



Securing Permanent Forests to Combat Climate Change and Enhance Sustainable National and Local Economies in Cameroon

ANNEX 3A

SOCIO-ECONOMIC ANALYSIS



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LIST OF ACRONYMS

ANAFOR	National Forestry Development Support Agency
BAU	Business As Usual
BIR	Rapid Intervention Brigade
BUCREP	Central Office for Population Censuses and Studies
CIFED	Information and Training Centre for the Environment and Development
CTA	Technical Centre for Agricultural and Rural Cooperation
CTFC	Communal Forest Technical Centre
ETM+	Enhanced Thematic Mapper
FGD	Focus Group Discussion
GIC	Groupe Initiative Commune
GIZ	German Agency for International Cooperation
INS	Institut National De La Statistique
IRAD	Agricultural Research Institute for Development
ITTO	International Tropical Timber Organization
MINADER	Ministry of Agriculture and Rural Development
MINEPDED	Ministry for the Environment, Nature Conservation and Sustainable Development
MINEPIA	Ministry of Livestock, Fisheries and Animal Industry
MINFOF	Ministry of Forests and Wildlife
MINMIDT	Ministry of Mines, Industry and Technological Development
OLI	Operational Land Image
NGO	Non-Governmental Organisations
OSC	Civil Society Organisations
PALFAR	Rice growing project
PAMAFECUL	Plant Material Production Project for Agricultural Intensification
NTFPS	Non-timber forest products
PNW	Waza National Park
PRODEL	Livestock Development Project
SEBC	Société d'Exploitation Forestière Des Bois
FMU	Forest Management Units
IUCN	International Union For Conservation Of Nature
WWF	World Wide Fund For Nature
ZIC	Hunting Areas of Interest
ZIGGC	Community-managed areas of hunting interest

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1. INTRODUCTION

1.1. BACKGROUND AND JUSTIFICATION

Cameroon is rich in natural resources. The country has an impressive geological potential and a rich forest ecosystem which perform multiple functions in terms of climate regulation, regulation of water regimes, economic and social development and soil protection. Sustaining these functions is a major concern for the international community and the Government of Cameroon. This is the background to the "securing permanent forests to combat climate change and sustainably strengthen national and local economies in Cameroon" project.

This project is justified by the fragility and vulnerability of Cameroon's forest ecosystem, which is under severe pressure from climate change and human activities, the main drivers of deforestation and degradation of the country's forest landscapes. These activities have had the effect of increasing the vulnerability of forests to climatic hazards. Aware of the importance of its biodiversity and the threats it faces, Cameroon has, over the last few decades, resolutely committed to a series of measures and actions that are regularly updated, and with which this project is aligned.

The project will be implemented in three forest landscapes whose basic social conditions are presented in this report: They are: Waza and its peripheral zone, home to the Waza National Park, a UNESCO Biosphere Reserve since 1982; Bamboutos-Bakossi, home to the Monts Bamboutos Reserve; and Dja-Lobéké, home to the Dja Reserve and the Nki, Ngoyla, Boumba-Bek and Lobéké National Parks. For these three landscapes, socio-economic analysis is important to understand the potential socio-economic impacts of a project to secure the permanent forests, particularly the changes induced in the overall dynamics of the population at cultural, social, economic, political, institutional and other levels.

To establish these basic socio-economic conditions, the socio-economic analysis was based on a systematic approach involving community and individual consultations, and visits to the three landscapes in order to identify key indicators of demographic characteristics and economic activities.

1.2. OBJECTIVES

This socio-economic analysis aims to: i) assess the existing situation in the proposed project areas; ii) identify and analyse current or potential socio-economic changes in the three landscapes; iii) determine the main drivers of these changes, the issues at stake and the recent implications for the sustainable management of permanent forests in these three landscapes.

1.3. STRUCTURE

This document is structured around four main sections. The second section presents the methodological approach adopted. Section three presents the socio-economic analysis of the Dja-Lobéké landscape. Sections four and five present the socio-economic analysis of the Bamboutos-Bakossi landscape and the Waza landscape respectively.

2. GENERAL METHODOLOGICAL APPROACH

To carry out the socio-economic analysis of the "Securing permanent forests to combat climate change and strengthen local and national economies in Cameroon" project, a four-phase research methodology was developed:

- The preparatory phase ;
- The field survey phase ;

- The data processing and analysis phase ;
- The validation phase.

During the course of the mandate, and based on the realities of each landscape, certain adjustments were made to the methodology, particularly in the sequence of activities linked to the field visits. These adjustments are specified in the activities concerned.

2.1. PREPARATORY PHASE

- LITERATURE REVIEW / COLLECTION OF SECONDARY DATA

The purpose of the literature review was to provide basic information for the drafting of the preliminary report on the socio-economic situation in the three landscapes. It consisted in exploring the available documentation, providing historical, economic, biogeographical, demographic and political information on the Dja-Lobéké, Bamboutos-Bakossi and Waza landscapes, including study reports, articles published in scientific journals and newspapers, Communal Development Plans (CDPs), Development Plans (DPs), Environmental and Social Management Plans (ESMPs), etc. Socio-economic activities were identified, as well as related activities and their ecological and social consequences, on the basis of the documents identified.

In addition, the databases and information (social, economic, etc.) of technical and non-technical partners active in the three landscapes were consulted, in particular WWF , IRAD and GIZ for the Dja-Lobéké landscape, GIZ and Green M'Muock for the Bamboutos-Bakossi landscape, and GIZ , SAILD, IRAD, IUCN and CADEPI for the Waza landscape. Consultation of the archives of the Bureau Central des Recensements et des Études de Population (BUCREP) and the Institut National de la Statistique (INS) provided demographic statistics for each village in the three landscapes. These statistics were supplemented by projections based on certain contextual assumptions. In addition, documents from the departmental and district delegations of MINFOF, MINEPDED, MINADER and MINEPIA for the Dja-Lobéké, Bamboutos-Bakossi and Waza landscapes were consulted, as well as other relevant official documents at local, regional and national levels.

These multiple sources of information were used to characterise and deepen our knowledge of the study environment. They facilitated the construction of the introductory part of the work and the illustration of the arguments in the analysis. In addition, this documentary analysis was used to draw up the preliminary socio-economic analysis report, on the basis of which the data collection tools for the field survey phase were designed.

Therefore, prior to the in situ observations carried out during the primary data collection phase, Landsat ETM+ (Enhanced Thematic Mapper) and OLI (Operational Land Imager) images, covering each of the three landscapes, were used to supplement the information provided by the administrative and topographical maps.

- DESIGN AND TESTING OF DATA COLLECTION TOOLS

The design of data collection tools is an important stage in the methodology. It was based on the gaps identified and the missing information detected during the documentary analysis phase. The data collection tools were designed to gather as much information as possible in the field, including the socio-economic analysis. This mainly involved drawing up interview guides for resource persons and target communities. These interview guides included closed and semi-open questions designed to capture social information from the communities, such as ethnic distribution, access to land, customs and traditions, etc., and economic data on their main income-generating activities, including agriculture, livestock farming, harvesting of non-timber forest products (NTFPs), mining, tourism, small-scale logging, etc. It was on the basis of these guides that consultations were carried out.

These tools were tested and improved before and during the data collection phase to optimise the quality and quantity of data to be collected, while taking into account the resources available and the landscapes to be covered.

- CONSULTANT SCOPING MEETINGS AND CONSULTATION PLAN

Two scoping meetings between the consultant and the client were held in preparation for data collection in the intervention sites of Dja-Lobéké in south-east Cameroon, Bamboutos-Bakossi in the west and south-west of the country, and Waza in the far north of Cameroon. These working sessions took place at the consultant's offices in Yaoundé on 14 and 15 January 2022, with a view to final adjustment and adoption of the sites and communities to be consulted, revision and finalisation of the field survey plan and methodology and other practical arrangements.

The consultation plan was drawn up in such a way as to define, for each landscape, the timetable for community consultations in the target localities, interviews with resource persons and technical and non-technical stakeholders, and visits to the categories of permanent forest targeted for observation purposes.

The criteria for selecting participants for the group discussions with local community members and the individual interviews with resource persons, as well as the main themes to be covered in the interview guides, were also discussed at these two working sessions.

Letters of introduction for each landscape were prepared to facilitate the federation of all technical and non-technical stakeholders in the provision of relevant data for the socio-economic analysis in each landscape.

2.2. FIELD SURVEY PHASE

Three data collection methods were used to carry out the field surveys, group discussions with local communities, individual interviews with resource persons and in situ observations in the targeted categories of permanent forest.

2.2.1. IN SITU OBSERVATIONS

This involved field observations with an emphasis on locating human activities and their visible impacts in terms of degradation and deforestation of the targeted permanent forests, as well as their geographical distribution. For direct observation, an observation guide based on precise criteria was used. Observations focused mainly on the activities of local people, the techniques used and their ecological, economic and social impacts. These observations also covered various aspects such as habitat, eating habits, living conditions and certain practices such as the conservation of animal and plant biodiversity. This observation enabled us to characterise the various activities and the environmental risks inherent in these activities.



Photo 1 Underused nursery field at Lokomo
Source: Fokabs, 2022



Photo 2 Impact of drought on soils in the Waza landscape.
Source: Fokabs, 2022



Photo 3 Babadjou agroforestry nursery.
Source: Fokabs, 2022



Photo 4 Djutitsa CTA in the Bakossi-Bamboutos landscape
Source: Fokabs, 2022

2.2.2. SAMPLING PROCEDURE FOR COLLECTING QUANTITATIVE DATA

The choice of localities for data collection at community level was made on the basis of stratified sampling based on criteria relevant to a project.

Stratified random sampling was adopted¹ in order to facilitate the constitution of samples taking into account the specificities of each landscape. The choice of this method is justified by the presence of huge disparities in terms of populations and localities in the Dja-Lobéké and Waza landscapes, and by a relevant choice of villages located near or on the slopes of the Bamboutos Mountains. The stratification made it possible to identify the localities whose populations are most likely to carry out activities that threaten the permanent forests in the three landscapes.

Two levels of stratification were defined at the scale of each landscape: i) The first level related to the identification and geographical location of deforestation hotspots in the three landscapes through an analysis of satellite images. This made it possible to create strata. The

¹ Stratification makes it possible to obtain representative samples on the basis of set criteria (variables of interest for a project) and to make an optimum choice of locations for conducting field surveys.

second level related to the location of villages within the identified hotspots and their proximity to the different categories of permanent forest targeted.

In the villages identified following the cross-referencing of stratification levels, two focus groups were formed, taking gender into account by means of random sampling: i) The men's group, comprising the different social strata relevant to the project (farmer, fisherman, hunter, trader, etc.); ii) The women's group, comprising women from the different social strata identified in each landscape. The focus groups were formed on the basis of simple random sampling of the two communities: men and women.

In the Waza landscape, the cross-referencing of sampling levels and criteria led to the selection of the following villages: Zina, Lougouma, Waza, Niwadji, Djeguere, Andirni, Badadaï, Diguina, Pette, Mora and Tchede.

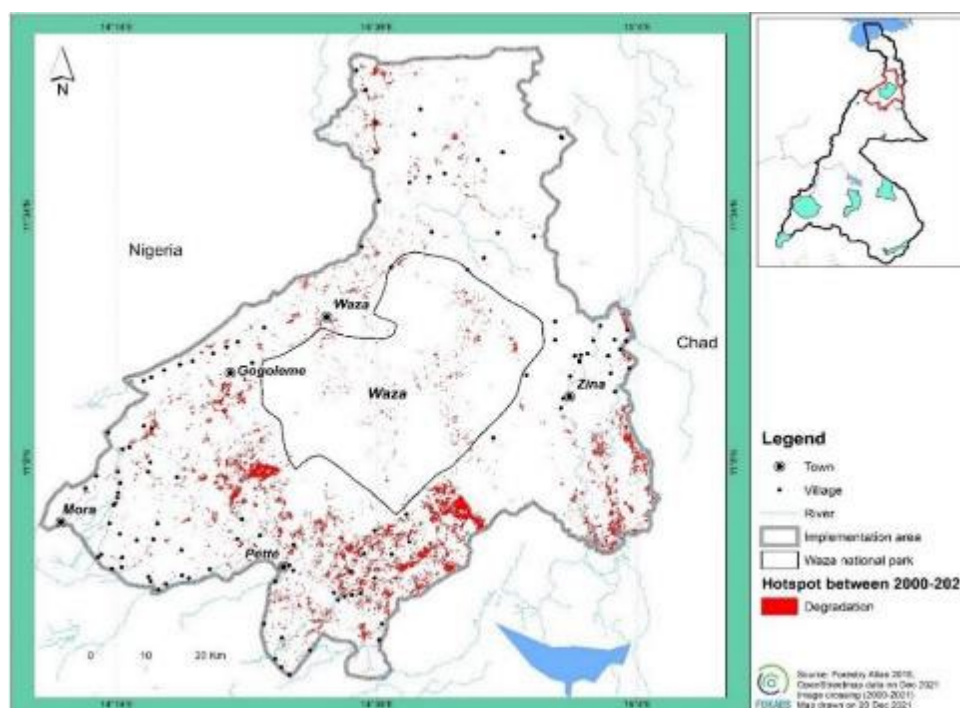


Figure 1 Location of deforestation hotspots targeted during field surveys in the Waza landscape

Source: Fokabs, 2022

In the Bamboutos-Bakossi landscape, the villages selected by cross-referencing the criteria are as follows: Bafou, Aghouong, Djutsitsa, Femock, Babajou, Mmuock Fossimondi.

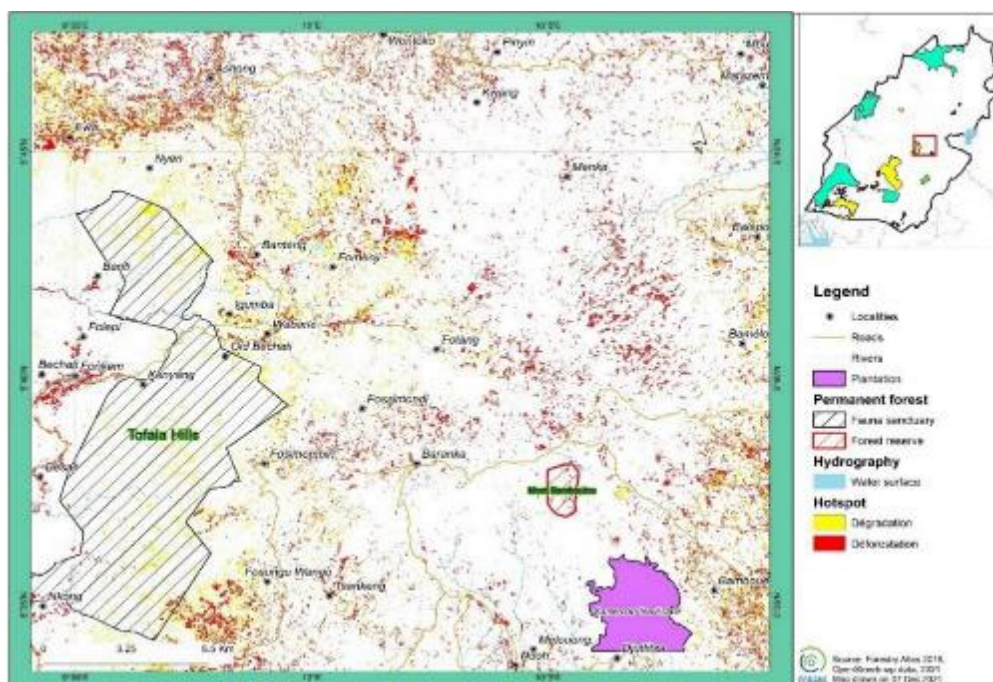


Figure 2 Location of deforestation hotspots targeted during field surveys in the Bamboutos Mountains Source: Fokabs, 2022

The villages selected for the Dja-Lobéké landscape are as follows: Moloundou, Mambélé, Salapoumbé, Iokomo, Kika, libongo, Kanyol, Ngato, Moumboué, Song, Yenga, Mindourou; then the villages along the second axis: Yokadouma Ngoyla.

