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# NATIONAL PLANTATION FORESTS DEVELOPMENT PROGRAMME (NPFDP) CAMEROON 2020-2045 SUMMARY



September 2019

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## FOREWORD

Previous research on plantation forests, conducted mainly in the tropics, followed a basically silvicultural approach. They led to development proposals and actions that were mostly scientifically and technically reliable, but often complex and costly, and therefore ill-suited to the social and economic contexts of countries concerned, hence the mixed and sometimes even questionable results.

Due to new developments in concepts and expectations in the field of tropical forestry (such as biodiversity, carbon, certification, sustainability, implementation of management plans, landscape restoration, etc.) and the need to take into account social and economic issues, as well as emerging issues in forest management, there is need to reconsider the underlying vision of the development of plantation forests in countries like Cameroon.

After the last 20 years, when forest management was almost entirely devoted to logging with no guarantee for sustainability of forests, there seems to be renewed interest in plantation forests. This trend relates to:

- Changing views of some donors on forestry policy (recent studies funded by the World Bank on plantations in Cameroon and Gabon);
- Willingness to transfer the management of forest resources from the state to private partners and communities, which may lead to the emergence of new actors;
- Strong environmental pressures on natural forests and timber harvested from these natural forests, leading to the preservation of large areas of production forests as well as a shift in demand from some markets towards tropical timber from plantations;
- Emergence of concepts such as "**Forest Landscape Restoration**" and "**2<sup>nd</sup> Generation Silviculture**", which afford an opportunity for the various planting methods to be ranked among more "ecological" new generation approaches;
- Development of management plans for production forests, requiring operators to maintain the environmental, economic and social capacities of the forests they manage;
- Growing market demand and enhancement tools, giving added value to smaller diameter timber, and the fact that some plantations have reached maturity for harvesting;
- Emergence of strong social demand for rural employment development, etc.

This general environment provided a backdrop for the transition from the 2006 National Tree Planting Programme, which advocated the granting of state subsidies to private actors and Local and Regional Authorities, to the new Plantation Forests Development Programme (PFDP), the backbone of the "silvicultural transition" underpinned by the concept of "2<sup>nd</sup> Generation Silviculture."

In addition to public institutions interested in resource regeneration issues, I urge the National Forestry Development Agency (ANAFOR), by virtue of the key role it has to play as part of the implementation of the NPFDP, to take ownership of this new Programme and make it a real development tool for job creation, which contributes in addressing climate change. This appeal also goes to Local and Regional Authorities, the private sector, associations, civil society and the population at large.

Furthermore, I wish to underscore that technical and financial support from development partners, the contribution of forestry research, as well as capacity building for stakeholders are unquestionable levers for achieving NPFDP objectives.



**Jules Doret NDONGO**  
Minister of Forestry and Wildlife

## PREFACE

Previous research on plantation forests, conducted mainly in the tropics, followed a basically silvicultural approach. They led to development proposals and actions that were mostly scientifically and technically reliable, but often complex and costly, and therefore ill-suited to the social and economic contexts of countries concerned, hence the mixed and sometimes even questionable results.

Due to new developments in concepts and expectations in the field of tropical forestry (such as biodiversity, carbon, certification, sustainability, implementation of management plans, landscape restoration, etc.) and the need to take into account social and economic issues, as well as emerging issues in forest management, there is need to reconsider the underlying vision of the development of plantation forests in countries like Cameroon.

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- Emergence of concepts such as "**Forest Landscape Restoration**" and "**2<sup>nd</sup> Generation Silviculture**", which afford an opportunity for the various planting methods to be ranked among more "ecological" new generation approaches;
- Development of management plans for production forests, requiring operators to maintain the environmental, economic and social capacities of the forests they manage;
- Growing market demand and enhancement tools, giving added value to smaller diameter timber, and the fact that some plantations have reached maturity for harvesting;
- Emergence of strong social demand for rural employment development;
- The Plantation Forests Development Programme (NPFDP) fits into this 'broader picture'.

The development of the NPFDP is part of the process to apply the concept of "second generation silviculture," which underpins forestry transition in Cameroon. It aims mainly to increase the surface area of national forests, develop value chains as well as a forestry economy that would serve as an alternative to timber production solely from natural forests, contribute in meeting national objectives of addressing climate change and restoring landscapes. It also seeks to create growth and "green" jobs, in keeping with the Growth and Employment Strategy Paper (GESP) guidelines.

This handbook includes summary data of the National Plantation Forests Development Programme (NPFDP), in order to allow a greater number of stakeholders to grasp the content of the Programme paper, which is a scientific document drafted following a rigorous approach, and to enable all actors to understand and implement it easily.

It comprises 10 (ten) sections, namely:

1. Background

2. Legal Basis of NPFDP
3. Some Key Concepts
4. Goal, Vision, Objectives and Expected Outcomes of NPFDP
5. Strategy for Implementation of Various Components
6. Institutional Mechanism for Coordination, Monitoring-Evaluation, Gender Mainstreaming and Inclusion of Underprivileged Groups
7. Implementation Stakeholders
8. Programme Impact
9. Sources of funding to be mobilised / explored
10. Technical options.



## 1. BACKGROUND

According to the FAO (2001), over two million hectares of dense forests and approximately 1 million hectares of moist savannah have disappeared in Cameroon over the last two decades. Mining, agro-industries and other development infrastructure cause a great deal of damage resulting in deforestation and degradation of forests, as well as the depletion of the genetic potential of plant formations.

Although the rates of deforestation and forest degradation are still lower than those of Latin American countries, the trend is still on the rise. The implementation of Cameroon's "Emergence Programme" (construction of hydroelectric dams, mining, road and rail infrastructure, agro-industries, etc.) could result in the destruction of at least 2.02 million hectares of forest, that is 8% the total current national forest cover, with complex induced short, medium and long-term effects or impacts. (CIFOR, 2015).

There is no guarantee that the area of the country's "natural" forests can be stabilised in the long term, given the dynamics of mining development, agriculture, infrastructure and food production, besides the gradual degradation of some state forests, while the need for wood (for timber, construction wood and fuelwood) will increase. It is therefore necessary to take forward-looking measures, namely, the creation of planted forests that can effectively fulfil the same functions as natural forests in a bid to increase production per unit area.

Besides, land degradation, which is the direct consequence of vegetation cover loss, takes on increasingly alarming proportions in the country each year, particularly in arid savannah and to a lesser extent in moist savannah areas. According to figures from the Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED), it is estimated that more than 12 million ha of land is degraded nationwide. As a result, desertification is becoming more threatening and is today one of the challenges, indeed the major challenge, the State of Cameroon must rise to in its quest for better living conditions for locals of the relevant areas, and this necessarily entails reforestation of degraded lands.

The State of Cameroon has not folded its arms. Several measures have been taken to maintain or even reduce the rate of deforestation and forest degradation.

Some of these measures include:

- Strengthening the legal and forest governance framework, institutional, strategic, programming and budgetary reforms in the forestry and wildlife sub-sector, notably the New Forestry Policy (NFP), predicated on the 2020 Forestry Sub-sector Strategy, which aims, in terms of forest resources regeneration, to promote the emergence and exploitation of plantation forests as against natural forests, organise and encourage sustainable and rational environmental development initiatives by individuals, associations, partners, civil society, etc... for sustainable and rational development of the environment;
- Establishing the permanent forest estate, which spans 15,689,586 hectares, representing about 33% of the national territory (MINFOF, 2015);
- International commitments made to address climate change, especially the Paris Agreement of 12 December 2015 following COP21, the 2017 AFR100 initiative for the restoration of 100 million hectares of degraded forests and landscapes in Africa, ratification of conventions on biodiversity conservation, etc.

Reforestation and creation of plantation forests address these issues.

Unfortunately, an analysis of reforestation experiences in Cameroon reveals that most plantation forests have always been developed without clearly defined objectives. The abandonment of forest reserves and reforestation areas backing up plantation forests, and the failure of tree planting programmes, are among the most visible consequences that at least could partly be ascribed to the 1990 economy liberalisation policy, and the "institutional review of the forestry sub-sector in 2003. Indeed, this shift in State policy, in addition to other measures, notably the liberalisation of the economy, caused the State to disengage from certain production functions, and these were taken up by the private sector.

The creation, in 2002, of the National Forestry Development Agency (ANAFOR) following the change in status of the erstwhile ONADEF (National Forest Development Board), in 2003 of the Forest/Environment Sector Programme (FESP), and in 2006 of the National Tree Planting Programme (NTPP), evidenced Cameroon's desire to implement a consistent sustainable development strategy for plantation forests. This development starts from seeds to the processing of plantation forest products, and the creation of a local market for timber and by-products from plantation forests. This is the National Plantation Forest Development Programme. (NPFDP).

