayo mosaic agroforestry zone, Edea-Douala mangroves and the Bayang-Mbo sanctuary landscapes for restoration with bamboo. A call for specific studies to be done has been launched by INBAR/IUCN, Cameroon.

- xi. MINEPDED has the mandate to enforce the Forest Investment Plan in Cameroon. The Forests Investment Plan outlines strategies on how to increase the country's resilience and adaptation to climate change. That is a reduction of emission from deforestation and forest degradation in the southern forested plateau, resilience and adaptation to climate change in the northern woodlands, integrated watershed management in the Western Highlands. To meet the planned targets, bamboo can be a potential candidate. Bamboo is a plant that sequester and stores carbon more than some ecosystems such as agroforests, oil palm, various types of swidden fallows, grasslands, shrub lands, and pastures (Nath *et al.*, 2015; Yuen *et al.*, 2017).
- xii. MINFOF is the promoter of the National Forestry Action Plan in Cameroon. This plan aims to promote opportunities for conservational use of forests, require that all forests and tree systems serve for a societal purpose, to alleviate poverty in nearby communities such as promoting the development of underutilised plants and tree species (or NTFPs) through sustainable management; e.g., development of the value chain of underutilised NTFPs through sustainable management. MINFOF has classified bamboo as NTFP. In Cameroon, bamboo is one of the underutilised forest products. It can be promoted under this plan through sustainable management for the value addition to meet the local population needs. The MINFOF National Development Plan for NTFPs contributes to economic and social development with the use of NTFPs including bamboo.

### 3.5 Constraints and opportunities in the bamboo sector

#### 3.5.1 Policy constraints

- i. There is no stand-alone bamboo policy in Cameroon. Only decisions regulating NTFPs (Decision No. 0210/D/MINFOF/CAB of 26 April 2019, lays down modalities of collection and utilisation of NTFPs including bamboo. Decision No. 0034/D/MINFOF/CAB of 05 February 2020, lay down the modalities of extraction and use of NTFPs from Plantations) are signed by the concerned MINFOF, which are still insufficient for bamboo development.
- ii. The absence of sustainable management practice and guidelines for bamboo is a constraint. Bamboo is not managed in Cameroon; due to the lack of knowledge and technical skills that would allow farmers in Cameroon to manage plantations, bamboo agroforestry systems and natural bamboo forests.

- iii. There is a practice of parafiscal charges (no specified amount) on bamboo resource exploitation that do not support bamboo restoration. These charges collected from bamboo exploitation are meant for the restoration of deforested landscapes, including bamboo. However, bamboo is never considered amongst trees species selected for the restoration initiatives.
- iv. The forest development and management authorities and local communities perceive that bamboo is invasive and products are non-durable. They don't see the need for planting and management mainly due to the lack of knowledge and potential of bamboo.
- v. The absence of market policy incentives that can boost the bamboo sector; thus, dissuade investors in the bamboo sector development in Cameroon;
- vi. The public procurement policies allow imported goods to compete with the local market thus, jeopardizing locally produced bamboo goods.

### 3.5.2 *Socio-economic and environmental constraints*

- i. Poor or no treatment of bamboo during production resulting in low-quality goods. The bamboo transformation sector is very rudimentary thus producing products with little or no added value and this stifles the quality and durability of the product;
- ii. People have negative perceptions of bamboo products in the market. They are often regarded as poor or low-profile products meant for the underprivileged in the society;
- iii. There are inadequate local financing schemes to stimulate the development of the sector. The primary stakeholders do not have access to loan schemes from financial institutions;
- iv. The bamboo sector is rudimentary and archaic: still an artisanal sector, with less transformation capacity and technologies.
- v. There are weak advocacy and awareness creation in the bamboo sector. This is witnessed in the behaviour of the local population towards the finished products of bamboo in Cameroon;
- vi. The tourism sector which used to promote the crafts sector has been negatively affected by the current socio-political crisis in the North West and South-West regions of Cameroon, and the Boko Haram insurgency in the far north region of Cameroon;
- vii. The land tenure law makes provisions for the acquisition and ownership of land. However, individuals find it difficult to acquire ownership over land to plant bamboo or development of bamboo transformation units due to administrative bottlenecks;

- viii. Bamboo harvesters or collectors face constraints such as transportation difficulties, injuries during harvesting and sometimes snake bites. Again, the low demand for harvested poles affecting their business;
- ix. Harvesters/processors have poor knowledge of harvesting and management techniques as well as poor harvesting tools and storage facilities. This leads to degradation of bamboo clumps and poor-quality bamboo poles (immature poles).;
- x. There is low and neglect in research in the bamboo sector, to drive growth and development in this sector.