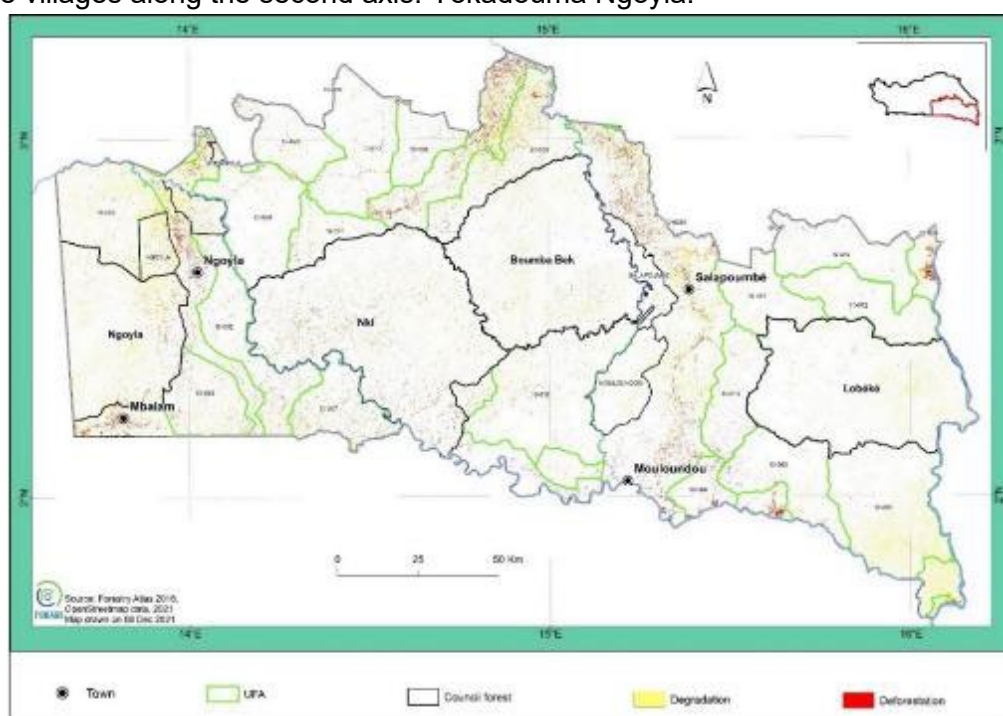


Figure 3 Spatial location of deforestation hotspots targeted during field surveys in the Dja-Lobéké landscape Source: Fokabs, 2022

2.2.3. INTERVIEWS WITH RESOURCE PERSONS

These consisted of individual interviews, using interview guides, with local officials in order to gain a better understanding of the existing dynamics in each landscape between the populations and the categories of permanent forest targeted, the expected role and the

observed attitude of local officials. These interviews were also intended to provide information on the relationships established between the populations living in each of the three landscapes.



Photo 5 Interview at the MINEPIA regional delegation (East Cameroon)
Source: Fokabs, 2022



Photo 6 Interview with ANAFOR (East Cameroon)
Source :Fokabs, 2022



Photo 7: Individual interview with DR MINEPIA in the Bakossi-Bamboutos landscape
Source: Fokabs, 2022



Photo 8 Individual interview Bakossi-Bamboutos landscape.
Source: Fokabs, 2022



Photo 9 Formal meeting with GIZ Far North.
Source: Fokabs, 2022



Photo 10 MINADER Departmental
Delegation in Mora
Source: Fokabs, 2022

Table 1 Distribution of stakeholders consulted in the Dja-Lobéké landscape

Date	People we met	Number of interviews
16/01/2022	- DR MINEPDED	1
17/01/2022	- DR MINMIDT - DR MINADER - DR MINFOF - DR MINEPIA - Heads of IRAD Bertoua - Heads of SAILD Est - ANAFOR managers, - Heads of GIZ Bertoua - Heads of NGO OKANI	9
18/01/2022	- DD MNFOF - DD MINEPDED - DD MINMIDT - NGO managers from CIFED and ROSE Yokadouma - WWF Yokadouma - Curator of Nki Park - Head of Nature et Développement NGO - CFC Operations Manager Ngola 35 - Yokadouma communal forest managers - Team CFC Ngola 35 - Ngola 35 nursery manager (CPF)	13
19/01/2022	- Site Manager SEBC Lokomo - SEBC Lokomo development	2
20/01/2022	- Sub-prefect of Moloundou - 1st Deputy Mayor of Moloundou - Head of COVAREF N°10 - Head of Moloundou Communal Forest - Salapoumbé Communal Forest Manager - Head of the Salapoumbé forestry post	6
22/01/2022	- Sub-prefect of Ngoyla - Head of WWF Ngoyla - Ngoyla Agricultural Station Manager	4

	- Head of the association Effort à la conservation de Ngoyla	
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Source: Field (Fokabs, 2022)

Table 2 Distribution of stakeholders consulted in the Bamboutos-Bakossi landscape

Date	People we met	Number of interviews
24/01/2022	- DR MINFOF - DR MINEPDED - DR MINEPIA - DR MINADER - Head of GIZ West,	5
25/01/2022	- DD MINEPDED Menoua - DD MINFOF Menoua - DD MINEPIA Menoua - DD MINEPDED Bamboutos - Researcher in the Geography Department (University of Dschang) - Head of NGO Green Mmuock	6
26/01/2022	- Mayor of Babadjou	1
27/01/2022	- DD MINFOF Bamboutos	1
28/01/2022	- Chairman of Eleveurs grand bétail ouest	1

Source: Field (Fokabs, 2022)

Table 3 Distribution of stakeholders consulted in the Waza landscape

Dates	People we met	Number of interviews
19/01/2022	- DR MINEPIA MAROUA - Head of the Statistics Department at the MINADER Regional Delegation MAROUA - Head of the Forestry Department at the MINFOF Regional Delegation MAROUA - MINEPDED staff MAROUA - GIZ staff (Maroua)	5
20/01/2022	- DD MINEPIA MORA - DD MINFOF MORA - DD of MINADER MORA	3
24/01/2022	- Manager of the ABOLI community forest, LAWANMAKI (PETTE district) - MINADER Delegate for the PETTE District	2

2.2.4. COMMUNITY CONSULTATIONS

The community consultations consisted of participatory discussions involving all social strata and categories of the rural population in the target localities. They enabled the collection of precise economic and social data and information on income-generating activities, the drivers of deforestation and forest degradation, community conflict management, the main value chains, the costs and prices of agricultural and non-agricultural products, the cost of living, etc.

- Dja-Lobéké landscape

The community consultations were held in 18 localities/villages and involved a total of 525 individuals, including 295 native and non-native men and 230 native and non-native women.

Table 4 Statistics on the populations consulted in the Dja-Lobéké landscape

Landscape: NGOYLA - LOBEKE			
Town/village	Number of people surveyed	Number of men	Number of women
Baka Mimbo Mimbo	34	21	13
Mimbo Mimbo	48	24	24
Legoué	13	5	8
Adjela	15	8	7
Nkondong II	13	6	7
Mambélé	21	16	5
Lokomo	57	34	23
Baka Mikel	27	15	12
Kika	35	20	15
Baka Gbine	16	4	12
Banana	13	9	4
Ngatto	36	12	24
Yenga	28	16	12
Mikel	49	28	21
Mbateka	50	34	26
Ngoyla town 1	13	11	2
Ngoyla village	43	26	17
Zoulabot 1	14	6	8
TOTAL	525	295	230

Source: Fokabs, 2022

Figure 4 shows a graphical overview of the distribution of men and women in the localities consulted in the Dja-Lobéké landscape.

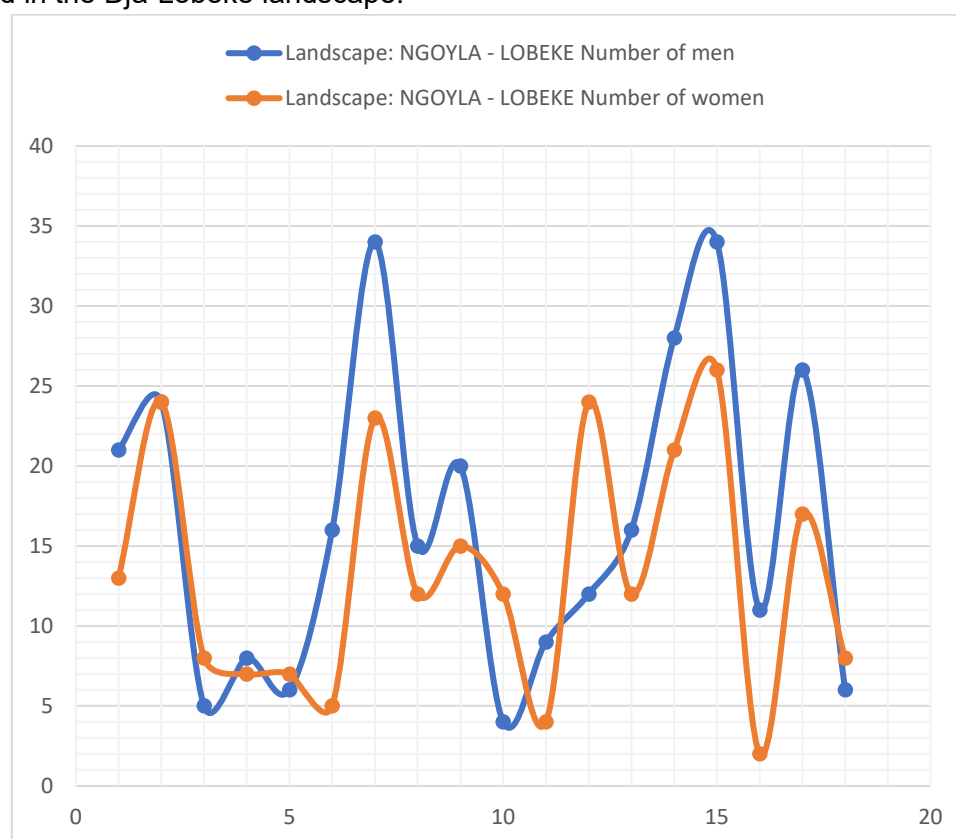


Figure 4 Men and women consulted by locality in the Dja-Lobéké payage.

Source: Fokabs, 2022



Photo 11 Baka communities in Mikel village
Source: Fokabs, 2022



Photo 12 Baka communities in the village of Mbateka
Source: Fokabs, 2022



Photo 13 Baka communities of Mimbo Mimbo
Source: Fokabs, 2022



Photo 14 Mambélé communities
Source: Fokabs, 2022

- Bamboutos-Bakossi landscape

The community consultations were held in 18 localities/villages and involved a total of 329 individuals, including 204 native and non-native men and 119 native and non-native women (Table 5).

Table 5 Statistics on the populations consulted in the Bamboutos-Bakossi landscape.

Landscape: Bamboutos - Bakossi			
Locality or Community	Number of people surveyed	Number of men	Number of women
Bagading II	12	0	6
Ndzih njutsa	19	18	1
Aghong-Messang	7	6	1
Tsopeua	30	9	21
Bamaka	31	26	5
Femock-Messong	20	16	4
Tsopiua Mbororo	14	8	6
Bamelo	21	14	7
BalatchiAghong	17	11	6
Messang	18	9	9
Ngangong II	11	5	6
Balepo	16	7	9
TOTAL	329	204	119

Source:Fokabs, 2022

The figure below gives a visual overview of the distribution of men and women in the villages consulted in the Dja-Lobéké landscape.

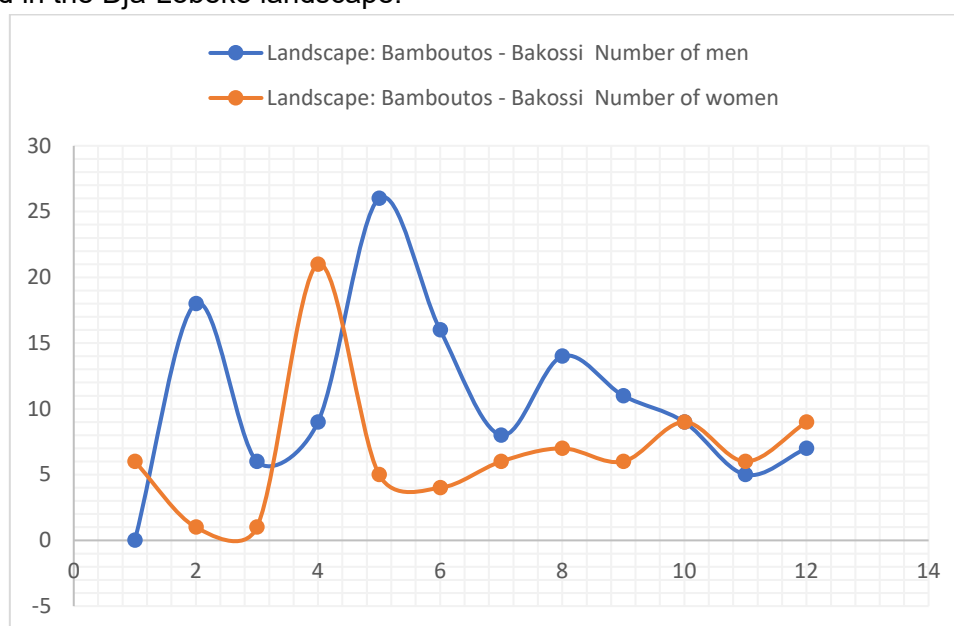


Figure 5 Men and women consulted by locality in the Bamboutos-Bakossi area.

Source: Fokabs, 2022

- Waza landscape

The community consultations were held in 9 localities/villages and involved a total of 624 individuals, i.e. 266 native and non-native men and 358 native and non-native women (Table 6).

Table 6 Statistics on populations consulted in the Waza landscape.

Landscape: WAZA			
Locality or Community	Number of people surveyed	Number of men	Number of women
Pétté	85	23	62
Zina	149	57	92
Bakié	37	16	21
Lougouma	50	34	16
Tchédé	47	6	41
Dieguere	77	50	27
Mora	77	64	13
Ndiguina	65	16	49
Badadaye	37	0	37
TOTAL	624	266	358

Source: Fokabs, 2022

Figure 6 shows the graphic distribution of men and women in the Waza localities consulted.

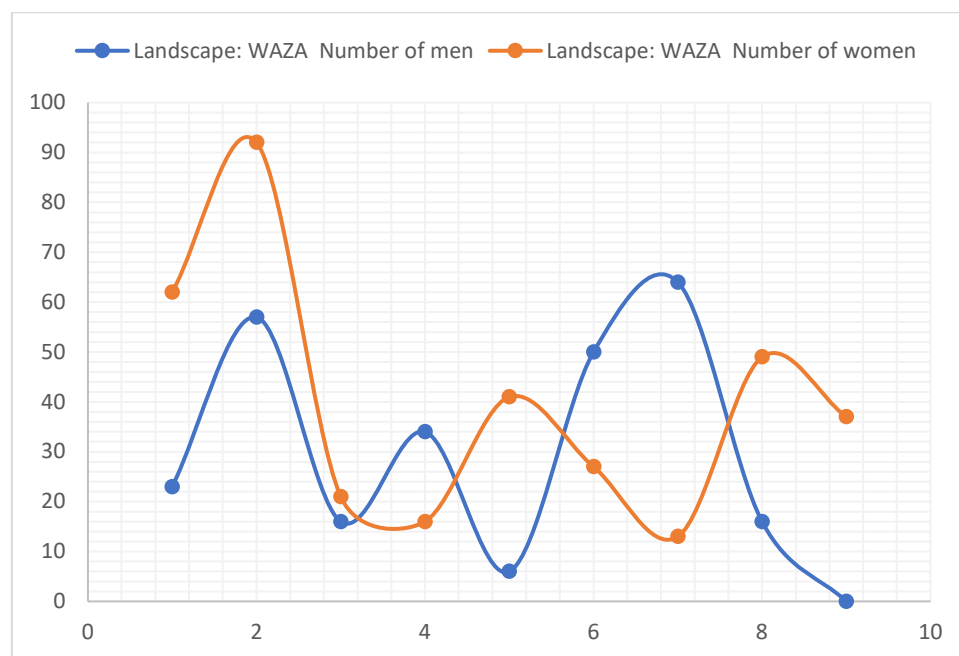


Figure 6 Men and women consulted by locality in the Waza area.