The implementation of this new strategic steering instrument is part of the “**silviculture transition**” initiated by MINFOF and underpinned by a **new generation approach**, in this case the “**2<sup>nd</sup> Generation Silviculture (2GS)**” **Concept**. These lay the foundation for a new vision predicated on the **paradigm shift from “tree planting” to “modern silviculture development”**, rooted in the "sector-based approach", and "*silvicultural value chains*", in which all forestry operations and benefits generated at each stage of forest stand development must be considered.

## 2. LEGAL BASIS of NPFDP

The NPFDP has its legal basis in the following:

- The international legal framework (Rio conference of 1992, ITTO and IUCN Guidelines on Plantation Forests and Degraded Forests, ITTO/ ATO principles, criteria and indicators on plantations and restoration of degraded forests. Principles, Criteria and Indicators on Plantation Forests and Degraded Forest, etc.);
- National Legal Framework (GESF, Forestry Laws, Legal Framework applicable to the decentralisation process, 2020 MINFOF strategy etc.).

## 3. SOME KEY CONCEPTS

**Management:** Generally speaking, management is the overall organisation of an area, methodically prepared for a specific use. Applied to natural production forests, management involves planning and implementing actions and activities necessary to achieve defined objectives, the main purpose of which is to produce timber, without jeopardising the sustainability of the forest stand. This planning must be carried out in full knowledge of the physical and socio-economic environment - which presupposes prior studies. The findings will then inform management decisions to be taken on the development of the concession area. Section 23 of Law N° 94/01 of 20 January 1994 to lay down Forestry, Wildlife and Fisheries Regulations defines management as: "the implementation, based on previously set objectives and a plan, of a certain number of activities and investments, with a view to the sustained production of forest products and services, without undermining the intrinsic value or compromising the future productivity of the said forest and without causing undesirable effects on the physical and social environment."

**Forest Management Plan:** This document lays down the rules for the cultivation of various stages of a forest stand and exploitation standards. Management is a prerequisite for exploitation.

**Inventory of forest resources:** The inventory consists of a census of forest resources. Firstly, there are inventories for immediate exploitation, which concern only large-diameter trees and a limited number of useful species. Secondly, there are inventories in view of management based on the future value of existing stands and including, besides species of immediate commercial interest, those likely to become so, since all trees are counted as from a certain diameter classified by category.

**Socio-ecosystem:** This concept allows for simultaneous analysis of the forest ecosystem and the stakeholders interested in it (Janssen et al. 2007).

**Afforestation or reforestation:** Afforestation or reforestation is defined as the planting of trees with the aim of establishing a wooded state on an area that has long been devoid of trees, or that may never (on human time scales) have been part of the forest area.

**Value Chain (sector):** This is a tool for optimisation and value/cost analysis that creates awareness of the importance of coordination in an organisation, as each link in the company chain brings value that needs to be optimised.

**Deforestation:** Deforestation is defined as *the long-term or permanent anthropogenic conversion of forest land to non-forest land*. Suffice it to note that in climate negotiations and REDD+, deforestation and forest degradation are considered only from the point of view of carbon stocks, leaving out biodiversity and other forest functions (Atyi et al. 2008). Simply put, **Deforestation** is the long-term or permanent anthropogenic conversion of forest land to non-forest land.

**Forest degradation:** This is a different process from deforestation. Several international bodies have proposed definitions. The FAO report (2011) points out that the ITTO (2002) definition is the most comprehensive and underscores that forest **degradation** refers to the *reduction in the capacity of a forest to produce goods and services*.

**Land degradation:** the persistent decline in the goods and services provided by an ecosystem, including water-related biological goods and services, and land-related social and economic goods and services.

**Landscape and Forest Restoration:** planned processes to restore ecological functionality and improve human well-being in deforested or degraded landscapes.

**Ecological functionality:** All ecological functions necessary to make the components of an ecosystem or habitat permanent. Functionality may be intrinsic to the environment under consideration or dependent on external factors.

**Ecological integrity:** a state of ecosystem development characterised by its geographic location, containing a diversity of native species and supporting processes present in sustainable numbers.

**Well-being:** a concept encompassing the factors that make human life comfortable, such as money, peace, health, food, water availability, stability and good governance.

**Forest:** The definition differs from one Body to another and even from one researcher to another.

- From a botanical point of view, a forest is a plant formation characterised by the size of the tree layer, but which also includes shrubs, low plants, vines and epiphytes. Many forest trees thrive in association with fungi and other micro-organisms and many depend on animals to transport their pollen, seeds or propagules;

- From an ecological point of view, a forest is a complex and rich ecosystem, providing numerous habitats for many animal populations and species, plants, fungi and microbes, most of which are interdependent;
- The FAO (2010) definition adopted by Cameroon considers a forest as a land area of at least 0.5 hectares, at least 10% of which is covered by trees whose height at maturity is at least 5 metres (Simula 2009);
- The United Nations Environment Programme (UNEP) uses the threshold of 40% coverage for 'closed forests' and 10-40% for 'open forests', while the Tropical Ecosystem Environment Observations by Satellite (TREES) project classifies areas with more than 70% tree cover as 'dense forests' and those with 40-70% tree cover as 'fragmented forests'.

**Plantation Forest:** This is the action of planting trees through seed sowing or seedling transplant, with a view to creating forests, forest stands or plantations, usually for timber production or for soil and water protection. It refers both to the land and the planted trees that grow on it. It is a forest estate established artificially either by transplanting or by seed sowing. (Green Facts - FAO 2001-2018). In some countries the seedling transplant operation is considered a plantation when the number of seedlings to be planted exceeds 1,875 seedlings/ha. Below this limit, it is considered replanting.

**Tree Planting:** This operation involves recreating woodlands or forests earlier destroyed by *clear-cutting* or by other diverse causes (over-exploitation, forest fires, overgrazing, war, etc.). Sometimes, it clearly refers to protection forests.

It is based on at least three major operations: the production of plant material, tree planting and forestry maintenance.

**Reforestation:** This notion suggests a more ambitious objective in terms of surface and ecological or landscape quality than tree planting. The objective is generally to restore a forest type ecosystem, thus reaching an area significant enough to justify the term *forest*.

**Forest regeneration:** This refers to all spontaneous natural processes and forestry strategies and techniques for restoring a forest cover. It can be natural or artificial.

**Block:** This term refers to the micro-zoning carried out in a forest, in this case a production forest. It consists in grouping into more or less homogeneous stretches, relatively identical areas with later identical management practices. Often, different land use situations are interwoven, making the task of defining the blocks to warrant the creation of blocks in which one situation or another is dominant.

The block is therefore a set of plots, not necessarily connected, which form a unit in terms of purpose and management practice. Blocks are defined according to the richness of the stands in commercial species and ecological criteria:

- All blocks in which wood harvest is envisaged sooner or later, and in which forestry activity could maximise the production function;
- **Production and Protection Blocks-** Timber harvesting can be reasonably envisaged yet with serious physical protection constraints. They are reflected in silvicultural stresses that no longer allow for the production function to be optimised;
- **Protection Blocks-** The site conditions or protection constraints imposed on the management of stands give no hope of a saleable harvest. Stands ought to play a strong protective role. Forestry activities should ensure that the wooded state is maintained;

- **Non-framework Blocks** - No production or protection objective linked to wood seems to justify forestry activity even in the long term. The objectives that may be assigned to these series are agro-forestry-pastoral objectives;
- **Biological Reserves** -The major objective here is to preserve natural resources and the scarce or endangered animal-type or plant-type biotopes.

**Silviculture:** This is an activity or series of methods and practices carried out by the “silviculturist” to develop, manage and enhance a forest or woodland in a bid to obtain the economic benefits or certain services beneficial to society (under the multifunctional forest approach). Effectively incorporating many sciences that prioritise the ecology, silviculture, which is equally grounded on the economy, can be defined as the application of scientific (biological) techniques to control the natural development of forests and guide their development towards targeted ends.

**2<sup>nd</sup> generation Silviculture in Cameroon:** This concept refers to a set of actions and techniques which use tree planting, reforestation and forest regeneration as props to the development of plantation forests, resource regeneration and reconstitution on uncultivated lands and degraded forests, serving as links in a value chain which, alongside biological, ecological, developmental and sustainable aspects, equally incorporates monitoring and control of forest stands, participatory management, processing, marketing of plantation products, financial and economic profitability, in order to effectively contribute to the well-being of the community and to growth and employment (Ngomin.A et al., 2015).

**Silvopole:** This is a group of forestry companies situated in a geographical area and which maintain a functional relationship in the production, processing (specific technology to put in place) and marketing of plantation forest products (thinning products, NTFPs, biomass, timber and construction wood products, etc.).