### 3.5.3 Key opportunities

- i. Government has the political will to develop the bamboo sector. This is observed in the actions, engagements and cooperation with stakeholders in the domain and INBAR.
- ii. There are several development partners (IUCN, FAO, GEF, INBAR) and technical support units (Universities, CIFOR, IRAD, ANAFOR, ICRAF) already supporting bamboo projects;
- iii. INBAR has been offering yearly scholarship for bamboo stakeholders in Cameroon to Beijing, China for building awareness and capacity building in the bamboo sector;
- iv. Bamboo provides ecosystem services and proven to be a suitable plant for controlling soil erosion, landslide control and water recharge. This makes bamboo a suitable resource to protect lands susceptible to erosion or landslides in Cameroon;
- v. Bamboo products and artefacts can be developed and sold at identified ecotourism areas by individuals for employment and income generation;
- vi. The relatively high potential of the resource with more than 10,000 uses worldwide could be exploited as much as possible. The development of the bamboo value chain can employ many people (skilled and unskilled labour) in the household, micro, small and medium scale enterprises and large-scale industries;
- vii. There are available funding partners (IFAD, FEICOM); civil society organisation (FODER). IFAD has been financing bamboo programmes and projects of bamboo with INBAR. FEICOM is the Council Support Fund for Mutual Assistant in Cameroon. They have signed a Memorandum of Understanding with INBAR to support local councils in the development of the bamboo sector in Cameroon. FODER has been active in the field, with sensitization, capacity building and fundraising for bamboo sector development; International donors

like GEF, IUCN, FAO are also available for funding. National donors like Cameroon Wildlife Conservation Society and Government of Cameroon present too.

- viii. The bamboo represents an important part of the history and culture of the people in the Western Highland of Cameroon (e.g. Bamilekes- West Cameroon), thus are used for ceremonial musical instruments like flutes, whistles, and even spear handles. They are also used in funeral ceremonies and also conserved in sacred forests.

### 3.6 Market trends

Most of the bamboos harvested/collected are sold to the bamboo craftsmen who transform the bamboo (craftsmen) into furniture and crafts products. It was found that the incomes of craftsmen in the bamboo sector in urban areas (Douala and Yaoundé) vary between 150,000 and 200,000 FCFA per month (MINEPDED, 2018). For harvesters, the individual's income was estimated on average at 236,208 FCFA which range from 1,625 to more than 2 million FCFA; contributing to about 36% of their household income and are used to meet their basic needs. Traders, wholesalers and retailers earn an income between 300000–1 200000 FCFA per year (averagely 709000 FCFA), contributing to about 75% of their household annual income (Ingram and Tieguhong, 2013).

Mankou (2017) verified prices of manufactured furniture, utility and craft products from bamboo, it varied from 1000 to 4.000.000 FCFA. For instance, bamboo beds cost 80.000 FCFA; five-seated chair cost 250.000 FCFA; a bar with 2 stools cost 180.000 FCFA, flute musical instrument cost 1.500 FCFA, and a cup cost 1.000 FCFA). According to sellers in bamboo crafts stores, the sales per week ranges between 5000- 48000 FCFA. In a month, sellers sell products worth 10000 – 180000 FCFA. The selling price of one harvested bamboo culm in the market range from 500- 700 FCFA. The prices are hugely determined by factors such as geographical location and forces of demand and supply. Finished bamboo products are available at market locations such as Mvogt Betsi craft store and craft market Tsinga (Yaounde), Presbyterian crafts centre (Bamenda), Bamenda handicraft centre, Fouban artisanal centre, Bafoussam craft shop, and crafts stores in Melong. Bamboo warehouses in Yaounde included the Mendong, Messassi, Nkooza, and Simbog bamboo warehouses. Ingram and Tieguhong (2013) also found that most bamboo products were sold in Bamenda, Bafoussam, Fouban, Limbe, Douala, Edea, Ngaoundere, Ebolowa and Yaounde.