Source: Fokabs, 2022



Photo 15: Exchanges with the community of women from the village of Ndiguina
Source: Fokabs, 2022



Photo 16: Exchange with the women of NIWADJI village
Source: Fokabs, 2022



Photo 17: Exchange with the people of Andirni village
Source: Fokabs, 2022



Photo 18: Exchange with the Dieguéré community
Source: Fokabs, 2022

2.3. DATA PROCESSING AND ANALYSIS PHASE

This phase began with the digitisation of data from community consultations and interviews with resource persons in the various project landscapes, followed by data formatting. The data was then processed and analysed. The data was processed and analysed using Excel 2013 and SPSS Statistics 20. This software was used to generate the various graphs and tables used in this analysis, to carry out diachronic analyses and to analyse the dynamics of forest cover change in the Business As Usual (BAU) scenario for other project components.

2.4. VALIDATION PHASE

A technical workshop was held on 12 March 2022 at the Hôtel Départemental in Mbalmayo to present the initial results of the socio-economic analysis of the three landscapes. During this workshop, guidelines and recommendations were formulated to better characterise the socio-economic context and environment in the intervention sites selected for this project. This work culminated in a final validation workshop for the results.

3. JA-LOBEKE LANDSCAPE

3.1. PROFILE OF FORESTS AND BIODIVERSITY IN THE DJA-LOBEKE LANDSCAPE

The Dja-Lobéké landscape is located in south-east Cameroon, with a total surface area of 6,537,230.49 ha. It is included in the project's impact zone, which covers the entire south-east of the country. It is a bimodal forest landscape comprising several categories of permanent forest representing a total area of 7,540,411 ha, i.e. 5 national parks, 02 wildlife reserves, 01 wildlife sanctuary, 40 communal forests and 83 Forest Management Units (FMUs) as summarised in Table 7.

Table 7. Permanent forests in the project's south-eastern impact zone

Category	Name	Surface area (ha)
National Parks	Lobéké	215 316
	Boumba Bek	236 176
	Nki	312 965
	Kom	67 839
	Mefou	1 101
Wildlife reserve	Dja	526 624
	Ngoyla	156 648
Wildlife sanctuary	Mengame	26 710
Communal forests	40	1 088 145
Forest Management Units	83	4 908 887
Total		7 540 411

The Dja-Lobéké landscape is rich in may plant. There are more than 1,000 species with a diameter at breast height of over 10 cm. This picturesque landscape is favoured by a Guinean equatorial climate characterised by alternating rainy and dry seasons: i) A short rainy season from mid-March to June; ii) A short dry season from June to mid-August; iii) A long rainy season from mid-August to mid-November; v) A long dry season from mid-November to mid-March. The average annual temperature of 24°C and the average rainfall of over 1,500 mm per year are favourable factors for the growth of forests (CTFC, 2009). These plant formations are rich in marketable species and non-timber forest products (NTFPs). These species thus form:

- Semi-deciduous forests with Sterculiaceae and Ulmaceae ;
- Mixed forests (evergreen and semi-deciduous) with a predominance of semi-deciduous forest elements;
- Mixed forests (evergreen and semi-deciduous) with a predominance of elements of the Dja forest.

The wettest months are October, September and May, while the least rainy month is December. Relative humidity ranges from 80% to 98%, with saturation levels recorded on dry season nights.

Other plant formations also populate this landscape:

- Clearings on marshy ground where herbaceous plants predominate;
- Mono-dominant forests with *Gilbertiodendron dewwevrei* ;
- Secondary forests on former logging sites;
- Forests on rocky mountains ;
- Swamp forests with *Raphia laurentii* and *Phoenix reclinata* ;
- Riparian forests ;
- Flood forests.

Figure 7 below shows the forest cover of the Dja-Lobéké landscape.

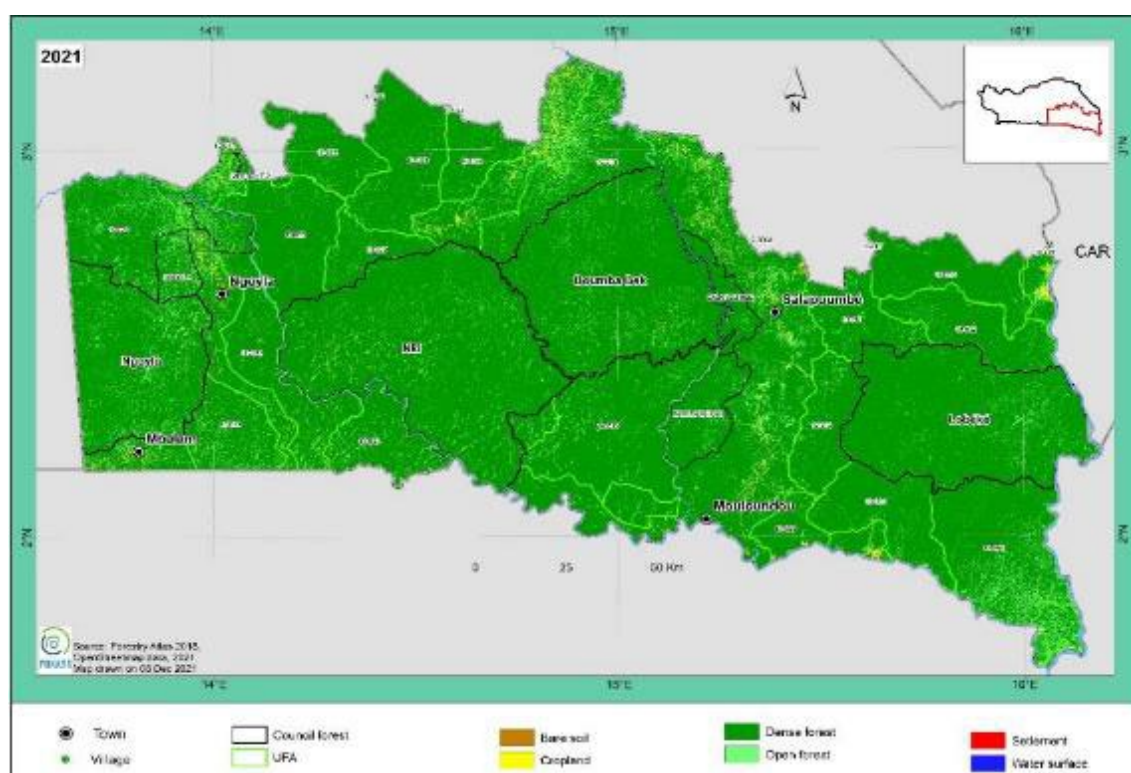


Figure 7 Forest cover of the Dja-Lobéké landscape
Source: Fokabs, 2022

Two categories of logging permit have been allocated by the State for permanent forests. These are titles relating to communal forests and forest management units (FMUs)². The main species exploited are Sapelli, Ayous, and to a lesser extent Tali, Iroko, Assamela and mahogany.

In terms of reforestation, there are pockets of restoration (for example, in the Ngoyla and Moloundou communal forests). Enrichment plantations have been created by forestry companies. However, these companies point to the low success rate of reforestation. One of the causes cited is the poor monitoring of plantations, which has led to solutions such as the allocation of substantial budgets for all the forest reserves in the landscape.

In addition, the consultations revealed other suitable locations for reforestation, such as the Salapoumbé, Mambélé and Yokadouma communal forests. In the Ngola 35 locality, reforestation initiatives concern areas of 1,000 to 2,000 m², between 40 and 60 feet, along the central axes of 10 to 15 parks.

In this area of dense forest, wild products are also fundamental to people's livelihoods, both for sale and for domestic consumption. They include: gnetum leaves, mushrooms, fruit, honey, edible caterpillars, snails and game (FEWS NET, 2019). In addition, there are several woody species in this landscape (Table 8).

² Forest management units are logging titles that the State allocates to private individuals for a maximum of 15 years, renewable once. Annual forestry revenues are divided as follows: 50% for the State, 40% for local authorities. However, in the various communes, the results of the management of FMU resources raise questions about the satisfaction of basic social needs (drinking water, access to education and health, opening up of roads, etc.).

Table 8. Some exploited timber products in the Dja-Lobéké landscape

Common name	Scientific name	Common name	Scientific name
1. Sapelli	<i>Entandrophragma cylindricum</i>	11. Framiré	<i>Terminaliaivorensis</i>
2. Moabi	<i>Baillonelatosisperma</i>	12. Eyong	<i>Sterculiaobloma</i>
3. Doussiérouge	<i>Afzeliabipindensis</i>	13. Ebenier	<i>Diopyros crassiflora</i>
4. Ayous	<i>Triplochytonscleroxylon</i>	14 Ilomba	<i>Picnanthus angolensis</i>
5. Sipo	<i>Entandrophragmautile</i>	15. Djangsang	<i>Ricinodendronheudolettii</i>
6. Kosipo	<i>Entandrophragma candolei</i>	16. Kotibé	<i>Nesogordoniapapaverifera</i>
7.iroko	<i>Chlorophoraexelsa</i>	17. Bubingarouge	<i>Guibourtiademeusei</i>
8. Fraké	<i>Terminalia superba</i>	18. Bosséclair	<i>Guareacedrata</i>
9. Beté	<i>Mansoniaaltissima</i>	19. Dibétou	<i>Lovoatrichilioides</i>
10. Mahogany	<i>Khayaspp</i>	20.Tiama	<i>Entandrophragma angolense</i>

The relief of the Dja-Lobéké landscape is fairly diversified and forms an integral part of the great South Cameroon plateau. Its topography is made up of plains, valleys and hills. It is generally a flat, gently undulating plateau. It is not very uneven, with a slope of between 0 and 3%, indicating a low susceptibility to erosion. The average altitude is between 500 and 850 m. The soils in this landscape are of several types, with red ferralitic soils accounting for most of the area's soils, ferralitic soils, Gley or alluvial soils and hydromorphic soils found at flood margins.

This particular relief is home to a wealth of fauna (table 9), divided into several categories, including small rodents, chiropterans, insectivores, more than 100 species of mammals, including some emblematic primate species, more than 150 species of fish (some of them newly discovered: *Aphyosemion* sp. nov. and *Phenacogrammus* sp. nov.), more than 80% of forest butterfly species, more than 100 lepidopteran species, more than 500 bird species, numerous freshwater shrimp species, ungulates, carnivores, reptiles and amphibians.

Table 9 Wildlife and hunting methods in the Dja-Lobéké landscape

N°	Company name	Scientific name	Use made by the local population	Hunting technique
1	Cephalopod with dorsal stripe	<i>Cephalophis dorsalis</i>	Marketing and consumption	Cable traps, weapons and spear hunting
2	Peters' cephalopod	<i>Cephalophiscalligypus</i>	Marketing and consumption	Cable traps, weapons and spear hunting
3	Blue cephalopod	<i>Cephalophismonticola</i>	Marketing and consumption	Cable traps, weapons and spear hunting
4	Black-fronted cephalopod cephalopod	<i>Cephalophis nigufrons</i>	Marketing and consumption	Cable traps and spear hunting
5	Gambi Rat	<i>Créetomysspp</i>	Marketing and consumption	Cable traps and spear hunting

6	Long-tailed Pangolin tail	<i>Manis tetradactyla</i>	Marketing and consumption	Cable traps and spear hunting
7	Giant pangolin	<i>Manis gigantes</i>	Marketing exclusively	Cable traps and spear hunting
8	Aquatic buckthorn	<i>Hyemoschusaquaticus</i>	Marketing and consumption	Cable traps and spear hunting
9	Royal antelope	<i>Neotragus pymacus</i>	Net marketing consumption	Cable traps and spear hunting
10	Red-fronted Gazelle	<i>Gazella rufifrons</i>	Marketing and consumption	Cable traps and hunting hunting
11	Sitatunga	<i>Tragelaphus spekei</i>	Marketing and consumption	Cable traps and spear hunting
12	Civet	<i>Viverra civetta</i>	Marketing and consumption	Cable traps and spear hunting
13	Herisson	<i>Erinaceida</i>	Marketing and consumption	Short-hunting, cable traps and spear hunting
14	Monstac	<i>Cercopithecus cephus</i>	Marketing and consumption	Gun hunting and cable traps
15	Rattle	<i>Cercopithecus nictitans</i>	Marketing and consumption	Gun hunting and cable traps
26	Talapoin	<i>Miopithecus talapoin</i>	Marketing and consumption	Gun hunting and cable traps
17	Bush pig / boar	<i>Sus scrofa</i> or <i>potamochoerus porcus</i>	Marketing and consumption	Gun hunting and cable traps
18	Elephant	<i>Loxodonta africana</i>	Marketing and consumption	Gun hunting
19	Gorilla	<i>Gorilla gorilla</i>	Marketing and consumption	Gun hunting and cable traps
20	Chimpanzee	<i>Pan troglodytes</i>	Marketing and consumption	Gun hunting and cable traps

Source: Fokabs, 2022

The people of this area, particularly the Bakas, Bakwelés and Bangandos, are traditional hunters. Hunting activities are most intense in the rainy season (PCDM, 2011).

The region's wildlife is under serious threat from resident poachers and temporary poachers supplying urban areas. This has prompted the authorities to take measures to combat poaching through concerted action by the Rapid Intervention Brigade (BIR) and the forces of law and order in each locality in the Dja-Lobéké landscape. Two opposing effects have resulted: a positive effect of a net reduction in the quantities of bush meat on local markets, and a negative effect of scarcity and higher bush meat prices, threatening the livelihoods of households that make a living from this activity.

Commercial hunting is essentially carried out for the purpose of marketing and trophies. It is similar to poaching in that it is usually carried out in protected areas and outside the regulations. Sport hunting makes a significant contribution to salaried employment in the region. Almost all of these jobs are seasonal.

In addition, this landscape has a dense hydrographic network made up of a profusion of watercourses which, in some areas, feed swamps that are sometimes highly developed. The main collectors of this relatively dense hydrographic network are the Dja, Ayina, Myé, Lélé,

Karagoua, Nsogo, Lolobye, Boumba and Bek, Edjé, Lessogone, Kpassèle, Mindjebile, Ngoyla and Mwesse.

3.2. SOCIO-ECONOMIC PROFILE OF THE DJA -LOBEKE LANDSCAPE

3.2.1. SOCIO-CULTURAL AND ECONOMIC ENVIRONMENT

- ADMINISTRATIVE DIVISION

The administrative division of the Dja-Lobéké landscape is subdivided into three departments: the Boumba-et-Ngoko department, the Haut-Nyong department and the Dja-et-Lobo department (Figures 8 and 9).