## 4. GOAL, VISION, OBJECTIVES AND EXPECTED OUTCOMES OF NPFDP

### 4.1. Goal of NPFDP

The 2020 Forestry and Wildlife Subsector Strategy sets the following goals for regeneration and reforestation:

- Increase timber potential;
- Curb desertification;
- Supply fuel-wood to cities;
- Increase green spaces in urban areas;
- Safeguard the forest gene pool;
- Preserve ecologically fragile zones and catchment areas.

### 4.2. Vision of NPFDP

NPFDP envisions to contribute, by 2045, in increasing the national forest potential and developing a plantation forest economy that should serve as a sustainable alternative to a forest economy based almost solely on natural forests.

The aim is for the State to make up the country’s shortfall in the supply of plantation forest wood. Indeed, it is estimated that the market share of timber and timber by-products from plantations worldwide now stands at over 35%.

Moreover, the land potential of forest reserves should be enhanced so that, pursuant to Section 22 of Law No. 94/01 of 20 January 1994 to lay down Forestry, Wildlife and Fisheries Regulations, it can contribute in fulfilling the ambition of covering at least 30% of the total surface area of the national territory with permanent forests, representing the country's ecological diversity, supporting the development of new secure plantations in order to increase the share of plantation forest timber in the country's supply, and as well serve as a Carbon sink and an asset in the REDD+ process.

### 4.3. Objectives of NPFDP

#### 4.3.1. Overall Objective

Providing Cameroon with a strategic steering instrument that should help in planning the creation and development of plantation forests, harmonise the roles of all stakeholders while contributing to put in place an enabling institutional environment for private investors, in tune with other national initiatives as part of the sector and value chain approach.

#### 4.3.2. Development Objective

Enhance the country's forest resource regeneration potential in order to contribute to the well-being of locals by improving their income and living standards.

#### 4.3.3. Operational Objective

Promote the growth and exploitation of plantation forests by creating 40,000 ha of forests per year over 25 years, thus 1,000,000 up to 2045, and support stakeholders in the silviculture sector value chain.

#### 4.3.4. Specific Objectives

These include:

**Specific objective 1:** Increasing timber production, and products other than lumber, construction wood and firewood, enhancing wood products and developing silviculture value chains;

**Specific objective 2:** Providing eco-system services other than supplies (recreation, etc.);

**Specific objective 3:** Restoring degraded lands and landscapes;

**Specific objective 4:** Supporting research - innovation, training and capacity building;

**Specific objective 5:** Implementing the programme consistently, ensuring that all social categories are involved from decision-making to implementation.

#### 4.3.5. Expected outcomes

The following outcomes shall be expected from the Programme:

- **Expected Outcome 1:** Production of timber and products other than timber, construction wood and fuelwood are increased; wood products are enhanced and silviculture value chains developed;
- **Expected Outcome 2:** Ecosystem services other than supplies (recreation, etc.) are provided, and protection of ecologically fragile zones and other woodlands are guaranteed;

- **Expected Outcome 3**: Degraded landscapes and lands are restored;
- **Expected Outcome 4**: Research and innovation, training and capacity building are supported;
- **Expected Outcome 5**: The Programme is consistently implemented to guarantee attainment of results and the inclusion of all social categories from decision-making to implementation.

#### 4.3.6. Presentation of various programme action lines

The programme comprises action lines (axes), each of which breaks down into components, sub-components and activities which make it possible for them to go operational and to evaluate outcomes. The NPFDP has the following four axes:

- **AXIS 1**: Timber production and products other than timber, construction wood, fuelwood, enhancement of wood products and development of silviculture value chains;
- **AXIS 2**: Protection and provision of ecosystem services other than supplies (recreation...);
- **AXIS 3**: Restoration of degraded landscapes and lands;
- **AXIS 4**: Research –Innovation – Training and capacity-building;
- **AXIS 5**: Institutional set-up, governance and gender-based decision-making process.

#### 4.3.7. Programme Action Principles

The contribution of grassroots stakeholders (Local and Regional Authorities, private individuals, civil society organisations, administrative authorities, community representatives, stakeholders, etc.) will be a major concern in the implementation strategy.

The activities carried out as part of the implementation of this programme shall be primarily structured around projects and micro-projects. These projects and micro-projects will vary depending on targeted needs and according to agro-ecological zones. In this regard, the participatory approach will allow for the involvement of beneficiaries at all levels, especially in identifying their needs.

The success of such a programme hinges very much on the involvement of grassroots actors (regions, councils, communities, civil society organisations and private operators). Measures must therefore be taken so that:

- Beneficiaries, in particular grassroots actors themselves, identify, develop and state their projects/micro-projects based on their interests;
- Mechanisms for selecting funding beneficiaries offer guarantees of transparency and ensure project/micro-project profitability and efficiency;
- A programme monitoring and evaluation mechanism is put in place to report on its progress and achievements made. This mechanism should be so designed as to guarantee the participation of all stakeholders, with priority given to the community as the final beneficiaries.

#### 4.3.8. Fundamental principles for the selection of projects and micro-projects submitted by grassroots actors

The selection of beneficiaries as well as the criteria for approval of projects and micro-projects will be guided by the principles of transparency, equity and social justice:

##### a) Eligibility criteria

To be eligible, the following conditions must be met:

- The project/micro-project implemented must belong to beneficiaries (council, community, Association, CIG, group of foresters, cooperative, private operators, etc.) identified beforehand and they must be involved at all levels in order to ensure long term transferability of operations. They must also have been active in the forestry sector for several years;
- Applicants must be holders of a deed of conveyance on the land dedicated to the plantation and provide all guarantee that the land will not be subject to a change of use.

##### b) Simplicity and transparency:

Procedures must be transparent and controllable, as well as simple and efficient, while being flexible enough to allow contracts to be signed with multiple operators (Associations, NGOs, public bodies, private individuals, etc.).

##### c) Gender equity

It is important to take into account gender concerns for maximum equity, ensure participation by women, young people, people living with disabilities and other disadvantaged groups in a meaningful and visible way, in all phases of the micro-projects cycle.

#### 4.3.9. Basic principles of project and micro-project financing

Ownership of the programme by beneficiaries, their direct involvement and empowerment will condition the funding of projects and micro-projects. **The conditions for beneficiary participation will be defined in a procedures handbook.** The projects and micro-projects to be financed must meet the needs of beneficiaries and be designed by them or at their behest, and must be geared towards a previously identified processing sector. Their participation in the development and future maintenance of projects and micro-projects must be guaranteed.

## 5. STRATEGY FOR IMPLEMENTING THE VARIOUS COMPONENTS

The NPFDP comprises axes, components and sub-components as presented in the table below.



**Table 1: Distribution of production targets according to ecological zones, biomes and forest areas**

Axis	Components	Sub-components	ECOLOGICAL ZONES + <i>Biomes and related forest estates</i>
<b>AXIS 1:</b> Timber production and products other than timber, service wood, fuel-wood, enhancement of wood products and development of silvicultural value  <b>Production target:</b> <b>30 000/year</b>	1. Wood Production (20000/year)	<ul style="list-style-type: none"> <li>• Production of timber</li> <li>• Production of construction wood</li> <li>• Production of wooden poles</li> <li>• Production of fuel-wood (Firewood)</li> </ul>	-ZESH / ZTr: 5000 ha -ZESS / ZESH: 5000 ha -ZESS /ZESH/ ZEFD: 5000 ha -ZESS/ZESH/Zhu (Mangroves): 5000 ha
	2. Production of industrial products other than wood (5000 ha/year)	<ul style="list-style-type: none"> <li>• Production of resins (latex, etc.), alcohol, Pulp (Trituration / Cellulose), etc.</li> <li>• Production for agro-food systems</li> <li>• Production of Bamboo from China / Rattan</li> </ul>	
	3. Products other than wood for human needs (food, pharmacopoeia, farming) and animal feed (livestock) (5000 ha/year)	<ul style="list-style-type: none"> <li>• Production of NTFP (4000 ha/year)</li> <li>• Production of fodder trees (1,000 ha/year)</li> <li>• Production of pharmacopoeia products and plant active ingredients</li> </ul>	ZESH: 1250 ha ZTr: 1250 ha ZEFD: 1250 ha ZHu: 1250 ha
	4. Development of silviculture and related value chains as a driving force behind forest regeneration	<ul style="list-style-type: none"> <li>• Development of wood value chains</li> <li>• Development of value chains for standing timber products</li> </ul>	
<b>AXIS 2:</b> Protection and provision of ecosystem services other than supply (recreation,)	1. Development of riverbanks/watersheds/ water catchment areas - soil protection and restoration (3000 ha / year)	<ul style="list-style-type: none"> <li>• Protection of riverbanks</li> <li>• Fight against erosion</li> <li>• Protection of watersheds</li> <li>• Protection of water catchment areas</li> </ul>	ZESS: 750 ha ZESH: 750 ha ZEFD: 750 ha ZTr: 750 ha
	2. Development of urban and peri-urban forestry (greening of urban and peri-urban landscapes) (2 000 ha/year)	<ul style="list-style-type: none"> <li>• Establishment/Restoration of council woods</li> <li>• Establishment/Restoration of green belts</li> <li>• Establishment/Restoration of ecotourism parks</li> </ul>	ZESS: 500 ha ZESH: 500 ha ZEFD: 500 ha ZTr: 500 ha
	3. Biodiversity enhancement	<ul style="list-style-type: none"> <li>• Creation of green infrastructure (gene banks,</li> </ul>	