## 4. Institutions and their role in the development of the bamboo sector in Cameroon

**Table 2.** Institutions and their role in policy integration

Institutions	Role in the bamboo sector
FEICOM and Councils	It is an institution that funds council or inter-council investment projects. In Cameroon, five council areas are currently working with FEICOM to develop the bamboo sector in their communities. These municipalities are Tinto, Nguti, Angossas, Ndikinimeki and Nguibassal.
ANAFOR	ANAFOR Mbalmayo is already working with INBAR in bamboo seedling nursing and distribution in Ekali Mbalmayo, located in the outskirts of Yaounde.
Research and Development	
Universities	The Universities (Faculty of Industrial Engineering, FGI-Douala, Department of Forestry in the Faculty of Agronomy and Agricultural Sciences, FASA -Dschang); and Higher Institute of Environmental Sciences-Nkolbisson (HIES). FGI can train engineers and architects in bamboo transformation technologies and craftsmanship. FASA is already promoting research in the domain of remote sensing and bamboo carbon stocks assessment. HIES was previewed for the development of training manuals for Agroforestry Systems Development, Community Bamboo Resource Management, and Sustainable Bamboo Management etc.
CTB	Centre de Transformation de Bois (CTB) Nkolbisson has an engagement with INBAR already and they are working in the resource development i.e. demonstration centre for bamboo transformation. This initiative should be extended to other centres in Cameroon for training and development in the bamboo sector.
National Herbarium of Cameroon	This institution in collaboration with INBAR has prepared and preserved reference specimens of bamboo species in Cameroon for identity confirmation. The service is available to the general public.

FODER	Currently involved in INBAR activities for bamboo development in Cameroon i.e. sensitization, capacity building, fundraising and preparing grounds for bamboo industrialization in Cameroon.
CIFOR	CIFOR sponsored research on bamboo production to consumption systems in Cameroon in 2010, carried out by Ingram et al. (2010).
ICRAF	ICRAF has promoted the planting of bamboo in some communities in Bangangte-West Region of Cameroon and others in the North West Region of Cameroon between 2006-2010.

#### 4.1 Proposed framework to guide the governance of bamboo in Cameroon

Policies and development interventions that build on customary regulations, traditional knowledge, skills and voices need to be coordinated to produce positive sustainable livelihood impacts. To ensure effective development of the bamboo sector in Cameroon, there must be a synergy between government ministries, development partners, civil society organisations, technical support units, financial institutions, councils and local entrepreneurs involved in the sector. Table 3 shows a model framework that could be implemented. This framework places the council at the helm of coordination because it is the local government.

**Table 3.** Collaborative Framework for the Bamboo Sector Development in Cameroon

Institutions	Role in the bamboo framework
Prime Minister's Office	Develop policy, strategy and coordinate the overall development of the sector
Council	They represent the local government in Cameroon. They will <ul style="list-style-type: none"> <li>- Open up horizontal and vertical collaboration with all state and non-state institutions contributing to the development of the bamboo sector in Cameroon.</li> <li>- Implement legislation regulating the bamboo sector.</li> <li>- Facilitate the development and commercialisation of bamboo finished products from craft centres to markets.</li> </ul>

<p>MINFOF, MINEPDED, MINADER, MINDEVEL etc.</p>	<p>They are state actors. They should work in synergy with councils to better coordinate the bamboo sector as follows:</p> <ul style="list-style-type: none"> <li>- Ministers should devolve powers to the delegations in the local council areas;</li> <li>- Delegates should accompany the local councils through their decentralised units (at sub-divisional delegations) to design and implement bamboo projects respecting the community development plans,</li> <li>- Develop local land use plans to integrate bamboo plantations and local transformation units, markets (strong cooperatives) and bamboo producer syndicates/trade unions (to advocate for craftsmen rights/obligations);</li> <li>- Support the elaboration of the Community Development Plan (MINEPAT through PNDP) in council areas who have not got one.</li> </ul>
<p>ANAFOR</p>	<p>It should</p> <ul style="list-style-type: none"> <li>- Build capacity on innovative techniques of forest landscape restoration (FLR), and best zones for restoration interventions with bamboo as a priority plant in the council areas;</li> </ul>
<p>Universities etc.</p>	<p>They should,</p> <ul style="list-style-type: none"> <li>- Intervene in research to provide sound knowledge in diverse research domains on bamboos e.g. bamboo stocks assessment, value chain, technology for processing or transformation at local levels, resource development and management (improved bamboo varieties, agroforestry, sustainable management, ecosystem services research (soil, water, carbon, etc.)</li> </ul>
<p>MINSME</p>	<p>It shall:</p> <ul style="list-style-type: none"> <li>- Regulate bamboo markets and bamboo traceability chain and certification;</li> <li>- Facilitate the creation of bamboo transformation enterprises by interested persons in the sector and within the council areas.</li> </ul>