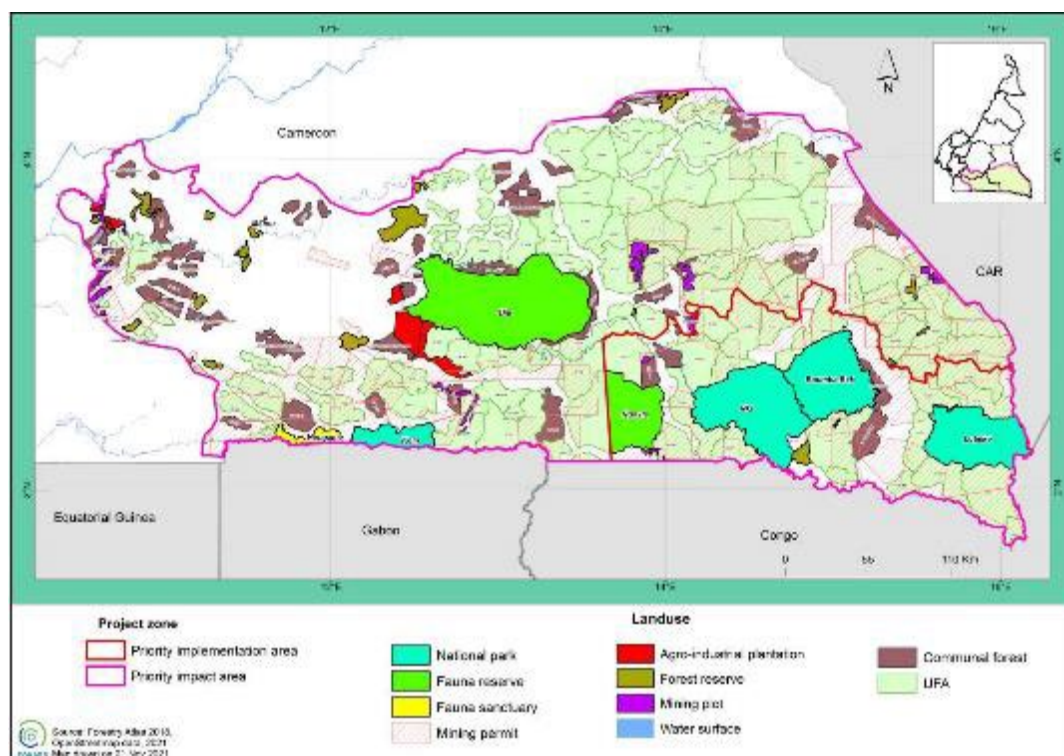


Figure 8 Geographical limits of the project's south-east impact zone

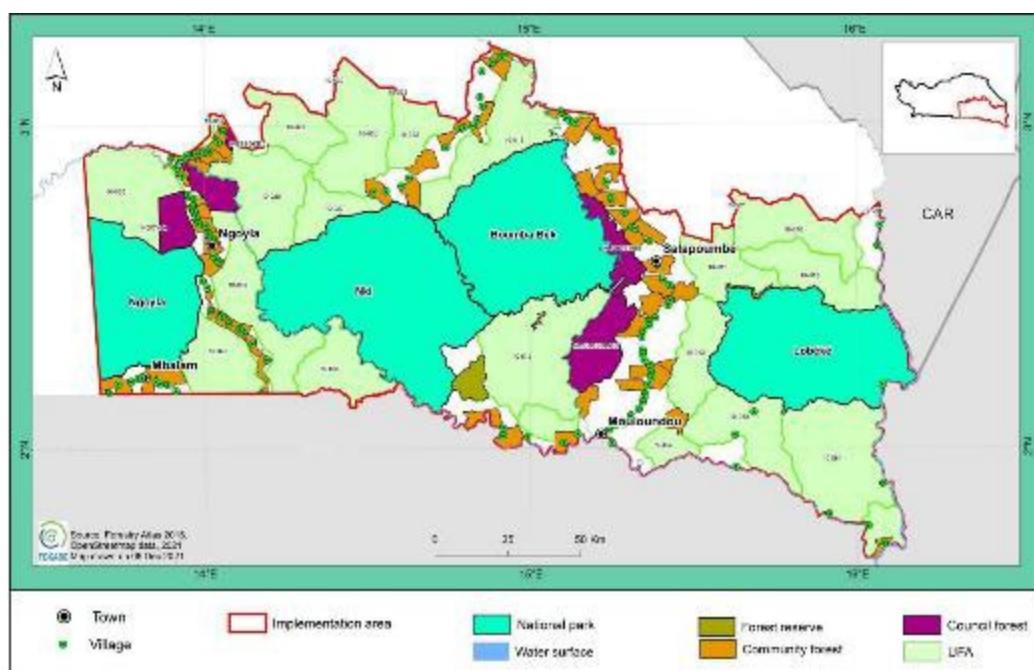


Figure 9 Geographical boundary of the Dja-Lobéké intervention site

- INDIGENOUS PEOPLES AND ETHNIC GROUPS

Although human densities in the Dja-Lobéké interzone (around 1 inhabitant/km²) are among the lowest in Cameroon, several ethnic groups are present in this landscape. They are spread across several localities (communities). The Baka pygmies are the main minority ethnic group in the landscape. They are present in almost 75% of the villages and constitute a sort of "transversal" ethnic group. The Bantu are the majority ethnic group. They are subdivided into ethnic sub-groups, including the Bangando, Mboman, Bimo and others.

The Baka inherited their clan structure from their Bantu neighbours. Over time, the Baka attached themselves to Bantu clans through blood pacts. The signing of a blood pact implied that the Baka family belonged to the clan with which the pact was signed and required the Baka family to leave the forest to settle with their new Bantu family. Through this pact, the Bantu family thus became the 'owner' of the Baka family. This explains the common parlance "mes Baka".

Table 10 shows the ethnic groupings and their statistics.

Table 10 Demographic statistics by ethnic group in the Dja-Lobéké landscape.

N°	Villages consulted Dja-Lobeke landscape	Populations by ethnic group	Estimated population Year 2021
1	Kika	Kika Baka	882
		Kika Bantou	5657
2	Yenga	Yenga Baka	1199
		Yenga Bantu	3845
3	Mbateka	Mbateka Baka	811
		Mbateka Bantu	1261
4	Ngoyla village	Ngoyla village	579
5	Mimbo-Mimbo	Mimbo-Mimbo	1472
6	Ngatto	Ngatto	1895

7	Mikel	Mikel	3504
8	Lokomo	Lokomo	3292
9	Baka Gbiné	Baka Gbiné	
10	Banana	Banana Baka	1057
		Banana Bantou	2429
11	Legoué	Legoué Bantou	176
		Legoué Baka	127
12	Zoulabot	Old Zoulabot	790
13	Adjela	Adjela	689
14	Ngoyla 1	Ngoyla 1	1916
		Total	

Source: Fokabs, 2022

The Baka remain very conservative and have difficulty opening up to outsiders, whom they generally refer to as 'Kaka'. In their relations with others, the Baka do not like to offend or make people feel uncomfortable, which is why, on first contact, they are often ready to accept all proposals (CIFED, 2010). The Baka are a nomadic people, but there has been a gradual sedentarisation in recent decades. The Baka can move and settle in a locality without any resistance from the Bantu, as long as the latter know that the Baka do not appropriate land or forests, their movements being motivated by the abundance or scarcity of the resources they need.

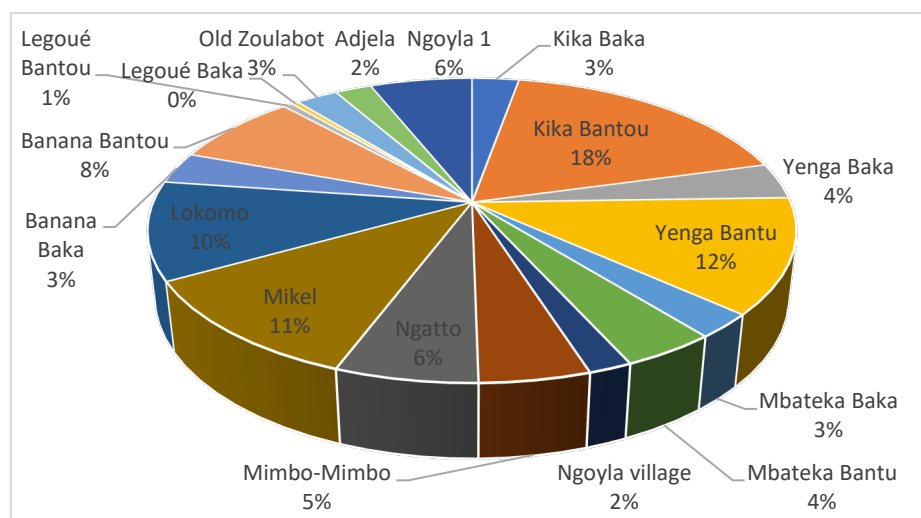


Figure 10 Demographic statistics for the Dja-Lobéké landscape

Source: Fokabs, 2022

Among the Bantu, gender aspects are taken into account in tradition: for example, a woman from a village who is not married has the same right to land as men. The choice of land for farming is based on certain indicators of soil fertility, such as the presence of specific fruit trees like the cheese tree.

However, the nature of the relationship between the Bakas and the Bantus has undergone considerable change.

- Free trade: exchanges based on barter were open and free. The Baka exchanged hunting, gathering and fishing products with the Bantu, and offered the services of

guides during forest expeditions in exchange for basic necessities such as salt, tobacco, clothing, agricultural produce, spears and machetes.

- A labour relationship: the Baka-Bantu relationship has evolved into a labour relationship in which the Baka are used as cheap labour due to changes in society, the introduction of new customs and the development of agricultural sectors.

Although the Baka-Bantou working relationship persists in the localities visited, there are also marriage relationships between Baka and Bantou where, in most cases, Bantou marry Baka daughters; the reverse is still difficult.

Figure 11 opposite shows that the Baka represent 13% of the total population consulted in all the villages consulted. The Bantu represent 87% of the population consulted via the focus groups. The income-generating activities of the Bantu and Baka populations include agriculture, livestock rearing, hunting, fishing, NTFP collection, mining, logging, fuelwood, handicrafts and petty trade.

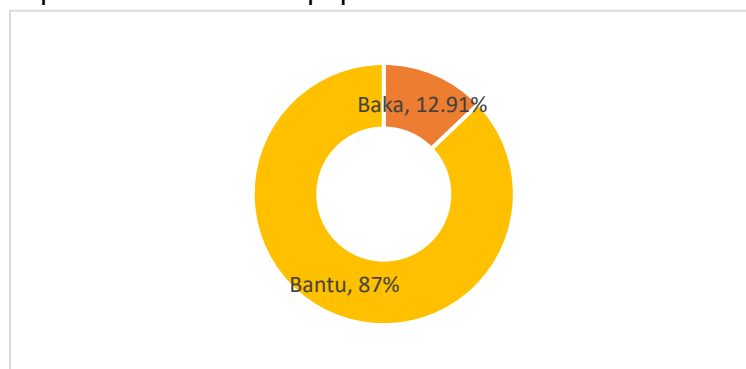


Figure 11 Proportion of Baka in the villages consulted

Source: Field (Fokabs, 2022)

- CRAFTS

Handicrafts are one of the daily income-generating activities in the Dja-Lobéké landscape. Craft products are generally intended for local use (table 11).

Table 11 Main craft products

Craft products	Category of player	Key player	Usage	Estimated costs
Rattan furniture		Men	Domestic	
Wooden furniture		Men	Domestic	
Mortars	Sculptors	Men	Domestic	
Tam-tam		Men	Culture	
Hunting lances	Blacksmiths	Men	Hunting	
Picking spears	Blacksmiths	Men	Picking	
Raffia mats	Weavers	Men	Construction (Housing)	
Sleeping mats	Weavers	Men	Domestic	
Baskets	Weavers	Men	Transport	
Litter bins	Weavers	Women	Domestic	

Source: Field data, 2022)

- PROCESSING UNITS AND SMALL BUSINESSES

In the villages consulted, very few small-scale processing units were found. The largest of these is in Lokomo. It was set up following the creation of a joint initiative group, BOCHAMEND. This GIC specialises in the small-scale processing of waste wood into charcoal. This small-scale processing unit is supported by the international organisation WWF

Cameroon, which is based in the area. The GIC's objectives are to produce sustainable charcoal and develop the value chain.

Petty trade involves the marketing of basic necessities in shops run by halogens, particularly nationals from the West, Centre and North regions, as well as nationals from other countries such as the Central African Republic and Mali.

The volume of trade in the area is modest, due in part to its small population, its low purchasing power and standard of living, its rural nature, the structure of the regional economy, accessibility problems and poor links with the global economy. Trade in the area has three main components: i) trade in manufactured goods for everyday consumption through shops and stalls; ii) trade in cocoa (and, to a lesser extent, coffee) by buyers who criss-cross the various villages on a more or less regular basis from July to February; iii) trade in foodstuffs, livestock and natural resources (NTFPs). Local people sell the surplus from their various products mainly from their homes along the road.

- HABITAT

The settlement appears to be grouped, with houses built along the main road, right on the edge. In the south-eastern part of the site, settlements are scattered in the form of villages, isolated dwellings or hamlets.

Four (04) types of housing were identified in the target villages: i) mud houses (photo 19), rectangular in shape with a gable roof, generally covered with mats and very rarely with corrugated iron sheets, and with bare floors. This type of construction is the most common in these villages; ii) Plank houses covered with mats or corrugated iron sheets; iii) Semi-hard-standing houses, the walls of which are made of mud bricks raised with cement mortar and covered with corrugated iron sheets; iv) Plastered breeze-block houses covered with corrugated iron sheets. Furthermore, with a view to securing permanent forests, consultations revealed the existence of dwellings in forest reserves.



Photo 19 House made of rammed earth, with a raffia leaf roof.

Source: Terrain, 2022

- LAND TENURE AND ACCESS TO LAND

Two systems of land appropriation prevail in the villages consulted: traditional and modern.

Although traditional collective appropriation of land varies between Bantu and Baka Pygmies, it is fundamentally based on customary law or right of use and remains the dominant form of land tenure. As far as the Bantu are concerned, there are three distinct types of land ownership, depending on whether the land is fallow land, plantations or virgin forest:

- i) The virgin forest belongs to the entire village community; the land is appropriated by the natives by clearing and felling the primary forest. The clearing serves as a customary land title.
- ii) Fallow land is privately owned by the family; woodland that has become fallow belongs to the family and remains under the control of the head of the family. The boundaries of the family's farmland are known to the members of the family. Within each family, land is transferred from the head of the family to a third family member by gift, bequest or sharing.
- iii) Plantations and fields belong to households.

For the Bantus, the appropriation of land and forests is of paramount importance in securing the territory for the benefit of present and future generations.

For the Bakas pygmies, the recent process of sedentarisation has meant that embedded resources are subject to a bundle of rights based on intertwined ties of kinship and friendship. Consequently, the land belongs to the whole community. The Baka attach no importance to the appropriation of land or forest. For them, the forest is overflowing with resources created by God, to which everyone should have access. The interests of the Baka man are directed towards the management of resources rather than the occupation of land. Consequently, the free movement of individuals in the forest is the right they defend most.

Modern methods of ownership, in particular purchase and lease, and above all modern land tenure law based on public ownership of land and forest areas, are still not widely applied in the region.

- GENDER-BASED VIOLENCE AND CONFLICT

In the villages consulted, conflicts are generally the manifestation of differing interests between two parties over a given issue. Table 12 below summarises the types and causes of conflict in the area in relation to the categories of permanent forest, and explores the solutions proposed by the local people.

Table 12 Typology, causes and solutions to conflicts

Types of conflict	Causes of conflict	Possible solutions
Farmers - Town Hall	Failure to mark the boundaries of agricultural zones and communal forests, forest reserves, etc.	Raising awareness, Marking the boundaries of communal forests Regularisation of the legal status of CFs, RFs, etc.
Farmers - Forestry company	Encroachment of plantations into Forest Management Units	Raising awareness, demarcation of FMU boundaries
Conservation hunters	Poaching in wildlife reserves	Raising awareness, Ecoguard training,
Farmers - Town Hall	Anarchic occupation of CF interiors by plantations	Raising awareness
NTFP collectors - town hall	Destruction of NTFPs by CF exploitation	
Town hall-local communities	Failure to respect local people's rights of use	Transparency and ethics in management and governance
Town hall-local communities	Failure to provide social services on the basis of CF income	Transparency and ethics in management and governance

Source: Field (Fokabs, 2022)

- TRADITIONAL CHIEFTAINCIES AND CUSTOMARY COURTS

In the villages consulted, the traditional chiefs are local auxiliaries of the administration who do not enjoy great authority or influence over the population. Each clan retains its autonomy and the chief's notables are generally the heads of the village clan or family. Traditional chieftaincy is based on territorial occupation/management rather than on tribal groupings of individuals.