Axis	Components	Sub-components	ECOLOGICAL ZONES + <i>Biomes and related forest estates</i>
		pollination reservoirs, arboreta... for adaptation)	
<b>AXIS 3:</b> Restoration of landscapes and degraded lands (5 000 ha/year)	1. Recovery of natural ecosystems and biodiversity conservation (1,000 ha/year)	Recovery of valuable endemic species endangered by logging and other factors - Establishment/Restoration of <ul style="list-style-type: none"> <li>• Sacred forests</li> <li>• Teaching and research forests</li> </ul>	ZESS: 200 ha ZESH: 200 ha Zefd: 200 ha ZTr: 200 ha ZHu: 200 ha
	2. (4,000 ha/year)	- Windbreaks/ hedges - Integrated plantations ( <i>agricultural, forestry and pastoral systems</i> )	ZESS: 1000 ha ZESH: 3000 ha
<b>AXIS 4:</b> Research – Innovation – Training and capacity-building	4.1 Research and innovation	4.1.1. Coordination of the Consultation Framework	
		4.1.2. Funding of forestry projects and research	
		4.1.3. Popularisation of Innovations	
	4.2 Stakeholder training and capacity building	4.2.1. Lifelong learning	
		4.2.2. Stakeholder capacity building	
<b>AXIS 5:</b> Institutional set-up, governance and gender-based decision-making process	<i>Institutional organisation, governance and gender</i>	<ul style="list-style-type: none"> <li>• Steering</li> <li>• Coordination</li> <li>• Governance</li> <li>• Gender</li> <li>• Monitoring and Evaluation</li> </ul>	

**Table 2: Table :Surface area distribution per sub-component in ecological zones**

Ecological zone	Areas to be developed	Surface Area to be developed (ha)
<b>ZESH</b>	Timber processing products (2500 ha+2500ha+1700 ha + 1700 ha)	8400
	Greenwood plantation products: 1250 ha	1250
	River banks/watersheds /water catchment areas: 500 ha	500
	Urban and sub-urban greening: 500 ha	500
	Recovery of natural ecosystems and biodiversity conservation: 200 ha	200
	Fight against desertification and restoration of degraded lands: 3000 ha	3000
	<b>Subtotal</b>	<b>13,850</b>
<b>ZTr</b>	Timber processing products: 2500 ha	2500
	Greenwood plantation products: 1250 ha	1250
	River banks/watersheds /water catchment areas: 500 ha	500
	Urban and sub-urban greening: 500 ha	500
	Recovery of natural ecosystems and biodiversity conservation: 200 ha	200
	<b>Subtotal</b>	<b>4,950</b>
<b>ZESS</b>	Timber processing products (2500 ha+1700ha + 1700 ha)	5900
	Greenwood plantation products: 0	0
	River banks/watersheds /water catchment areas: 500 ha	500
	Urban and sub-urban greening: 500 ha	500
	Recovery of natural ecosystems and biodiversity conservation: 200 ha	200
	Fight against desertification and restoration of degraded lands: 1000 ha	1000
	<b>Subtotal</b>	<b>8,100</b>
<b>ZEFD</b>	Timber processing products: 1700 ha	1700
	Greenwood plantation products: 1250 ha	1250
	River banks/watersheds /water catchment areas: 500 ha	500
	Urban and sub-urban greening: 500 ha	500
	Recovery of natural ecosystems and biodiversity conservation: 200 ha	200
	<b>Subtotal</b>	<b>4,150</b>
<b>Zhu</b>	Timber processing products: 2500 ha	2500
	Greenwood plantation products: 1250 ha	1250
	River banks/watersheds /water catchment areas: 0	0
	Urban and sub-urban greening: 500 ha	500
	Recovery of natural ecosystems and biodiversity conservation: 200 ha	200
	<b>Subtotal</b>	<b>4,450</b>
<b>GRAND TOTAL</b>		<b>35 00</b>

## 6. INSTITUTIONAL MECHANISM FOR COORDINATION, MONITORING-EVALUATION, GENDER MAINSTREAMING AND INCLUSION OF DISADVANTAGED GROUPS

### 6.1. Coordination

Coordination shall be done by the Contracting Authority, the Ministry of Forestry and Wildlife.

### 6.2. Strategic management

In order to ensure proper coordination, monitoring and evaluation of the programme, a Steering Committee (COFIL) shall be set up by decision of MINFOF. The COFIL shall be the supreme programme implementation body.

**This Committee shall comprise the following:**

- **Chair: The Minister of Forestry and Wildlife;**
- **Vice-chair: The Secretary-General of the Ministry of Forestry and Wildlife;**
- **Coordinator of the Technical Secretariat: The Director General of ANAFOR;**
- **Deputy Coordinator of the Technical Secretariat: The Director of Forestry;**
- **Members:**
  - ✓ A representative of MINADER;
  - ✓ A representative of MINEPIA;
  - ✓ The representative of ANAFOR;
  - ✓ The Director, Department of Promotion and Processing of Forestry Products;
  - ✓ A representative of the Ministry of Economy, Planning and Regional Development;
  - ✓ A representative of the Ministry of Finance;
  - ✓ A representative of MINDCAF;
  - ✓ A representative of the Ministry of Trade;
  - ✓ A representative of the Association of Mayors of Cameroon;
  - ✓ Two representatives of Professional Forestry Organisations;
  - ✓ A representative of the Agricultural Research Institute for Development (IRAD);
  - ✓ A representative of the Civil Society.

The Steering Committee shall have a Technical Secretariat headed by the Director of Forestry, assisted by the CSRRVS. (Service Head for Regeneration, Reforestation, Silviculture Extension and Monitoring). In any event, the assignments, composition and mode of operation of the Steering Committee shall be regulated by Decision of the Ministry of Forestry, Wildlife and Protected Areas.

### 6.3. Operating system

Implementation will be done upon award either to ANAFOR or to forestry companies through agreements for the setting up and control of plantation forest operations, following a public tender procedure.

Implementing stakeholders shall include the following:

- ANAFOR;
- Local and Regional Authorities (LRAs);
- Concession holders;
- Research Institutions.

### 6.4. Project Development and Selection Mechanism

A project manager shall be appointed and shall be responsible for:

- Drawing up the annual programme of activities under the programme's Projects Portfolio management;
- Identifying projects that can be implemented under the programme;

- Supporting potential beneficiaries in the maturation of projects;
- Evaluating projects, preparing evaluation reports and preparing documents to be presented to the Steering Committee;
- Supporting the procurements officer of the Ministry of Forestry and Wildlife in monitoring the procedures for the procurement of goods and services under funded projects, stating reasoned opinion at each stage of this procedure;
- Coordinating the supervision and overseeing the implementation of the projects funded under the programme;
- Coordinating and conducting project completion missions with a view to drawing lessons and experience for the implementation of future similar projects.

### **6.5. Monitoring and Evaluation (M&E)**

The programme shall be endowed with an M&E software for technical and financial monitoring of the implementation of the Annual Budgetary Work Plan (ABWP).

A programme M&E officer shall be appointed from the Regeneration, Reforestation, Silviculture Extension and Monitoring Service and shall be responsible for developing and coordinating the project's monitoring and evaluation plan. In collaboration with ANAFOR, he/she shall be responsible for drawing up the monitoring and evaluation plan and integrating it into the logical framework, setting up an updated database, and the various reports provided for in the monitoring and evaluation mechanism.

### **6.6. Monitoring and Advisory Support Strategy**

**Chiefs of forestry control posts and ANAFOR forestry advisers** shall be in charge of closely monitoring holdings benefiting from the project's support. The forestry adviser shall support the technical implementation of the project/micro-project while the Chief of post shall collect monitoring data using a data collection sheet (based on the defined frequency) for monitoring the activities carried out by the beneficiaries. These shall be forwarded to the Divisional Delegate.

The Divisional Delegate shall verify the effectiveness of the implementation of activities, process the data collection forms received and forward them to the Regional Delegate after compilation in case several projects/micro-projects are ongoing in his or her Division.

## **7. IMPLEMENTATION STAKEHOLDERS**

Various actors are involved in the implementation of the NPFDP.