MINDCAF	<p>It shall:</p> <ul style="list-style-type: none"> <li>- Facilitate the allocation of land to the local councils (council forests) and communities (community forests) for management.</li> </ul>
Other Ministries (MINJEC, MINEFOP, MINTOUR, MINAC etc.)	<p>They shall</p> <ul style="list-style-type: none"> <li>- Build craftsmen technical capacity, promote bamboo arts exposure in museums for tourism, promote markets, regulate commercialization, encourage the participation of youths and women etc.</li> </ul>
CSOs / NGOs/ media (FODER)	<p>They shall:</p> <ul style="list-style-type: none"> <li>- Identify major difficulties in the development of this sector in Cameroon, develop sustainable bamboo value-chain demonstration models, Sensitise and encourage youths and women to be involved in bamboo projects;</li> <li>- Propose strategies, programs and legal reforms to the state for bamboo development in the council areas;</li> <li>- Sensitise and handhold the population in the development of the bamboo sector;</li> </ul>
Bamboo actors (CIGs, Cooperatives etc.)	<p>They will:</p> <ul style="list-style-type: none"> <li>- Organise and regulate bamboo actors (those directly involved in harvesting, craftsmen, sellers, etc.)</li> </ul>
Local communities in the bamboo sector	<p>They will:</p> <ul style="list-style-type: none"> <li>- Collaborate with other stakeholders to acquire new skills, sustainable management of bamboo forests, plantations, home gardens etc;</li> <li>- Respect regulation in force on bamboo forest products</li> </ul>
Financial institutions/ development partners	<p>They will:</p> <ul style="list-style-type: none"> <li>- Finance bamboo activities, projects for the development of this sector;</li> <li>- Make available micro-funds to small investors and actors in the bamboo value chain; thus, facilitating expansion in the bamboo sector.</li> </ul>

## 5. Conclusion

Bamboo development is at its early stage in Cameroon. The Government of Cameroon recognises the important role bamboo can play in alleviating poverty among rural communities as well as contributing to climate change mitigation and adaptation. The latest relevant legislation supporting bamboo sector development in Cameroon is Decision No. 0209/D/MINFOF/CAB of 26 April 2019 classifying special forest products and Non-Timber Forest Products (NTFPs), where bamboo is classified as an NTFP, whose conservation status is not threatened. Despite the growing emphasis on bamboo development, the sub-sector yet has a dedicated policy or a national strategy. However, there are existing national strategies and plans that could be leveraged to facilitate the development of the bamboo sector. For example, bamboo development can be significantly integrated in Cameroon's Vision on Biodiversity; National REDD+ Strategy; Rural Sector Development Strategy; National Development Plan for NTFPs; National Plan on Desertification; National Agricultural Investment Plan; National Climate Change Adaptation Plan; Forest Investment Plan; Cameroon Action Plan; Emergency Plan; National Reforestation Plan; and Bonn Challenge Pledge.

The key stakeholders in the development of the bamboo sector were categorised into three groups: the primary stakeholders (e.g. artisans, council); secondary stakeholders (e.g. State institutions: MINFOF, MINEPDED, MINSME) and tertiary stakeholders (INBAR, IFAD, FODER, IUCN). Some of the major constraints identified included the absence of bamboo policy; weak forestry and land laws responding to bamboo. In the environment and socio-economic domains, the major constraints were the poor treatment of products during transformation, poor perception of bamboo products; inadequate local financing scheme, absence of technology transfer, weak advocacy and awareness creation; socio-political crises affecting the tourism sector which used to promote crafts sector.