In terms of gender mainstreaming, in the localities and villages visited, the local population reported the existence of women notables sitting on the chieftaincy among the other notables concentrated around the chief.

This is a local jurisdiction body made up of village notables, municipal councillors, a secretary and the village chief, who chairs the customary court. One of the special features of these

customary courts is the presence of women notables, who are an integral part of the court's constituent members.

- INFRASTRUCTURE

In terms of road infrastructure, the road network is classified as follows: regional roads; departmental roads; and rural roads. Based on the road network index for the Eastern region (1km per 26 sq km) (CPDM, 2009), the road network in the Dja-Lobéké region is poorly equipped, making the area very isolated. This isolation is exacerbated by the lack of maintenance of these unpaved roads, which are difficult to navigate during the rainy season. In fact, some roads are impassable during the rainy season. If we take into account the forest tracks, the picture becomes very mixed in terms of the quality of the road infrastructure.

In terms of educational infrastructure in the communes of the Dja-Lobéké region, there are primary schools, nursery schools and public schools, all of which have insufficient classrooms, desks and teaching materials. There are few educational facilities, and the number of teachers is correspondingly low. In rural areas, the inadequacy of primary and secondary education infrastructure, which is generally dilapidated where it exists, schools with incomplete cycles, and their location in villages that are relatively far apart are factors that explain why young people in these areas stop schooling early.

In terms of health infrastructure in the Dja-Lobéké region, there are district hospitals, integrated health centres, dispensaries and integrated health centres (e.g. Socambo, Nguillili and Yenga). PMI, infirmaries and community health centres). The health situation in the rural areas of the Dja-Lobéké landscape is characterised by the low number of health facilities and staff, and the inadequate supply of health equipment and medicines.

3.2.2. MAIN INCOME-GENERATING ACTIVITIES

3.2.2.1. AGRICULTURE

Agriculture is the main activity practised by the working populations of the villages consulted. Unsustainable farming practices are widespread in this landscape: slash-and-burn agriculture with crop rotation and periodic fallow rotation (alternating several crops) in the same field is a common practice used by farmers in the Dja-Lobéké landscape. This is subsistence farming, with harvests generally used for family consumption (75%) and marketing (25%). These proportions vary according to the type of crop (food crop or cash crop) and the agricultural speculation.

○ Cash crops

Cocoa (*Theobroma cacao*) and coffee (*Coffea robusta*) are the main cash crops and are grown by almost all the active male population in the villages. The average size of cocoa farms varies from 1 to 5 ha, with minimums of 1 ha and maximums of up to 10 ha (under cultivation). They are found under a canopy of trees scattered throughout the plantation, giving it the appearance of a secondary forest. The workforce is mainly family-based, with an average production of 4 to 8 bags per hectare. The cocoa and coffee produced are generally sold via c"oxeurs" (informal collectors/buyers) operating in the region.

○ Food crops

Food crops are grown using slash-and-burn techniques. Food crops in the Dja-Lobéké landscape are very varied and mainly include: plantain, cassava, maize, macabo and yams. Other crops include vegetables from market gardens, groundnuts, chillies, cucumbers and other crops such as sweet potatoes and sugar cane, which is less developed in the area. These crops are grown mainly by women. Food crop production is divided between consumption (75% on average) and marketing (25% on average).

The harvesting of the main food crops follows a very precise schedule (Figure 12); that of the other crops is more or less continuous depending on their state of maturity. The harvest calendar for the main food crops is as follows:

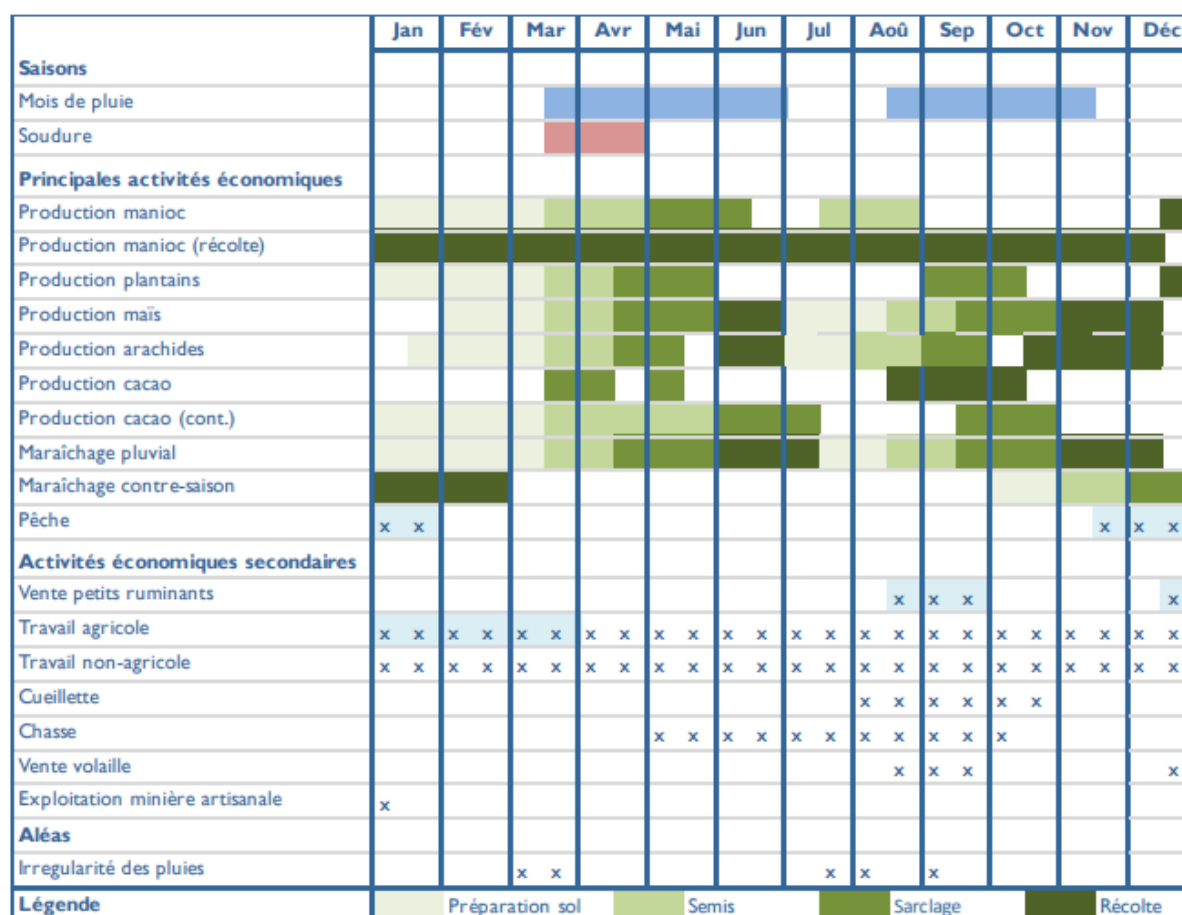


Figure 12 Seasonal agricultural calendar for the Dja-Lobéké landscape.
Source: FEWS NET, 2021

Table 13 and Figure 13 below show, for the average household, the average quantities produced for each of the food crops. For cocoa, cassava and macabo, 100kg bags are used to measure annual production.

Table 13 Production and unit price for the average household of the main food crops

Agricultural speculation	Cocoa	Banana - Plantain	Maize	Cassava	Macabo	Peanut
Annual production for one harvest season (/ha)	4 - 8 bags	700 -1000 diets on average	15 bags (4 bowls = 1 bag)	8 bags	10 bags	1 -6 bags on average

Source: Field (Fokabs, 2022, 2019)

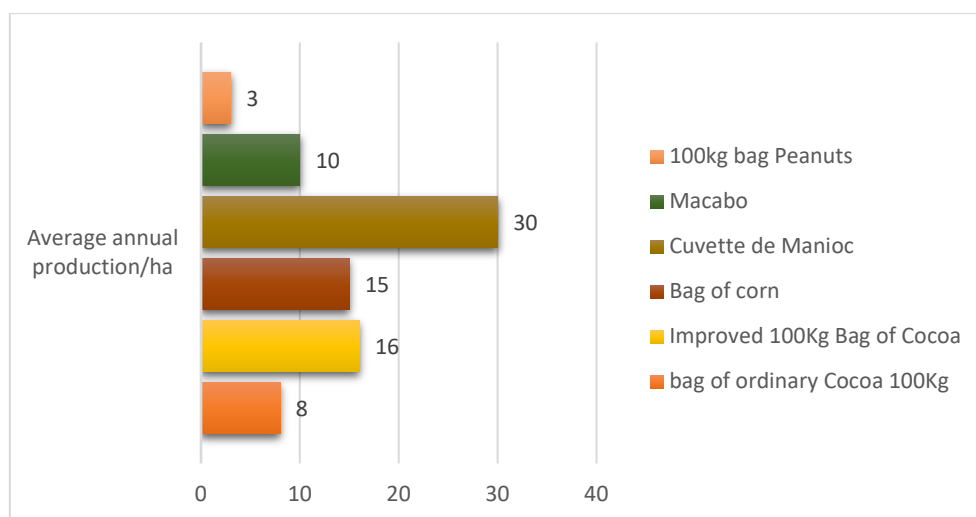


Figure 13 Average annual production by crop in the villages consulted
Source: Fokabs, 2022

The high demand for plantain and manioc at logging company sites in the landscape means that local people have to sell them regularly throughout the year.

Plantain is generally sold in the village. Each household has a peg or shelf in front of the door to hang or place loads of plantain. The price of a bunch of plantain can vary between 800 and 1,000 CFA francs, depending on size. The price of a bowl of cassava starts at 4,000 CFA francs (Figure 14).

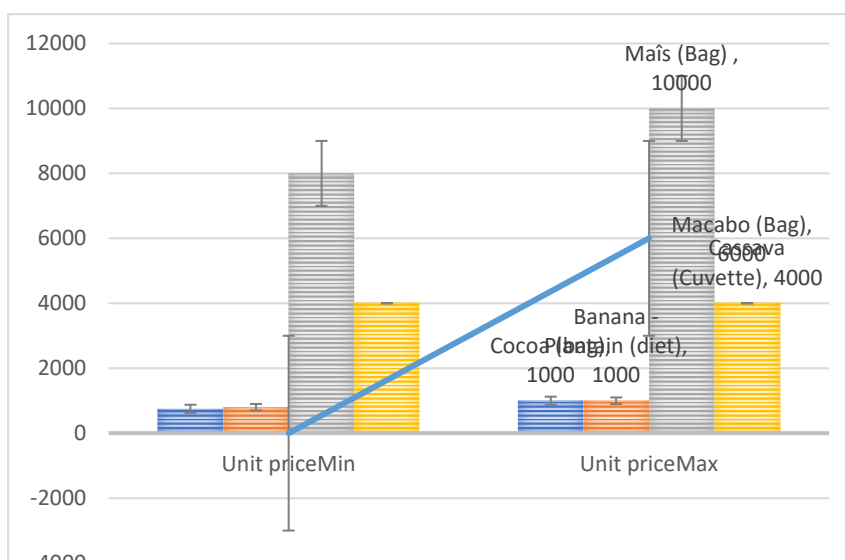


Figure 14 Average price differentials for the main food crops in the villages surveyed

Source: Fokabs, 2022

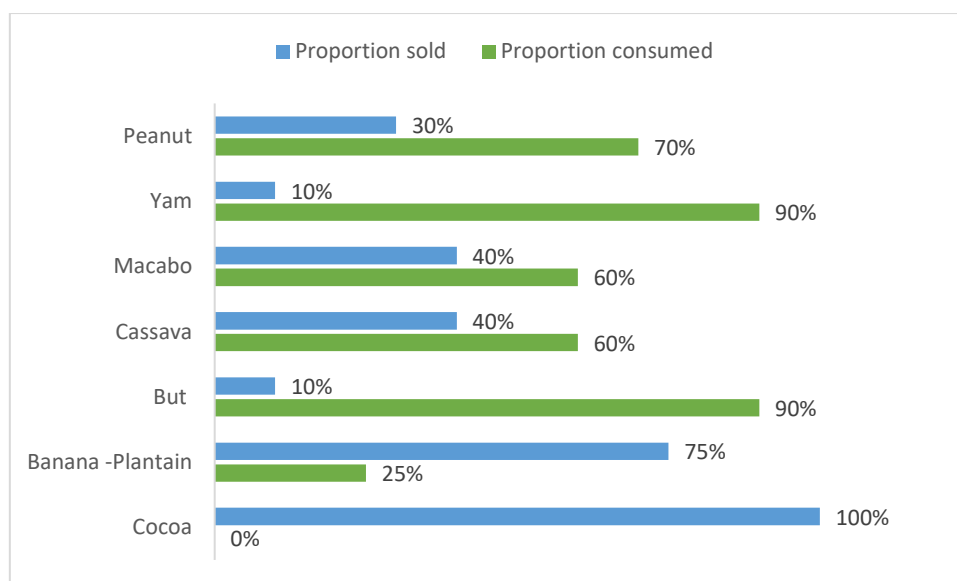


Figure 15 Average consumption of the main food crops

Source: Fokabs, 2022

On average, cocoa is produced exclusively for marketing, and the local population is unaware of and uninterested in the techniques for processing cocoa into butter or oil. On average, maize and yams are used almost entirely for domestic consumption (Figure 15).

Maize and manioc are produced in relatively large quantities, and are used to make a local wine (ariki or ngolos). These two food crops represent considerable sources of household income once processed. However, this wine causes health problems for consumers.

Figure 16 shows that cocoa and plantain are the two main crops with the largest average area per household in all the villages surveyed.

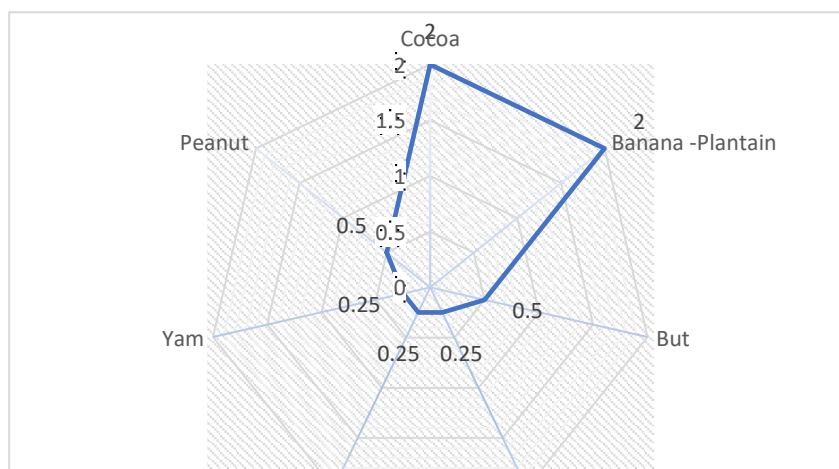


Figure 16 Average area cultivated by an average household.

Source: Fokabs, 2022

With regard to the distribution of tasks by sex, it can be seen that all field preparation activities are carried out by men, while sowing and harvesting are the responsibility of both men and women for food crops, and only men for cash crops, as shown in Table 14 below:

Table 14 Breakdown of farm work by gender

Agricultural tasks	Men		Woman	
	Cash crops	Food crops	Cash crops	Food crops
Preparing the fields	☐	☐		☐
Sowing	☐			☐
Maintenance	☐			☐
Harvest	☐	☐		☐

Source: Field (Fokabs, 2022).

It is possible that one member of the household may be supported in his or her tasks by the other and by the children in the household.