### **7.1. Government stakeholders**

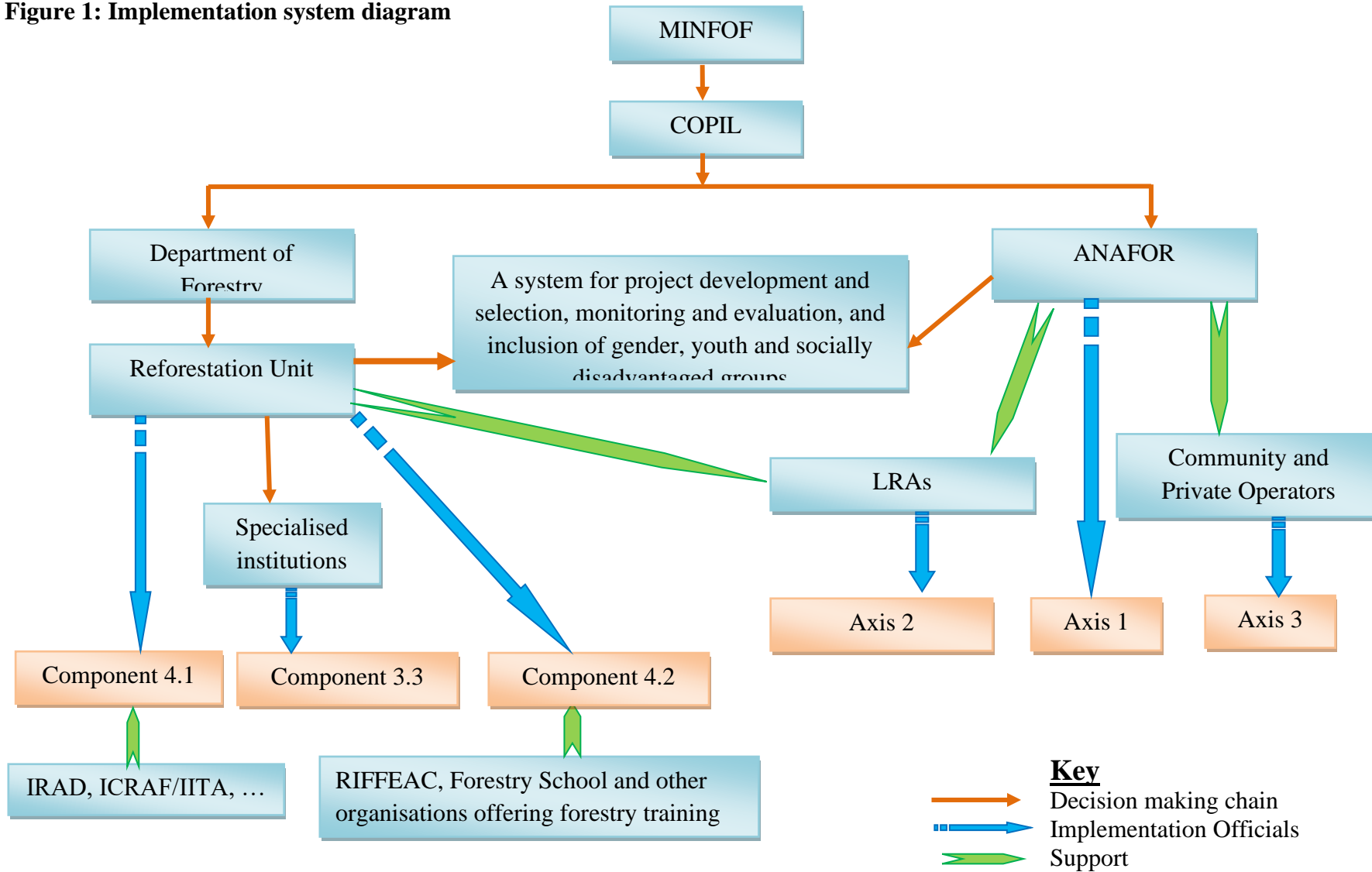
These include: MINFOF, MINEPDED, MINADER, MINEPIA MINRESI, MINAT, MINDDEVEL, CTD, PNDP.

### **7.2. Non-state stakeholders**

Amongst others, we can enumerate the following: communities, traditional authorities, development partners, Central African Network of Forestry and Environmental Training (RIFFEAC).

The figure below illustrates the complementarity amongst stakeholders.

**Figure 1: Implementation system diagram**



## 8. IMPACT OF NPFDP

### 8.1. Cost of NPFDP

Estimates to set up a production forest are drawn from “the Analytical Accounting Plan” of the National Forest Regeneration Board (ONAREF, 1987) and the Paper titled “Module for the creation of one hectare of plantation forest” drafted by ANAFOR and the Technical Centre for Council Forests (ANAFOR and CTFC, 2011). They indicate the number of trees per hectare, average spacing, the surface area to be reforested or regenerated, the average cost to set up one hectare of plantation and forest maintenance for the 4 years following the year of planting.

- Average cost to set up 1 (one) hectare of plantation forest = 5m x 5m in full = CFAF 1,000,000;
- Maintenance after planting = CFAF 500,000/year, representing CFAF 2,000,000 for 4 years of maintenance;
- Total cost to set up one hectare of plantation forest + 4 years of silviculture maintenance = **CFAF 3,000,000.**

**Supposing that 150 m<sup>3</sup> of lumber and construction wood can be harvested from one hectare of plantation, the corresponding surface area to reconstitute the 3 million m<sup>3</sup> of timber harvested yearly in Cameroon stands at 20,000 ha/year.**

Considering that the total cost to set up one hectare of plantation forest + 4 years of silviculture maintenance = CFAF 3,000,000.

Table 3 below shows the estimated cost of the NPFDP.

Table 3: Programme cost assessment tables

Axis	Components	Sub-components	ECOLOGICAL ZONES	Cost
			+ Biomes and related forest estates	
<b>AXIS 1:</b> Timber production and products other than timber, service wood, fuel-wood, enhancement of wood products and development of silvicultural value	1. Wood Production (20000/year)	· Production of timber	-ZESH / ZTr: 5000 ha	3.75E+11
		· Production of construction wood	-ZESS / ZESH: 5000 ha	3.75E+11
		· Production of wooden poles	-ZESS /ZESH/ ZEPD: 5000 ha	3.75E+11
		· Production of fuel-wood ( <i>Firewood</i> )	-ZESS/ZESH/Zhu (Mangroves): 5000 ha	3.75E+11
	2. Production of industrial products other than wood (5000 ha/year)	· Production of resins (latex, etc.), alcohol, Pulp ( <i>Trituration / Cellulose</i> ), etc. · Production for agro-food systems · Production of Bamboo from China / Rattan		3.75E+11
	<b>Production target: 30 000/year</b>	3. Products other than wood for human needs (food, pharmacopoeia, farming) and animal feed (livestock) (5000 ha/year)	· Production of NTFP (4000 ha/year)	ZESH: 1250 ha
· Production of fodder trees (1,000 ha/year)			ZTr: 1250 ha	93,750,000,000
· Production of pharmacopoeia products and plant active ingredients			ZEFD: 1250 ha	93,750,000,000
			ZHu: 1250 ha	93,750,000,000
4. Development of silviculture and related value chains as a driving force behind forest regeneration		· Wood value chains development · Development of value chains for standing timber products	FF	2,000,000,000
<b>AXIS 2:</b> Protection and provision of ecosystem services other than supply (recreation,)		1. Development of riverbanks/watersheds/ water catchment areas - soil protection and restoration (3000 ha / year)	· Protection of riverbanks	ZESS: 750 ha
	· Fight against erosion		ZESH: 750 ha	56,250,000,000
	· Protection of watersheds		ZEFD: 750 ha	56,250,000,000
	· Protection of water catchment areas		ZTr: 750 ha	56,250,000,000
	2. Development of urban and peri-urban forestry (greening of urban and	· Establishment/Restoration of council woods	ZESS: 500 ha	37,500,000,000
		· Establishment/Restoration of green belts	ZESH: 500 ha	37,500,000,000
		· Establishment/Restoration of	ZEFD: 500 ha	37,500,000,000



Axis	Components	Sub-components	ECOLOGICAL ZONES	Cost
			+ Biomes and related forest estates	
	peri-urban landscapes) (2 000 ha/year)	ecotourism parks	ZTr: 500 ha	37,500,000,000
			ZHu: 500 ha	37,500,000,000
	3. Biodiversity enhancement	· Creation of green infrastructure (gene banks, pollination reservoirs, arboreta... for adaptation)		500,000,000
<b>AXIS 3</b> : Restoration of degraded landscapes and lands	1. Recovery of natural ecosystems and biodiversity conservation	Recovery of valuable endemic species endangered by logging and other factors	ZESS: 200 ha	15,000,000,000
		- Establishment/Restoration of	ZESH: 200 ha	15,000,000,000
		· Arboretum	ZEFD: 200 ha	15,000,000,000
		Sacred forests	ZTr: 200 ha	15,000,000,000
	· Teaching and research forests	ZHu: 200 ha	15,000,000,000	
2. Combating desertification	- Windbreaks/ hedges	ZESS: 1000 ha	75,000,000,000	
Rehabilitation of degraded lands (4 000 ha/year)	- Integrated plantations ( <i>agricultural, forestry and pastoral systems</i> )	ZESH: 3000 ha	75,000,000,000	
<b>AXIS 4</b> : Research – Innovation – Training and capacity-building	1 Research and innovation	Coordination of the Consultation Framework		500,000,000
		Funding of forestry projects and research		
		Popularisation of Innovations		
2 Stakeholder training and capacity building	Lifelong Training		500,000,000	
	Stakeholder Capacity Building			
<b>AXIS 5</b> : Institutional set-up, governance and gender-based decision-making process	<i>Institutional organisation, governance and gender</i>	Steering Coordination Gender · Monitoring and Evaluation		2,000,000,000
<b>Total</b>				<b>2,893E+12</b>
<b>annual cost of the project</b>				<b>115,720,000,000</b>

## 8.2. Social impact of the NFPDP

- The community will, through the programme, enjoy forest resources, contribute in improving their income and living conditions through silviculture, **thus enabling them to find solutions to their social problems such as paying their children's school fees and ensuring their family's health;**
- The programme will create several direct and indirect jobs for rural households (especially women with serious fuelwood needs).