The government has shown a strong political will to develop the bamboo sector. Other development partners such as INBAR, IUCN, FAO, CIFOR, IRAD, ANAFOR, ICRAF and universities are already implementing bamboo projects. The market shows a weak but promising future for bamboo development.

A framework to guide the governance of bamboo in Cameroon proposed a synergy between government ministries, development partners, civil society organisations, technical support units, financial institutions, councils and local entrepreneurs involved in the sector, and with the team leader being the head of Local Councils (Mayors) for coordination.

## 6. Recommendations

1. Amend the 1994 forestry and 1974 land tenure laws to make provision for bamboo development and ensure coherency in land ownership and users' right respectively.
2. Enact bamboo policy, strategy and action plan with appropriate fiscal and non-fiscal incentives to attract investments in the bamboo sector in Cameroon.
3. Mobilise funds from national, and international development partners (FAO, IUCN, GEF, IFAD etc.) and financial institutions (International Monetary Fund, World Bank, African Development Bank) to fund research, technology transfer for the industrial development of bamboo in Cameroon;
4. Conduct research on bamboo transformation technologies, bamboo value chain, market, improved species and ecologically friendly bamboo species (IRAD, ANAFOR), etc.
5. Civil society organisations like FODER should sensitise, build capacity and assist the government in developing the bamboo sector;
6. Integrate bamboo development actions into municipal development/management plan, funding initiatives (FEICOM) etc;
7. Include bamboo in public procurement list, open up and encourage institutional markets for bamboo products to create a market pull in initial stages.
8. Create widespread awareness and sensitisation for bamboo sector stakeholders and consumers
9. Build capacities of bamboo sector stakeholders at all levels: farmers, craftsmen, traders, line department, universities, research agencies, etc.
10. Train researchers and craftsmen in Universities (Faculty of Industrial Engineering and Faculty of Agronomy and Agricultural Sciences); vocational schools, as well as transfer technology to Cameroon.
11. Encourage South-South Knowledge transfer and international cooperation for capacity building, knowledge and skill transfer including investment promotion.

## 7. References

- INBAR, (2020). Remote sensing and bamboo resources assessment in Cameroon. Report. INBAR/Geomatic Laboratory of University of Dschang. Unpublished data
- Ingram V. and Tieguhong C. J. (2013). Bars to Jars: Bamboo Value Chains in Cameroon. *Ambio*. 42(3): 320–333.
- Ingram V., Tieguhong C. J., Nkamgnia M. E., Eyebe J. P., Ngawel M. (2010). Bamboo production to consumption system, Cameroon. CIFOR, Bogor, Indonesia. 110p.
- Mankou V. (2017). Domestication's constraints and opportunities of Bamboo species (*Poaceae*) (*kunth*) in the Menoua Division, West Cameroon. Msc Thesis, University of Dschang, Cameroon, 84p.
- MINEPDED, (2017). Analyse approfondie des moteurs de déforestation et de dégradation, 252p.
- MINFOF, (2018). Programme National de Développement de la filière du Bambou de Chine au Cameroun.
- Nath A. J., Lal R., and Das A. K. (2015). Managing woody bamboos for carbon farming and carbon trading. *Global Ecology and Conservation*, 3(2015), 654–663. <https://doi.org/10.1016/j.gecco.2015.03.002>
- Ngansop T. M., Biye E. H., Fongnzossie F. E., Forbi P. F., Chimi D. C. (2019). Using transect sampling to determine the distribution of some key Non-Timber Forest Products across habitat types near Boumba-Bek National Park, South-East Cameroon. *BMC Ecology*. 19:3. <https://doi.org/10.1186/s12898-019-0219-y>.
- Perez M. R., Belcher B., Fu M., Yang X. (2004). Looking through the bamboo curtain: An analysis of the changing role of forest and farm income in rural livelihoods in China. *International Forestry Review*. 6:306–316. Available at: doi: 10.1505/ifor.6.3.306.59968.
- Yuen J. Q., Fung T., and Ziegler A. D. (2016). Review of allometric equations for major land covers in SE Asia: Uncertainty and implications for above- and below-ground carbon estimates. *Forest Ecology and Management*, 360, 323–340. <https://doi.org/10.1016/j.foreco.2015.09.016>



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