However, the agricultural sector in the Dja-Lobéké landscape is experiencing a number of difficulties (Table 15) that are hampering the sector's take-off, in particular poor farming practices such as slash-and-burn agriculture, which contribute to soil impoverishment and leaching, and difficulties in marketing and storing harvests.

Table 15 Obstacles to agricultural development in the Dja-Lobéké landscape

Obstacles	Boumba and Ngoko	Upper Nyong
Lack of a supply centre for plant protection products	x	x
Slash-and-burn agriculture	x	x
Poor road conditions	x	x
Fluctuating sales	x	x
High labour costs	x	x
Poorly developed agroforestry systems	x	x

Source: Field (Fobabs, 2022)

3.2.2.2. BREEDING

Livestock farming in the Dja-Lobéké landscape has very little added value. Around 95% of animals are left to roam: this is extensive farming, with livestock unevenly distributed across the social strata. The poorest households own few animals (small livestock and poultry) and therefore rarely consume meat from their own livestock. The wealthiest households have large herds (30 to 60 goats, sheep, 15 to 30 pigs, poultry, but no cattle) which are intended more for sale than for family consumption. These animals are left to roam in search of food, and are kept much more to satisfy traditional needs for hospitality, dowries and so on, than for income. Table 16 below shows the average numbers of pigs and goats per household in the Dja-Lobéké landscape.

Table 16 Pig and goat breeding data

	Number of heads		Selling price	
	Min	Max	Min	Max
Pigs	15	30	80000	100000
Goats	30	60	15000	20000

Source: Field data, 2022

The product of this breeding is mainly invested in the social obligations of hospitality and matrimonial compensations or sold in regret to local traders (Muslim) and to travellers passing through to meet pressing monetary needs.

Livestock farmers have also benefited from a number of projects aimed at improving the sustainability of pastoral practices, such as the PRODEL project.

3.2.2.3. HUNTING

Hunting in the Dja-Lobéké landscape is carried out exclusively by men and young boys in the forest and around plantations. Hunting takes two forms: controlled hunting and traditional subsistence hunting.

Controlled hunting: this is carried out in zones of hunting interest (ZICs) and community-managed zones of hunting interest (ZIGGCs). ZIGGCs are hunting grounds managed by local communities (PCDM, 2011). The species regularly shot in ZICs and ZIGGCs are: the Blue duiker (*cephalophus monticola*), the Buffalo (*syncerus caffer nanus*), the Elephant (*loxodonta africana*) and the Bongo (*tragelaphus euryceros*) (PCDM, 2011).

Traditional subsistence hunting: this is carried out by local people to meet their subsistence needs. In this zone, hunting is a means of capturing or killing animals, a means of protecting crops and a means of subsistence for certain households. However, poaching is rife in this dense forest zone. The list of poached species is shown below (table 17).

Table 17 List of animal species hunted in the Dja-Lobéké landscape

Hunted animals	Scientific names	Unit of measurement	Average quantity/year	Share consumed (%)	Share sold (%)	Average annual income (fcfa)
Pork - spices	<i>Hystrix cristata</i>	Whole or legs	13.48	32.5	67.5	60 660
Pangolin	<i>pangolin</i>	Whole or legs	11.79	23.6	76.4	76 635
Doe		Whole or legs	14.08	38.5	61.5	112 500
Rat	<i>Rattus rattus</i>	Whole or legs	15.67	12.5	87.5	54 845
Little monkeys	<i>Calithrix pygmaea</i>	Whole or legs	13.42	54.8	45.2	74 675
Varan	<i>Varanus varius</i>	Whole or legs	11.37	28.4	71.6	78 655
Hedgehog	<i>Echinops telfairi</i> , <i>Setifer setosus</i> , <i>Tenrec ecaudatus</i>	Whole or legs	15.87	38.5	61.5	122 475
Squirrel	<i>Myosciurus pumilio</i>	Whole or legs	22.06	74.7	25.3	6 455
Total						822 705

Source: Field data and CAGEDDEL update, 2013

Hunting is mainly practised by men, and mainly by local people. The scarcity of wildlife in areas close to villages is a problem for local people. This forces local hunters to go further and further into the forest. During the peak of this activity in the rainy season, hunters can travel several dozen kilometres and set up temporary hunting camps inside the forest.

3.2.2.4. FISHING AND FISH FARMING

People in this area fish, which is generally a secondary activity. It is practised intensively in the dry season (December-March and July-August), when travelling by boat is less dangerous. Fishing is both a traditional and a modern activity: the poorest households practise traditional fishing using rudimentary fishing rods, while the wealthiest households practise quasi-modern fishing in that they have a considerable range of fishing tools and are even equipped.

During periods of low water and flooding, fishing with weirs (scoop nets and creels), carried out mainly by women and children, is a much-loved traditional activity. The produce (fish, prawns, mussels, oysters, crabs, turtles, etc.) is almost all eaten on the farm. It represents a significant food supplement. Some species (*Dalophys* sp; *Malapterus electricus*; *Pollimyrus kingeleyae*; *Nannochromis candifacsiatus*) are used in traditional medicine.

The most popular fish caught include catfish, captains, tilapia and pike. Crustaceans include prawns and crabs. The fishing techniques used are: i) Line and net fishing, practised by men; ii) Catch and release fishing, practised by women and children.

Fishing techniques are rudimentary: fishing with nets, weirs, pots, spears, poisoning or hooks. Some of these practices have a negative impact on the resource's ability to renew itself. Moreover, the fishing product is much sought after by the local population. But it is a long way from satisfying the area's food needs because of its low production due to the rudimentary techniques used up to now.

This landscape offers potential for the development of fishing, particularly shrimp fishing, provided that sustainability is ensured or guaranteed. For example, on the outskirts of the Lobéké park, unsustainable shrimp fishing has led to a drastic reduction in the quantities fished over at least 5 years.

3.2.2.5. NON-TIMBER FOREST PRODUCTS (NTIP)

Collecting and gathering non-timber forest products is one of the main activities in the villages consulted. NTFPs are collected in the traditional way. A variety of NTFPs are collected: for example, wild yams, which are highly prized by the Baka, and pharmacopoeia, particularly tree bark and roots, seeds and dried fruit, products such as snails, caterpillars, white grubs, mushrooms, etc.

In the villages consulted, there is an impressive number of NTFPs (table 18) that people use for food, traditional medicines, socio-cultural practices and marketing.

Table 18 List of NTFPs collected in the s villages consulted

Common name	Scientific name	Part sought	Usefulness
Dabema	<i>Sterculia tragacanta</i>	Bark	Pharmacopoeia
Sapelli	<i>Entandrophrama cylindricum</i>	Bark	Pharmacopoeia
Djansang	<i>Ricinodendron heudelotii</i>	Bark, Almond	Pharmacopoeia, food
Marantaceae leaves	<i>Maranta leuconeura</i>	Leaf	Food packaging
Bitter Kola	<i>Garcinia spp</i>	Bark, fruit	Food, traditional drinks
Wild mango	<i>Irvingia spp</i>	Almond, fruit	Power supply
Wild soursop	<i>Anonidium mannii</i>	Fruit	Power supply
Amvut	<i>Trichoscypha acuminata</i>	Fruit	Power supply
Mbongo	<i>Aframomum spp</i>	Fruit	Power supply
Kola	<i>Cola spp</i>	Fruit	Power supply
Yam	<i>Dioscorea spp</i>	Racine	Power supply
Okok	<i>Gnetum africanum</i>	Leaf	Power supply
Mushroom	<i>Fungi</i>	Whole product	Power supply
Raphia	<i>Raphia spp</i>	Leaf, stem, sap	Traditional drinks, Construction, Crafts
Rattan	<i>Eremospatha spp</i>	Stem	Construction, crafts
Moabi	<i>Baillonella toxisperma</i>	Fruit	Food, pharmacopoeia

Source: Fokabs, 2022

However, NTFPs do not benefit from good packaging and storage conditions, resulting in post-harvest losses. What's more, low selling prices mean that this activity is not as profitable as it could be.

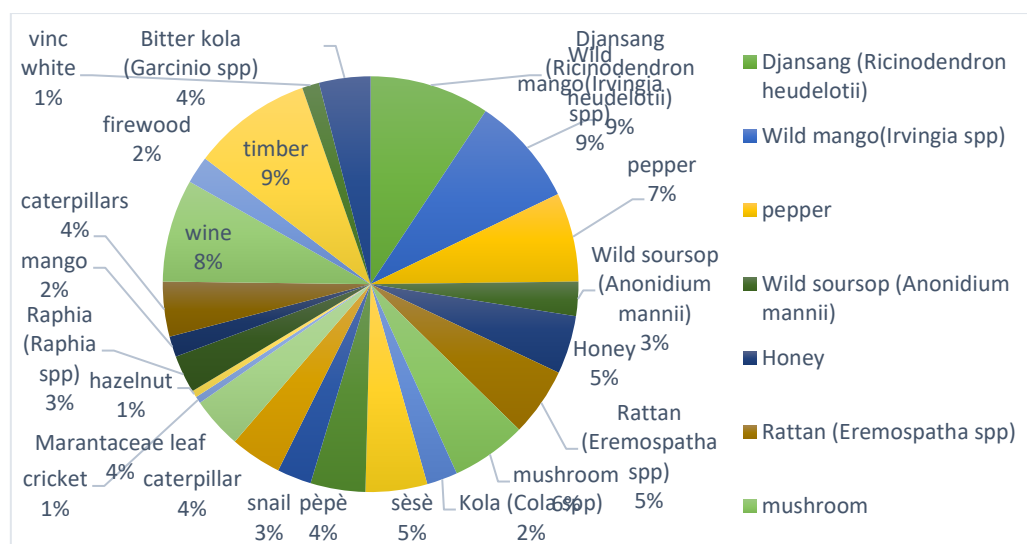


Figure 17 Proportions of non-timber forest products harvested in the Dja-Lobéké landscape
Source: Fokabs, 2022

Figure 17 shows the most profitable NTFPs in the villages consulted and Table 19 shows the NTFP collection periods.

Table 19 NTFP collection period

PFNL	Acteur principal	Période											
		J	F	M	A	M	J	J	A	S	O	N	D
Djansang													
Andok	Femmes (Bb)												
Ignames sauvages	Femme (B)												
kocko	Femmes (Bb)												
Miel	Hommes (B)												
Nom andok	Femme (B)												
Tondo	Enfant (b)/femme (B)												
Chenille	Enfant /femme (Bb)												
champignon	Homme/femme (Bb)												
Escargot	Homme/femme (Bb)												
Essessang	Femme (Bb)												
Raphia	Homme (Bb)												
Rotin	Homme/femme (Bb)												

BN : Bantou (b), Baka (B)

Source: Fokabs, 2022 and adapted from CIFED, 2010

The difficulties associated with the development of value chains in the NTFP sector relate to problems of storage, packaging and conservation of NTFPs. There are also difficulties with centralisation and redistribution.

3.2.2.6. FORESTRY AND MINING

According to the survey data, group discussions and interviews with resource persons, timber forest products are exploited in two ways: artisanal logging and industrial logging (legal, for processing and sale).

It is mainly practised in the form of artisanal wood cutting. The cut wood is used for a variety of purposes: energy wood, timber and construction wood. In this case, the tree belongs to the plot owner, who has the right of usufruct.

Illegal logging is practised by locals and non-natives. Trees are sold standing at prices ranging from FCFA 50,000 to FCFA 100,000, depending on the species and volume (Figure 18).

In terms of mining resources, the dense forest zone, particularly the Eastern region, is rich in mineral resources such as diamonds, gold, manganese, iron and related products such as sand, kaolin and clay. Mining also includes artisanal sand extraction.

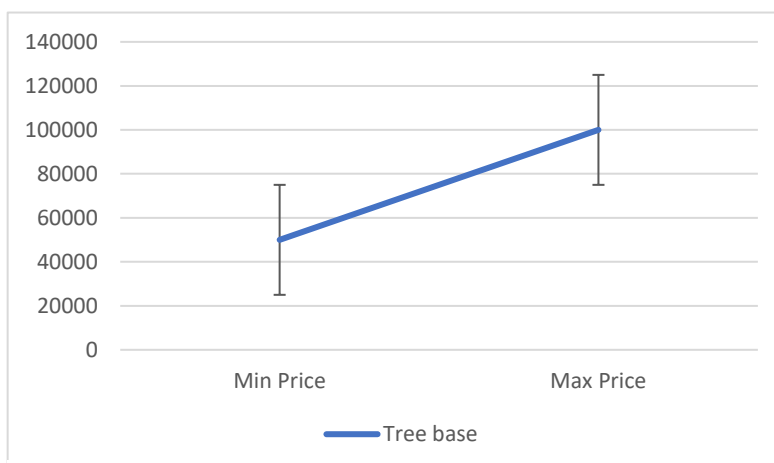


Figure 18 Minimum and maximum price of a tree in the landscape.

Source: Fokabs, 2022

3.3. BASELINE SCENARIO AND PROJECT SCENARIO

3.3.1. BASIC SCENARIO

This section presents the baseline scenario for the socio-economic analysis in the Dja-Lobéké landscape. The baseline or Business As Usual scenario corresponds to the situation without the project, i.e. what would happen if no restoration action were envisaged. This scenario presents the evolution of yields per hectare of the main income-generating activities in the absence of the restoration activities project in the degraded landscapes of the Dja-Lobéké interzone. The modelling of this likely scenario of income and yield dynamics is based on extrapolation techniques.

The areas of forest likely to disappear over the coming years have been estimated in the absence of any project. The hypothesis of a probable increase in the extensification of cultivated land was formulated as a result of urbanisation, demographic growth, etc.

Trends in agricultural yields and nfl are presented in the Dja-Lobéké landscape in a context of securing permanent forests and reducing agricultural areas.

3.3.1.1. AGRICULTURE

The determination of yield trends in the agriculture sector takes into account the likely increase in cultivated area in the Dja-Lobéké landscape in the absence of projects. Based on Tables 1 below, which present the probabilities of changes in land use by 2026 and 2031, the rate of increase in cultivated area is estimated for the Dja-Lobéké landscape. This rate of increase is used to predict changes in yields and farmers' incomes in the absence of the project.

Unsustainable agriculture is a function of the area under cultivation. The tables below show that, in the absence of the project, cultivated land will grow by around 902.36 hectares/year over the years. This means that large areas of land will be deforested by almost 1,005.17 hectares each year to make way for plantations and crop fields, among other things.

Table 1 Baseline scenario between 2021 and 2026

2021-2026	Year BAU					
	2021	2022	2023	2024	2025	2026
Forest	6 383 247.68	6 381 631.48	6 380 015.28	6 378 399.08	376 782.88	6 375 166.68
Cropland	125 484.05	126 845.21	128 206.37	129 567.53	130 928.69	132 289.85

Total	6 537 230.49	6 537 230.49	6 537 230.49	6 537 230.49	6 537 230.49	6 537 230.49
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Table 2 Baseline scenario between 2026 and 2031

2026- 2031	Year BAU					
	2026	2027	2028	2029	2030	2031
Forest	6 378 221.84	6 376 605.64	6 374 989.44	6 373 373.24	6 371 757.04	6 370 140.84
Cropland	129 995.87	131 357.03	132 718.19	134 079.35	135 440.51	136 801.67
Total	6 537 230.49	6 537 230.49	6 537 230.49	6 537 230.49	6 537 230.49	6 537 230.49

The table below shows the annual change in cultivated area per hectare in the Dja-Lobéké landscape in the absence of the project.