## 8.3. Financial impact of the NFPDP

Based on calculations made in the production of Teak (NGOMIN et al, 2015) close to 150 m<sup>3</sup> of timber and construction wood could be harvested from one hectare of plantation after a 25-year cycle. If it is considered that the market price for species of the same value stands at about CFAF 250,000 per m<sup>3</sup>, then, the programme will help generate **CFAF 750 billion/year<sup>1</sup>**.

## 8.4. Economic impact of the NFPDP

The economic impact of the NFPDP will be felt through:

- **Increase in production that will undoubtedly boost the country's GDP. Timber exports will improve the trade balance and attract foreign currencies;**
- Contribution to the promotion of local development through private sector development support. To this end, the implementation of some tasks notably technical activities should rest as much as possible with service providers (companies, economic operators, NGOs).

## 8.5. Environmental impact of the NFPDP

The programme will contribute in curbing desertification and the genetic depletion of forest resources, restore degraded lands and mangroves as well as protect forest belts and watersheds.

## 8.6. Cultural impact of the NFPDP

The programme will contribute in curbing the genetic depletion of resources and ensure the sustainability of some important cultural species for communities.

## 9. SOURCES OF FUNDING TO BE MOBILISED / EXPLORED

Meeting the objectives of the NPFDP requires not only the mobilisation of a number of stakeholders, but also financial mobilisation beyond the State's capacity. The sources of funding to be mobilised are as follows:

- Funding provided for under Law No. 94/01 of 20 January 1994 to lay down Forestry, Wildlife and Fisheries Regulations;
- State subsidies;
- Income from ANAFOR's financial empowerment process;

- Contributions from LRAs;
- Local tax revenue;
- Contributions by concession holders;
- Participation of local community and private operators;
- Funding from international Funds.

## 10. TECHNICAL OPTIONS OF PLANTATIONS

### 10.1. Ecosystem dependent technical options of plantations

Several technical options are open to plantations depending on the ecosystem as illustrated in table 4 below.

**Table 4: Technical options of plantations depending on ecosystems**

	Size of residual forest cover		
	A little residual forest remaining	No residual forest on the site	
<b>Possible restoration options</b>	<b>Option 1:</b> -Count mainly on natural successional processes -Protect the forest and allow nature to act -Protect the forest and manage trees in a way to promote certain species (by proceeding for example with crop care or thinning)  -Protect and enrich the forest by introducing species with market value	<b>Option 2:</b> -Set-up plantations using choice species -Use single-crop species capable of adapting to the conditions of the site (preferably local species) -Use single crops but plant different species in different areas of the landscape depending on the conditions of the site -Use single crops, and grow subsistence crops non-timber products at the sub-layer -Create plantations of diverse tree species	<b>Option 3:</b> -Use cover crops or plant species capable of facilitating the growth of choice species  - Use species capable of adapting to site conditions and eliminate weed, preserve or improve soil fertility and enable the future growth of choice species

### 10.2. Various onsite option scenarios

#### a) Onsite restoration strategies in degraded primary forests

ITTO (2002) defines a degraded primary forest as: a forest whose initial cover has been compromised by unsustainable harvesting of timber and/or non-timber forest products in a way that its structure, processes, functions and dynamism are altered beyond the short-term resilience of the ecosystem; this means the ability for these forests to fully recover from exploitation, rapidly or in the medium term has been compromised.

The scenarios summarised below in table 5 illustrate how ecological and silvicultural factors could influence RPF choices.

**Table 5: Main objectives and major management actions for various types of forest lands and other degraded lands**

Types of forests/degraded lands	Restoration Objectives	Management actions						Desired outcomes
		PROT	CONS S&E	MAN REG	PLANT ENR	PLANT	AGRO-FOR	
Agricultural Lands	Restore fertility							<ul style="list-style-type: none"> <li>•Agricultural production systems</li> <li>•Agroforestry</li> <li>•Tree planting</li> <li>•Protected forests</li> <li>•Restored forest cover</li> <li>•Developed secondary forests</li> <li>•Multi-purpose forests</li> </ul>
	Restore and boost productivity							
	Meet subsistence needs							
	Generate income							
	Protect against fire , grazing; wind, etc.							
Restore/preserve biodiversity								
Riparian areas	Protect river banks							<ul style="list-style-type: none"> <li>•Protected forests</li> <li>•Restored forest cover</li> <li>•Stabilised rivers</li> </ul>
	Improve water quality downstream							
	Restore/preserve biodiversity							
Watersheds	Prevent and control erosion							<ul style="list-style-type: none"> <li>•Protected forests</li> <li>•Restored forest cover</li> <li>•Stabilised slopes</li> </ul>
	Stabilise drainage basins							
Production forests	Restore and boost productivity							<ul style="list-style-type: none"> <li>•Developed/restored forests</li> <li>•Tree planting</li> <li>•Protected forests</li> </ul>
	Restore/preserve biodiversity							
	Protect against fire, illegal logging, poaching, colonist, etc.							
	Prevent and control erosion							
	Generate income							
Protected areas	Restore ecological integrity							<ul style="list-style-type: none"> <li>•Protected forests</li> <li>•Restored forest cover</li> </ul>
	Restore/preserve biodiversity							
	Increase the population of endangered/threatened species							
	Protect against fire, illegal logging, poaching, etc.							
Protected zones	Restore ecological integrity						<ul style="list-style-type: none"> <li>•Rehabilitated areas</li> <li>•Restored forest cover</li> </ul>	

‘The filled boxes indicate better conservation actions to achieve desired objectives; PROT = protection measures; CONS S&W = soil and water conservation; MAN REG = management of natural regeneration (including practises aimed at maintaining, inducing and supporting natural regeneration); PLANT ENR = enrichment planting; direct planting (mixed or pure species) AGROFOR = agroforests

### b) Onsite strategies for management of secondary forests

ITTO (2002) defines secondary forest as: *the regrowth of the woody vegetation on lands largely cleared of their original forest vegetation (that is having less than 10% of their original forest cover).*

Strategies for the management of secondary forests are presented in table 5 below.

**Table 6: Management systems and examples of technical options for secondary forests**

Management objective	Management system	Example of technical option/management techniques
Boost the efficiency with which fallow vegetation accelerates the recovery of soil productivity in view of a future farm business	Improved fallow in short cycle	<ul style="list-style-type: none"> <li>•Leguminous cover crops</li> <li>•Organic fertilizers produced out of the farm (ex: animal fertilizers, earthworms)</li> <li>•Growing of hedges following the contours and vaults rotation</li> </ul>
Increase the availability of useful products to be used in the agricultural system and to diversify production	Improved fallow/ enriched in the medium cycle	<ul style="list-style-type: none"> <li>•Select and treat (timber and non-timber) tree species naturally established and useful, palm trees or small trees</li> <li>•Enrich with desired tree species (for ex: those preferred for timber, fuel-wood, fruits, medicine or fodder)</li> <li>•Useful semi-perennial and perennial crop species</li> </ul>
Boost the productivity and the value of secondary forest in view of generating income through the sale of timber and non-timber products and services of the forest.	Production forests in medium and long cycles  Conservation forest	<ul style="list-style-type: none"> <li>•Conservation and management of seed species of commercial interest</li> <li>•Thinning clearing in favour of trees for commercial interest</li> <li>•Cover opening and cleaning of the under story to favour regeneration establishment of commercial interest</li> <li>•Soil exposure to favour desired regeneration</li> <li>•Enrichment (in lines, blocks or in empty spaces) with tree species of commercial interest</li> </ul>
Ensure the sustainability of secondary forests in view of improving its functions and protective/ environmental/recreational values	Conservation forest	<ul style="list-style-type: none"> <li>•Protection of species useful to wildlife, and as seeds</li> <li>•Collection of natural seeds (young plants, saplings) of desired species to replant in farms and enrich fallows, high forests, etc. and</li> <li>•Wildlife management</li> </ul>

Source: Smith et al. 1997.