Table 3 Annual change per hectare of cropland and forest land

Project Year		Forest		Cultivated land	
N o	Yr	Annual change (ha)	cumulative change (ha)	Annual change (ha)	Cumulative change (ha)
1	2022	-1,616.20	-1,616.20	1,361.16	1,361.16
2	2023	-1,616.20	-3,232.40	1,361.16	2,722.33
3	2024	-1,616.20	-4,848.60	1,361.16	4,083.49
4	2025	-1,616.20	-6,464.80	1,361.16	5,444.65
5	2026	-1,616.20	-8,081.00	1,361.16	6,805.82
6	2027	-1,616.30	-9,697.30	1,361.16	8,166.98
7	2028	-1,616.30	-11,313.60	1,361.16	9,528.14
8	2029	-1,616.30	-12,929.90	1,361.16	10,889.31
9	2030	-1,616.30	-14,546.20	1,361.16	12,250.47
10	2031	-1,616.30	-16,162.50	1,361.16	13,611.63
11	2032	-1,616.30	-17,778.80	1,361.16	14,972.80
12	2033	-1,616.30	-19,395.10	1,361.16	16,333.96

The increase in cultivated land will be the main variable explaining the increase in agricultural yields that will be observed by 2026 and 2031. Tables 20 and 21 below show the estimated per-hectare increases in agricultural yields and related income.

Table 20 Yields per hectare in 2026 and 2031 in the absence of the project

Years	Cocoa (bag)	Banana- Plantain (diets)	Maïs (bag)	Cassava (Bag)	Peanut (bag)
2020	4	700	10	8	50
2021	9	1000	15	10	100
2022	14	1300	20	12	150
2023	19	1600	25	14	200
2024	24	1900	30	16	250
2025	29	2200	35	18	300
2026	34	2500	40	20	350
2027	39	2800	45	22	400
2028	44	3100	50	24	450

2029	49	3400	55	26	500
2030	54	3700	60	28	550
2031	59	4000	65	30	600

Table 21 *Change in income per hectare in 2026 and 2031 in the absence of the project*

Year s	Cocoa(fcf a)	Banana- Plantain (fcfa)	Master (fcfa)	Cassava (fcfa)	Groundnuts (fcfa)
2020	400000	700000	100000	128000	750 000
2021	900000	1000000	150000	160000	1 500 000
2022	1400000	1300000	200000	192000	2250000
2023	1900000	1600000	250000	224000	3000000
2024	2400000	1900000	300000	256000	3750000
2025	2900000	2200000	350000	288000	4500000
2026	3400000	2500000	400000	320000	5250000
2027	3900000	2800000	450000	352000	6000000
2028	4400000	3100000	500000	384000	6750000
2029	4900000	3400000	550000	416000	7500000
2030	5400000	3700000	600000	448000	8250000
2031	5900000	4000000	650000	480000	9000000

3.3.1.2. NON-TIMBER FOREST PRODUCTS

The quantities of non-timber forest products collected will also be influenced by the increase in the area under cultivation. The increase in NTFPs production and income will slow down by 2026 (Table 22). The quantities harvested will fall considerably due to the disappearance of forests.

Table 22 *Changes in quantities of NTFPs produced in the absence of the project*

Year	Ndoo	Washers	Koko	Kola	Djanssang	4 dimensions	Pep e	Biter kola
2020	532.5	550	323	52.5	69	100	37	10.5
2021	782.5	800	711	87.5	101	150	50	15
2022	1032.5	1050	1099	122.5	133	200	63	19.5
2023	1282.5	1300	1487	157.5	165	250	76	24
2024	1532.5	1550	1875	192.5	197	300	89	28.5
2025	1782.5	1800	2263	227.5	229	350	102	33
2026	1632.5	1650	2030.2	206.5	209.8	320	94.2	30.3
2027	1482.5	1500	1797.4	185.5	190.6	290	86.4	27.6
2028	1332.5	1350	1564.6	164.5	171.4	260	78.6	24.9

2029	1182.5	1200	1331.8	143.5	152.2	230	70.8	22.2
2030	1032.5	1050	1099	122.5	133	200	63	19.5
2031	882.5	900	866.2	101.5	113.8	170	55.2	16.8

Table 23 Trends in NTFP yields in the Dja-Lobéké landscape

Year	Ndoo	Washers	Koko	Kola	Djanssang	Black pepper	Biter kola
2020	156250	104000	161500	45500	30000	14000	9000
2021	509000	353600	550000	104000	32500	42000	22500
2022	861750	603200	938500	162500	35000	70000	36000
2023	1214500	852800	1327000	221000	37500	98000	49500
2024	1567250	1102400	1715500	279500	40000	126000	63000
2025	1920000	1352000	2104000	338000	42500	154000	76500
2026	2272750	1601600	2492500	396500	45000	182000	90000
2027	2625500	1851200	2881000	455000	47500	210000	103500
2028	2978250	2100800	3269500	513500	50000	238000	117000
2029	3331000	2350400	3658000	572000	52500	266000	130500
2030	3683750	2600000	4046500	630500	55000	294000	144000
2031	4036500	2849600	4435000	689000	57500	322000	157500

3.3.2. PROJECT SCENARIO

This section presents the project scenario from the socio-economic analysis in the Dja-Lobéké landscape. This scenario relates to the likely evolution of yields and incomes of the populations in the event of the implementation of restoration activities in the degraded landscapes of the Dja-Lobéké interzone.

Trends in yields and farm incomes in the project scenario are likely to be characterised by two phases: an initial phase of sharp reduction due to the reduction in farmland, and a second phase of recovery due to planned activities to restore degraded land, agricultural intensification and agroforestry.

- Decline in farmland and slowdown in local economies

The reduction in cultivated areas will be due to the implementation of activities to restore degraded landscapes, which will impose limitations on the extension of plantations into virgin forest land. The main consequence of this will be a fall in agricultural yields and household incomes in the Dja-Lobéké landscape. This will lead to a slowdown in local economies, which are mainly driven by income from agricultural activities.

The limitations imposed by restoration will be partly offset by the practice of agroforestry. Agroforestry will also have a major role to play in boosting farm incomes and yields. Agroforestry has proved to be one of the main sustainable intensification activities in many parts of Africa, with a significant impact on soil fertility and increased productivity thanks to nitrogen-fixing trees (Pretty et al., (2010); Gudeta et al., (2009); Pinho et al., (2012)), as well as major benefits for biodiversity. This makes agroforestry an excellent candidate for saving land.

The drop in yields and farm income will only be temporary, but will last depending on the efforts made to reforest and plant cocoa-based agroforests.

- **Agricultural intensification and recovery of local economies**

The recovery phase will depend on the strength of agricultural intensification activities. The efforts made in these activities will reverse the decline in income and yields caused by the reduction in cultivated areas to combat unsustainable agriculture.

The main reason for the practice of unsustainable agriculture seems to be the loss of soil fertility, linked to the very rapid podzolisation of the soil, which leads farmers to cultivate large areas and to fallow for long periods. So, to combat this phenomenon, the project should enable farmers to settle down and increase their productivity by providing more appropriate agricultural inputs and building the capacity of farming associations and cooperatives in ecological agriculture (crop rotation, composting, use of improved seeds, etc.). These agricultural intensification measures must take place on land that is already being farmed (fallow land and plots in use), or on land that is earmarked for agriculture as part of land use plans.

3.4. MAIN ISSUES IN THE DJA-LOBÉKÉ LANDSCAPE

An issue is an analytical element that can be used to justify a decision in favour of or against a project. The issues identified are presented below.

3.4.1. ECONOMIC ISSUES

- POVERTY TRENDS: THE PARADOX OF ABUNDANCE

In terms of poverty, the people of the Dja-Lobéké landscape live below the poverty line, with an estimated monetary income of 350frcs/day/person. Despite fertile soils and a variety of food crops, the area is not economically self-sufficient insofar as the two main cash crops, cocoa and robusta coffee, are transported to Douala for export, and sales of food crops and forest products are made outside the Dja-Lobéké landscape and even outside national borders, with local people benefiting very little from agricultural production and yields.

In addition, there is a large and widening gap (Figure 19) between poor and well -off households in the Dja-Lobéké landscape. This gap is reflected in terms of ownership of arable land and livestock across most of the landscape:

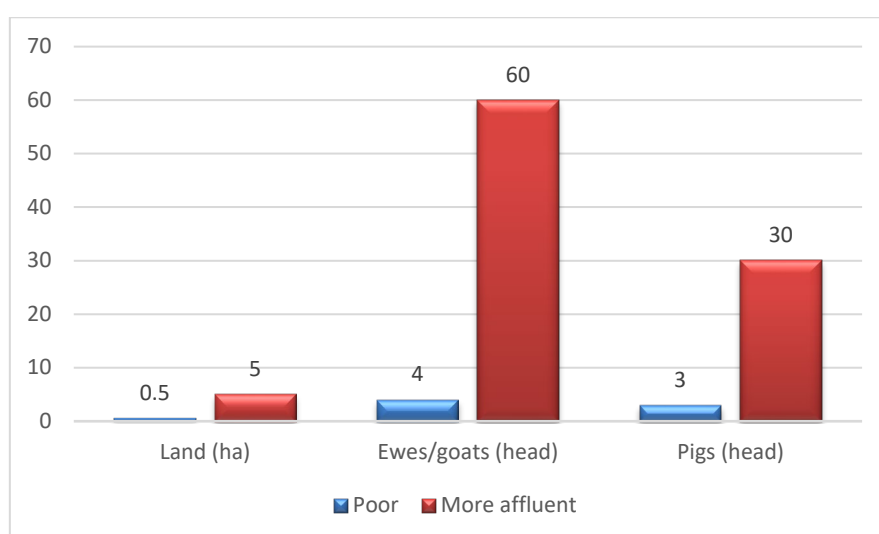


Figure 19. Gap between farmland and livestock between poor and rich in the Dja-Lobéké landscape.

Source: FEWS NET, 2021

On the other hand, the Dja-Lobéké landscape displays all the aspects of the paradox of abundance of natural resources, with a high level of monetary poverty. The paradox of natural resources and development (or paradox of abundance or resource curse) argues that regions with an abundance of natural resources, particularly non-renewable point resources such as minerals and fuels, tend to have lower economic growth and worse development outcomes than regions with fewer natural resources (Same, 2009; Barbier, 2009).

Endowed with a horde of natural resources (table 24) that are supposed to drive development, the Dja-Lobéké landscape remains particularly poor despite the abundance of natural resources with which it abounds. The socio-economic take-off that was logically expected has been slow in coming.

Table 24 Natural resource potential of the Dja-Lobéké site

Resources	Indicators	Upper Nyong	Boumba and Ngoko	Dja-et-Lobo
Agricultural potential	Favourable climate Fertile soils Extensive plantations Slightly undulating terrain	×	×	×
Forest resources	National parks ; Wildlife reserves, Wildlife sanctuaries Communal forests	×	×	×
Minerais	Iron, gold, cobalt, nickel, manganese, diamond	×	×	×
Oil				
Strategic position	Close to the border Agricultural product exchange Livestock trade Other exchanges	×	×	×
Falls		×		

Source: MINMIDT and Fokabs, 2022

As people continue to languish in poverty, it would be appropriate for the government and other stakeholders to take all necessary steps to identify this missing link between the abundance of natural resources and the persistent poverty in this project area.

- DEVELOPMENT OF FORESTRY

Forestry has real potential for developing sustainable value chains. Planting species such as sapelli would be a real opportunity for economic and social development in the Dja-Lobéké landscape. The example of sapele is justified by the ease with which this species can be marketed and the fact that it would also generate other sources of income from the marketing of caterpillars, for which sapele provides natural shelter.

- ECOTOURISM

The physical and human diversity of the Dja-Lobéké landscape offers a wide choice of picturesque sites, hunting, artistic and folkloric treasures with a multitude of ethnic groups and traditional values. There are a number of potential tourist sites in the Dja-Lobéké landscape: i) Local forests with numerous protected animal and plant species; ii) Pygmy camps: these include the Baka pygmy camps of Somalomo (Dja Reserve) and the Baka pygmy camps of Moloundou.

The springs that feed the Boumba and Bek rivers maintain a complex of marshy clearings or bays. These are centres of attraction for several species of mammals (forest elephants, lowland gorillas, buffalo, bongos, sitatungas, hylochera, bushpig, etc.) and birds (parrots,

green pigeons, Dja warblers, etc.). The ease with which these sites can be used to observe animal species, as well as the ethnic and cultural diversity of the region's populations, could be exploited to develop vision tourism. What's more, the Boumba river is dotted with waterfalls and rapids, all of which help to promote ecotourism.

The development potential of ecotourism remains unexploited. The sector's take-off is hampered by a lack of reception facilities, technical resources and support, and logistical means, particularly roads. Other obstacles include low demand at national level and the lack of development of tourist sites.

3.4.2. ENVIRONMENTAL ISSUES

There are a number of environmental issues at stake:

- Illegal logging has disastrous environmental consequences for both the ecosystem and the local population. It is a factor in the drying up of watercourses, the increase in sunshine following the loss of forest cover, and the silting up of watercourses through the accumulation of debris from illegal sawing.
- Invasive species represent a growing threat to the livestock sector in that they lead to a considerable reduction in grazing land. One of the species mentioned repeatedly during the focus groups is Mbocassa grass.

3.4.3. SOCIO-CULTURAL ISSUES

The project will result in a cultural mix due to the movement of people from one locality to another (employees, job seekers, economic operators, etc.). Places of worship such as religious buildings (churches and chapels), as well as leisure areas (sports grounds, tourist sites) could be disrupted.

Ethnic minorities, in particular the pygmies of the Dja-Lobeke landscape and vulnerable populations (widows and orphans), will be taken into account through mechanisms for integrating the changes inherent in the project. For example, the development of the Djansang sector, in which the Baka pygmies have a virtual monopoly, could contribute to the development of this ethnic minority. Moreover, the Djansang sector is one of the two most popular NTFP sectors for the development of NTFP value chains.

- SUPERPOSITION OF LAND RIGHTS

The overlapping of land rights is a major environmental issue in terms of securing permanent forests, ensuring the survival of local communities and achieving the climate change objectives set by the State. Several categories of rights at local level (traditional law), both over land and over embedded resources, are superimposed on each other at local level (table 25); this can be observed through the exercise of these rights by distinct social authorities: the family, the lineage, the village. This traditional law is then superimposed on the so-called modern law recognised by the State. The State remains the legal owner of certain areas and decides how these areas are allocated, even if the indigenous populations have been living there for several centuries. Depending on the type of resources that exist in the area and what is at stake for both the State and the local populations, the State grants the right to extract or use these resources either to the populations or to economic operators.

However, in the logic of securing the permanent forests inherent in the current project, carbon conservation and climate preservation in the Dja-Lobeke site must take precedence over any other land allocation. Although the Dja-Lobeke site is ancestral territory, ideal for farming, rich in minerals and home to species that are highly prized by loggers, environmental issues must take precedence over the demands of economic operators, while taking into account the subsistence and well-being of the local population, which remains a social imperative.

Table 25 Overlapping categories of traditional and modern rights

Law	Description
-----	-------------

Traditional law	axe rights: control of the area by the first person to clear the forest	genealogical rights: the first occupants pass on the property to their descendants	productive rights (usufruct rights, planter's rights) enabling the owner to make a living from their own work	inheritance tax determined by the principles of patrilineal transmission, allowing descendants to benefit from bequeathed property
Modern law	Legal owner of certain areas even if they have been occupied for centuries by indigenous populations			

Source: Fokabs, 2022

The lack of cooperation between the various institutions (MINFOF, MINEPDED, MINMIDT, MINADER) that have the power to grant rights to resource users, combined with the diversity of resources in high demand in the same Dja-Lobeke area, inevitably leads to overlapping rights, which is a source of conflict (Figure 20). Moreover, the overlapping of rights could hamper the effectiveness and optimality of the project's activities.