### c) Onsite strategies for the rehabilitation of degraded forest lands

#### Degraded forest lands

*Degraded forest lands* were defined by the ITTO (2002) as: ancient forests seriously damaged by excessive harvest of wood and/or non-wood forest products, poor management, repeated fire disasters, overgrazing or other hazards and land use damaging to the soil and vegetation to the extent that the forest regrowth has been inhibited or that the forest recovery has been seriously retarded after being abandoned.

Four strategies for the rehabilitation of degraded forest lands:

- Protection measures;
- Measures aimed at accelerating natural recovery;
- Measures aimed at facilitating natural regeneration;
- Tree planting.

#### **d) Onsite strategies for the restoration of forest functions on agricultural land**

Agroforestry, as currently defined by the International Centre for Research in Agroforestry is: *an ecology-based system with dynamic management of natural resources, which, through the planting of trees in farms and the agricultural landscape, diversifies and sustains production while increasing social, economic and environmental advantages to the benefit of land users at all levels* (CIRAF, 2000).

Off-site advantages could comprise watershed improvement and biodiversity conservation. Agroforestry systems could also be classified under three major types of structures, notably:

- *Agroforestry (arboriculture systems)*: it is a land use system in which agricultural and forest products are developed simultaneously or alternately;
- *Silvo-pasture (systems associating trees, pasture and livestock)*: In this system, land use is a combination of forest and livestock management through fodder production and organised grazing;
- *Silvo-pasture* is the land use system predominant in arid regions and generally areas for livestock farming;
- *Agroforestry-pasture (systems associating trees, crops and livestock)*: In this case, land use associates the three activities mentioned above, that is, agriculture, silviculture and livestock. They all occupy the same piece of land but not at the same time: trees providing fodder for animals and nutrients for crops; crops providing food for farmers, fodder for animals and organic matters for the soil; and animals providing manure, which is used as organic fertilizer to increase soil fertility and boost crop and tree growth.

## CONCLUSION

Cameroon's forestry sector is one of the major pillars of its economy. Not only does it contribute to the daily life of the population as a source of food, medicine, timber, firewood and other ecosystem services, but also, it creates formal and informal jobs. Besides its contribution in stabilizing the climate, it has become a major instrument in addressing climate change.

Unfortunately, much pressure is brought to bear on this sector owing to the increasing needs of the rapidly growing human population. The most obvious consequences are degradation and deforestation that result in the loss of soil fertility due to erosion, biodiversity loss, depleting forest cover and lower productivity.

Sustainable management of production forests has often been touted as the major solution to curb deforestation and forest degradation, while supplementing timber production from natural forests.

However, the emergence of concepts like Degraded Forest Landscape Restoration (FLR), 2<sup>nd</sup> generation silviculture and agriculture, climate change resilient agriculture and the emergence of plantation timber in the world market, falling demand for timber from natural forests, which will probably result in natural forests being declared out of bounds, open avenues for the development of plantation forests as solutions to climate change as well as meeting the demand for timber.

Cameroon could not afford not to keep pace with this momentum. It has therefore set up a new strategic steering tool, the National Plantation Forests Development Programme (NFPDP).

Of course, it is an ambitious programme that requires significant financial resources. Nevertheless, it should be implemented and all identified stakeholders should feel concerned. Monitoring, evaluation and good governance can guarantee the success of this programme, which can be viewed as a vision. Its institutional set-up is an asset that will help to correct past mistakes.

As one of the options of FLR, a plantation forest requires feasibility studies, economic and financial profitability. The evaluation method has been outlined in the Programme Paper.

## Appendix 1: Economic analysis as applied to silviculture

REPUBLIQUE DU CAMEROUN  
Paix – Travail – Patrie

**MINISTERE DES FORETS  
ET DE LA FAUNE**

**SECRETAIRE D'ETAT**

SECRETARIAT GENERAL

DIRECTION DES FORETS



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REPUBLIC OF CAMEROON  
Peace – Work – Fatherland

**MINISTRY OF FORESTRY  
AND WILDLIFE**

**SECRETARIAT OF STATE**

SECRETARIAT GENERAL

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### ***ECONOMIC ANALYSIS AS APPLIED TO SYLVICULTURE***

#### ***1. Modelling the economic indicator***

Silvicultural economics stands as a means of analysis, an interdisciplinary link, but also and most importantly, as a decision-making tool for the implementation of genuine sustainable forest management, likely to guarantee **economic and financial profitability of existing or future forest stands**.

Using the **net annual profit of forest as economic criterion**, some experts hold that a balanced forest with an accounting system is the only valid production unit.

For others who adopt as **economic criteria both the overall net income of the activity and its profit rate**, production units should be the sets of plots on which the same production activity is carried out.

According to Faustmann (1849) as cited by Jean-Luc Peyron (2014), it is not advisable to calculate the value of stands that are not yet exploitable by the market price of their current wood volume, but by the value obtainable from the price of their harvest when exploitable.

The practical advantage of this calculation lies in the fact that it is possible to obtain necessary information on forest value both in cases of voluntary or involuntary sales, and to determine the most profitable silvicultural system as well as the rotation period.

**Therefore, the value of a forest depends on its future (net) profits, and on setting its discount rate as well.**

As part of the project to develop economically oriented (industrial) plantation forests (with fast-growing tree species), **silvicultural value chains** will be developed. An **economic indicator model** will also be designed to enable foresters and plantation forest promoters to quickly assess the expected economic profitability (**Internal Rate**



**of Return)** of the chosen plantation forest scheme, depending on its objectives and characteristics.

## 2. Profitability of plantations

Comparisons of profitability can be made using the Internal Rate of Return on Capital Investment, which takes into account the sum of all expenses and income related to the life of a plantation (Edens, 1991. Forest Management and Regeneration Project (FMRP)).

**For this measure, the highest profitability is achieved when initial costs are minimised and income generated as quickly as possible (either through the sale of thinning products or through short rotation periods).**

### a) Cost-benefit assessment methods

Cost-benefit assessment can be approached by **discounting costs and profit** and using **profitability criteria**, which include **net discounted earnings (NDE)** and the **profit/cost ratio**.

In the case of state-developed monospecific plantations, discount calculations can be made at 3% and 4% for ecology-oriented plantations. For private plantations, discount rates can be 7% and 8% given the risks to be managed and investment repayment requirements.

For this project, assumptions are based on cases where direct income will be derived solely from final timber harvests (thus excluding thinning products and other associated benefits such as aesthetic, wildlife and ecological values as well as carbon credits). It is also assumed that timber prices increase by 2% annually.

Profitability can be calculated with the Excel software.

### b) Revenue and costs are discounted using the following general discounting formula:

VA = current value

$$VA = VF \left[ \frac{1}{(1+a)^n} \right]$$

VF = future value year  $n$

$a$  = discounting rate

$n$  = number of years to the future value.

### c) Net profit discounted is obtained by the following formula:

$$BNA = \sum_{i=1}^n \frac{R_i}{(1+a)^i} + \sum_{i=1}^n \frac{C_i}{(1+a)^i}$$

BNA= net profit discounted

$R_i$  = revenue in year  $i$

$C_i$  = costs in year  $i$

$a$  = discounting rate

**d) Profit/cost is calculated using the following formula:**

C/P= cost/profit ratio

$$B / C = \frac{\sum_{i=1}^n \frac{R_i}{(1+a)^i}}{\sum_{i=1}^n \frac{C_i}{(1+a)^i}}$$

R<sub>i</sub> = revenue in year *i*

C<sub>i</sub> =costs in year *i*

*a* = discounting rate

**3. Table presenting a cost benefit simulation of a plantation forest (open, monospecific, agro-forestry, etc...).**

Costs and benefits									
Service		Costs (CFAF)	Costs + contingencies	Total CVST	MVST	Discounted benefits	Discounted costs	Discounted benefits	Discounted costs
		CFAF/ha				Discount rate		Discount rate	
		Base (Assumption year)			Age of plantation		Age of plantation		
Plantations roads 1	+	Year 1							
Manual repairs									
	2	Year 2							
	3	Year 3							
	4	Year 4							
	5	Year 5							
Contingencies									
Annual increase in wood prices									
		Poles							
Total									
BNA									
B/C									
TRI									

**CVST:** Commercial volume of standing timber in m<sup>3</sup>.

**MVST:** Market value of standing timber in CFA Francs

**DNP:** Discounted net profit in CFA Francs

**C/P:** Cost/profit ratio

**IRR:** Internal Rate of Return

**Source:** Anicet NGOMIN – MINFOF

## Appendix 2: Simplified fact sheet for reforestation and forest regeneration monitoring and evaluation

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N° \_\_\_\_\_/FTSE/MINFOF

Yaounde, \_\_\_\_\_

### SIMPLIFIED FACT SHEET FOR REFORESTATION AND FOREST REGENERATION MONITORING AND EVALUATION

#### SECTION 1: GENERAL INFORMATION

Organisation or Business Name: .....

Identity of Representative: .....

Address: .....

Tel: ..... P.O. Box/E mail: .....

Actor: FMU/CFs/Council/Cooperative/CIG/Association/Chiefdom: .....

References of FMU and Council Forest: .....

Description of land (Title deed): .....

Total surface area (ha): .....

Stand prior to afforestation or reforestation: .....

Nature and source of funding: .....

Amount: .....

#### Stakeholders:

Number of employees: .....

Categories: No. of young people: ..... adults: .....

Sex: Number of men:..... women:.....

#### SECTION 2: TECHNICAL SILVICULTURAL PROCESSES

##### Execution of Work (specify if approved in silviculture)

Owner of organisation: .....

Service provider: .....

Others (specify): .....

**A. PLANTATIONS****2.1. Nature of activity**

Afforestation: .....

Reforestation: ..... Reforestation with diversification: .....

Regeneration (method: natural? artificial? Others (*specify*): .....

Targeted objective: .....

Expected outcome: .....

End result: .....

**2.2. Preparatory work**

**Nursery:** (*Production of seedlings*) Site:..... size:.....

objectives:..... production volume: .....

Propagation/production technique: Generative:.....Vegetative:.....

Watering (type, frequency and period (*specify*):.....

Treatment: fertilization:.....phytosanitary:.....

Species used (*scientific, trade and vernacular names*):

-

-

-

**Site preparation**

- Full ploughing:..... Windrowing: .....

- Row ploughing: ..... Sub-soiling:.....

- Treatment with herbicides:..... Mechanical potting: .....

- Fertilising:.....

- Others (*specify*): .....

**2.3. Setting up**

Plantation density (Number of seedlings /ha ):.....

Watering (type, frequency and period (*specify*):.....

**2.4. Plantation protection**

Treatment:.....

Type of protection:.....

Others (*specify*): .....

**2.5. Maintenance**

Weeding/clearing:.....

Filling: .....

Pruning:.....

Number of clearings envisaged: .....

Type of clearing /Manual:..... with machine: .....

Companion planting :.....

Others (*specify*): .....

**2.6. Indicators**

**Number of trees/ha:**.....

**Surface area planted/Linear:**.....

**Survival rate:**.....

**Achievement rate (compared to objective):** .....

**Success rate:**.....

**B. NATURAL REGENERATION**

Method:.....

Surface area treated:.....  
 Names of species targeted by regeneration activities: .....  
 Number of seed companies/identified/marked/geo-referenced per species: .....  
 .....  
 Seed shed and harvest:.....  
 Density of valuable planting species:.....  
 Survival rate of young plants:.....  
 Growth rate of young plants: .....  
 Removal of unwanted trees:.....  
 Other activities:.....  
 Thinning (number/target surface area/period...): .....

### **C. ARTIFICIAL REGENERATION**

Method: .....  
 Other methods (*specify*):.....  
 Targeted species:.....  
 Improvement planting on gaps: density (Number of seedlings/ha):.....  
 Others: ..... density (Number of seedlings/ha): .....  
 Others: .....density (Number of seedlings/ha):.....

### **D. AGROFORESTRY BLOCKS / DOMESTICATION**

Method:.....  
 Sites: .....  
 Techniques: .....  
 Others:.....  
 Species: .....

## **SECTION 3: PROJECT/ACTIVITY IMPACT ASSESSMENT (BY ASSESSOR)**

### **3.1. MONITORING**

Administrative:.....  
 Socio-organisational:.....  
 Financial:.....  
 Technical:.....

### **3.2. EVALUATION**

**Relevance** (*relation between stakes, problems or needs observed and objectives identified to address them, added value compared to what is existing*):.....  
 .....

**Effectiveness** (*level of attainment of objectives*): .....  
 .....

**Efficiency** (*profitability, cost effectiveness, rational use of means available, assessment of level of attainment of objectives at minimal cost (financial, human and organisational)*):.....  
 .....

**Sustainability/Continuity/Impact** (*impact of long-term effects of the activity upon completion*):.....  
 .....

**SECTION 4: FOR OFFICIAL USE ONLY**

**Conclusion/resolutions/recommendations:**

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- 
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- 
- 

**File reference:**.....

**Field inspection:**.....

**Date:**.....

**Name and signature (MINFOF official):**.....

### Appendix 3: Fact sheet for monitoring and evaluation of production and distribution of plant material

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Yaounde, \_\_\_\_\_

#### FACT SHEET FOR MONITORING AND EVALUATION OF PRODUCTION AND DISTRIBUTION OF PLANT MATERIAL BY ..... (To be kept for each nursery)

##### SECTION 1: GENERAL INFORMATION

Branch:.....  
Regions covered:.....  
Location of Nurseries: .....  
Region:.....  
Division:.....  
Localities/Villages: .....  
Names and addresses of Nursery managers per site:.....  
.....  
.....

##### SECTION 2: DESCRIPTION OF NURSERY

###### 2.1. Type of nursery:

-Makeshift/temporary nursery (< 30 000 seedlings): .....  
-Permanent Nursery (>30,000 seedlings): .....

###### 2.2. Nursery sites /Factors /Infrastructure (Tick existing items):

Rich soil - level ground or slightly sloping (2%) - accessibility at all seasons - steady and enough water supply - protection against strong winds - available labour supply - germination area - store for working equipment - administrative and records office - wood park (trees and plants that provide plant material - for instance grafts, cuttings, etc.) - seedling transplanting space - space for storage of transplants and for filling - fencing and shading - shed for storage storing substrate and acclimatising young transplants - propagation frame (rooting propagator) for cuttings - rehabilitation frame (giant frame) for propagation by layering - irrigation systems ( engine pump, wind pump, basins, piping) - production blocks - composting rooms.

###### 2.3. Equipment (tick existing items):

Secateurs, grafters, scalpels, scissors, sprayers, watering cans, planters, buckets, wheelbarrows, spades, hammers, machetes, hoes, files, drums, sieves, saws, ladders, knives, rope, other inputs and insecticides.

**2.4. Equipment maintenance – and seedling care**

Technique used:.....

Means:.....

**2.5. Distribution and marketing of plant material**

Means applied:.....

Total number of seedlings supplied by each player + Amount per seedling and per actor:

1- 6 -

2- 7 -

3- 8 -

4- 9 -

5- 10 -

**Total number of seedlings:** .....**Total amount (CFAF):** .....

Date delivery: .....

Place of delivery:.....

Plantation site: .....

**SECTION 3: DIMENSIONS AND CONFORMITY OF PLANT MATERIAL**

- Botanical, phenological and technical specifications of species:.....

- Quantity of species: .....

- Age of each species: .....

- Average size of each species: .....

- Root system of each species: .....

- Number of leaves per species: .....

- Type of seedling (bare roots, cups, plugs, etc.): .....

- Qualifying criteria: (quality, non-conformity (defects), health and physiological condition...):

- Post-production conservation: .....

**SECTION 4: TECHNICAL PROCESSES**

- Seed sources ? .....



- .....
- *In situ* conservation? *Ex situ* conservation ? .....
- Seed treatment? .....
- Vegetative propagation (techniques applied) ?.....
- .....
- Generative propagation (techniques applied) ?.....
- .....
- Germination rate of each species?.....
- .....
- Survival rate of young plants per species?.....
- .....

**SECTION 5: ACTIVITY IMPACT ASSESSMENT (BY ASSESSOR)**

**5.1. MONITORING**

Administrative:.....

Socio-organisational:.....

Financial:.....

Technical:.....

**5.2. EVALUATION**

**Relevance** ((*relation between stakes, problems or needs observed and objectives identified to address them, added value compared to what is existing:*.....

.....

.....

**Efficiency** (*level of attainment of objectives*) :.....

.....

.....

**Efficiency** (*profitability, cost effectiveness, rational use of means available, assessment of level of attainment of objectives at minimal cost (financial, human and organisational):*.....

.....

.....

**Sustainability/Continuity/Impact** (*impact of long-term effects of the activity upon completion*):.....

.....

.....

**SECTION 4: FOR OFFICIAL USE ONLY**

**Conclusion/resolutions/recommendations:**

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- 
- 

**File reference:**.....

**Field inspection:**.....

**Date:**.....

**Name and signature (MINFOF official):**.....

Appendix 4: Forest reserves and reforestation areas in Cameroon