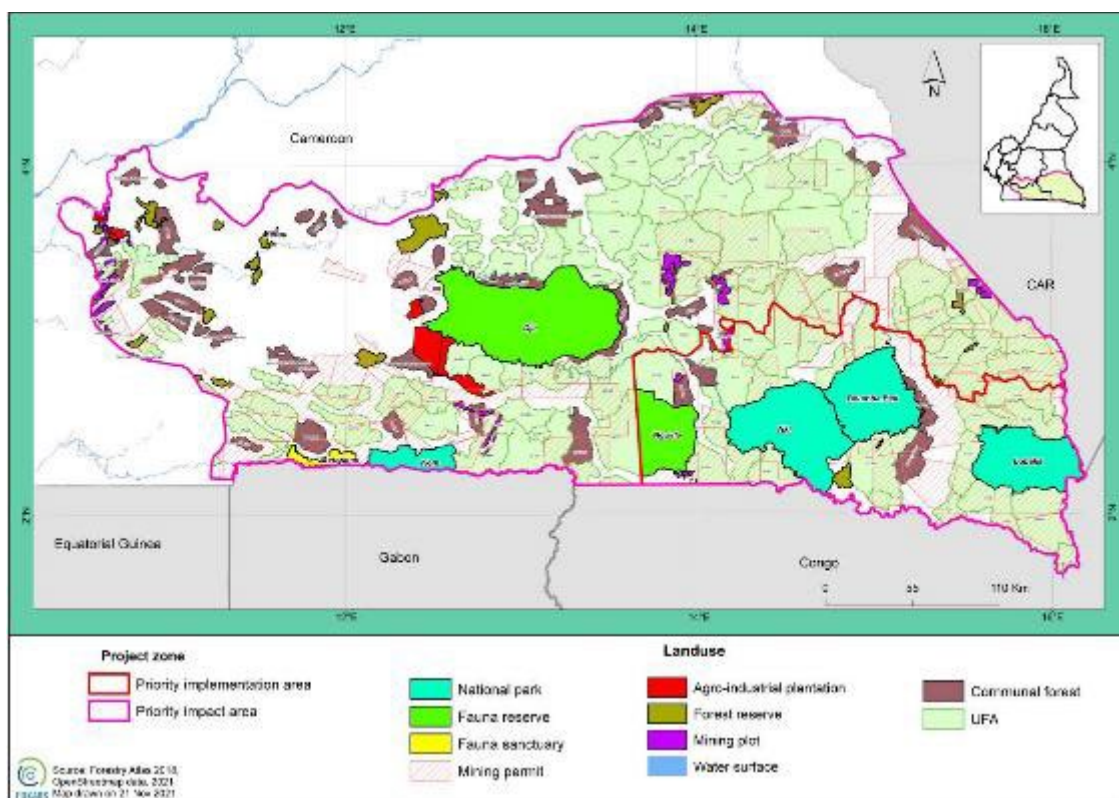


Figure 20 Overlap of the different allocation units in the Dja-Lobeke intervention site (Source: Fokabs, 2022)

Figure 20 illustrates the superimposition of users' land rights on the Dja-Lobeke site. The overlapping of mining permits on local people's land, on protected areas and on FMUs is visible. This situation is the result of inconsistency between Decree 95/678/PM, which provides the indicative framework for land use in the southern forest zone, the Forestry Law, the Mining Code and the various agreements and conventions ratified by the State, and is at the root of these conflicts of use.

From the point of view of ethnic minorities in relation to land issues, land problems take the form of a lack of recognition of land rights for the Baka people. In theory, they have areas allocated to them, but in practice they are denied access.

4. BAMBOUTOS-BAKOSSI LANDSCAPE

4.1. PROFILE OF FORESTS AND BIODIVERSITY IN THE BAMBOUTOS-BAKOSSI LANDSCAPE

The Bakossi-Bamboutos landscape is dominated by herbaceous savannah vegetation (pennisetum, impérata, huparaténia, clotalaria, etc.) with shrubs and trees, with eucalyptus dominating towards the summits, particularly in the crop and livestock farming areas. The landscape is a mosaic of savannah forest on the Bamboutos region and dense forest on the Bakossi region. However, eucalyptus populations have declined drastically, giving way to agriculture. This landscape alone encompasses several categories of permanent forest, covering a total area of 904,697 ha.

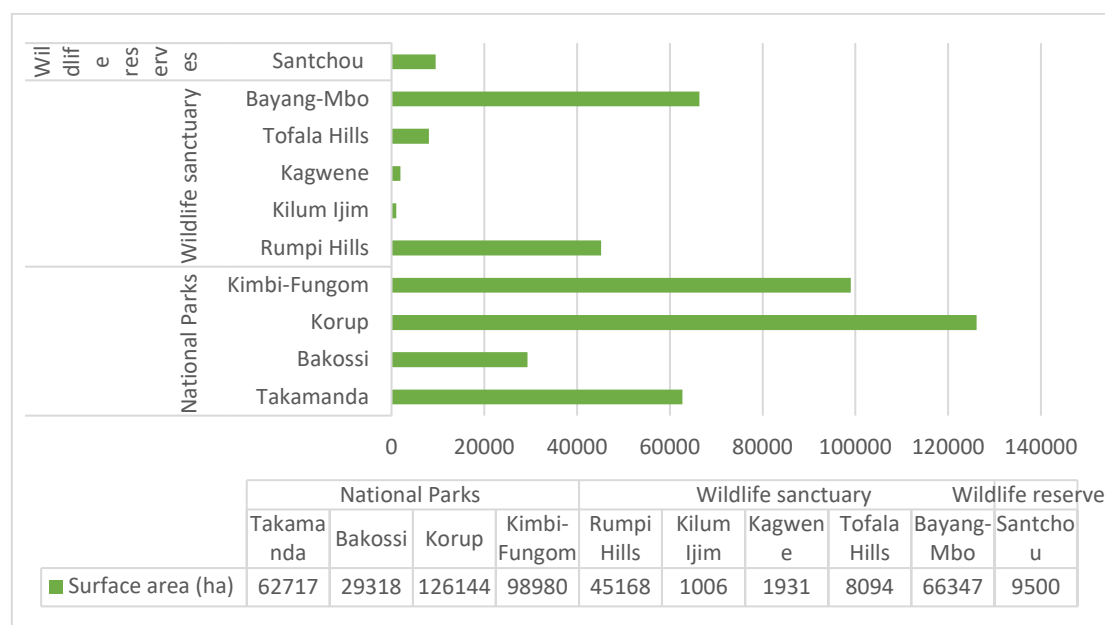


Figure 21 Area of national parks, wildlife sanctuaries and wildlife reserves in the Western Highlands impact zone. Source: Fokabs, 2022

Table 26 Other permanent forest categories in the project's Western Highlands impact zone

Permanent forest category	Quantities	Surface area (in ha)
Communal forests	3	75224
FMU	9	380268
Total		904 697

Source: Fokabs, 2022

Along the many watercourses that rise from the mountain peaks, we can see forests of galleries that wind their way from the peaks to the foot of the mountains, following the route of the water flow.



Photo 20 Gallery forests around watercourse flow paths
Source: Fokabs, 2022

This type of vegetation is closely linked to the type of climate that prevails in the Bamboutos-Bakossi landscape. It is generally a highland Cameroonian type of climate, with two characteristic seasons: a rainy season lasting 8 months (March to November) and a short dry season lasting 4 months (mid-November to mid-March). Temperatures in the area fall as you move towards the peaks. The minima vary between 12°C and 15°C, the averages between 22°C and 24°C and the maxima between 28°C and 30°C (ITTO, 2014). Rainfall is more abundant towards the peaks, with August and September being the wettest months, reaching peaks of over 330 mm/month.

Towards the foot of the mountains, there is an abundance of fruit trees (avocado, orange, guava, grapefruit, safou, mango, lemon, canary, kolana, lemon, etc.) and many other wild species in addition to food crops of all kinds.

The Mount Bamboutos in particular are dominated by eucalyptus trees, which are generally planted in rows and form hedges in places. Although the eucalyptus population has declined, this dominance is justified by the multiple uses of this silvicultural species, particularly in the demarcation of cultivation plots, the marking out of barriers to avoid agro-pastoral conflicts, its use as a windbreak, as timber for construction, lumber and firewood, and many other lesser uses. In some places, it is felled intensively for the above-mentioned uses.

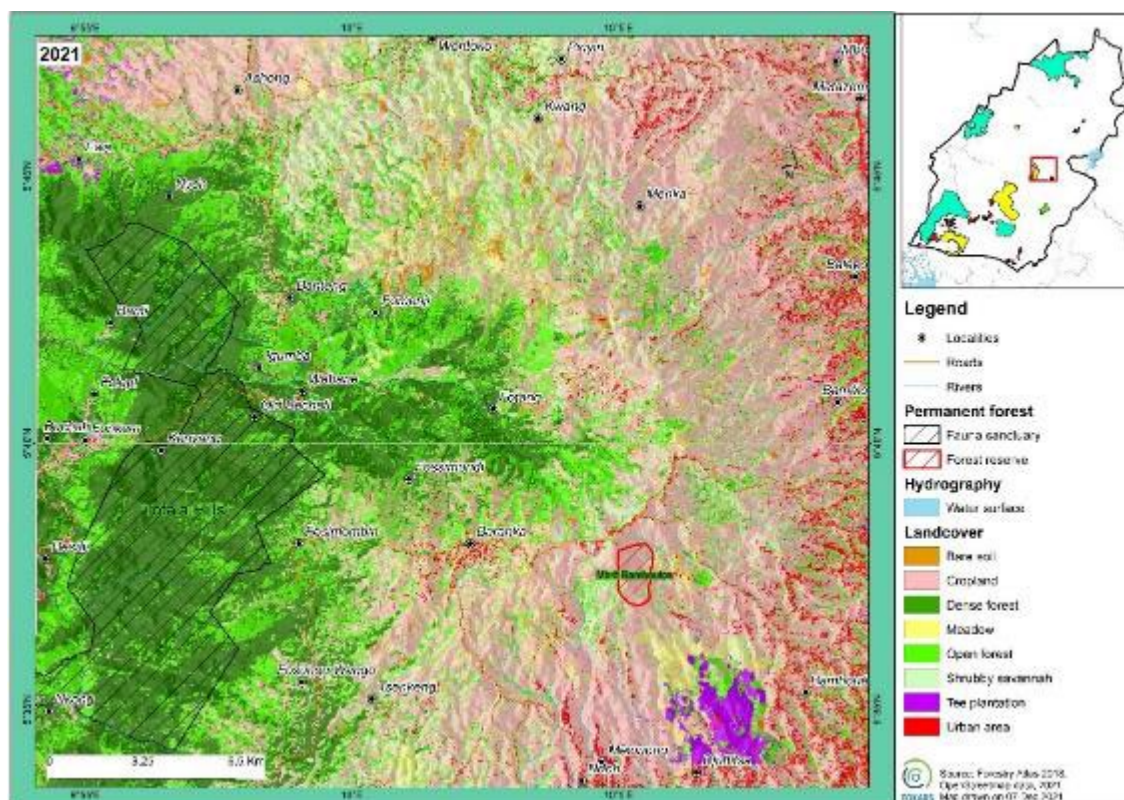


Figure 22 Forest cover of the Bamboutos-Bakossi landscape.

Source: Fokabs, 2022

At the heart of this vegetation lie a number of watercourses, particularly in the higher elevations, which increase in volume as they flow towards the foot of the mountains. These include the Metché, Tsdédeng, Matazem, Falifo, Nkoo, Ko'okwalé, Doji, Tousson, Meloung, Maleou, Madjui, To'odza, etc. These rivers are characterised by periods of high water in the rainy season and low water in the dry season. Low water levels are exacerbated by the many catchments, numbering in the thousands, which operate by gravity and pumping, such as the one operated by Cameroon's water company (ITTO, 2014).

Illegal logging is also rife in the Bamboutos-Bakossi landscape, affecting many permanent forests. For example, most of the forest reserves in this landscape are highly plundered due to the lack of legal protection measures (no classification deeds, or even creation deeds in some cases). As a result, illegal logging is rife, making it difficult to prosecute those who commit these reprehensible acts.

The mosaic of savannah forests that is the Mount Bamboutos contains few non-timber forest products (NTFPs). However, there are a few that are prized in this landscape, notably *Raphia* palm wine, black fruit, Kola and *Prunus Africana*.

The landscape is essentially made up of hills, valleys, plateaux and lowlands consisting of more or less marshy plains. The landscape includes the Bamboutos mountain range, which is the third highest mountain in Cameroon's volcanic belt after Mount Cameroon and Mount Oku (Gountié Dedzo et al., 2013). There are steep slopes on the Nkong-Ni and South-West sides.

In the case of the Bamboutos Mountains, the slopes are dominated by two types of soil: i) Closer to the hills, old, fine, friable volcanic soils that are charcoal black in colour and very fertile; ii) Towards the bottom (foot of the mountains), ferralitic, lateritic soils, more or less gravelly, brown in colour, sometimes sandy-clayey. The lowlands are characterised by hydromorphic soils, rich in alluvium (ITTO, 2014).

The wild fauna of the savannah includes game (hedgehogs, rats, squirrels, monkeys, porcupines, rabbits, deer), birds (partridges, sparrowhawks, owls, bats, sparrows), reptiles and insects (snakes, lizards, centipedes, margouillats, bees, wasps, flies, locusts, termites, earthworms, crickets and many other beetles). As for domestic species reared by man, this is the domain of intensive livestock rearing, mainly cattle in Mbororo communities. Other farmed species include sheep, goats, poultry, pigs, guinea pigs, bees, fish, dogs, cats, etc.

In terms of road infrastructure, the communes of Batcham and Mbouda have the largest road networks in the area surrounding the Mount Bamboutos massif.

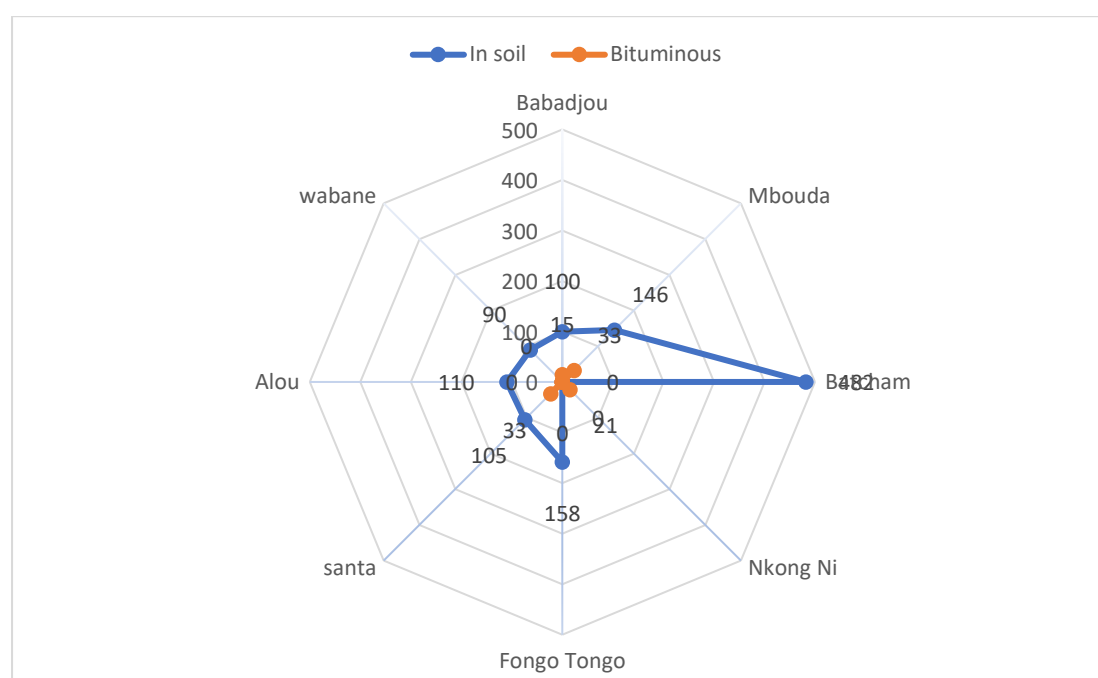


Figure 23 Road infrastructure in the communes bordering the Massif des Monts Bamboutos (2014)

As far as educational infrastructure is concerned, three communes are particularly well endowed: Mbouda, Batcham and Nkong Ni. The remaining communes have roughly similar amounts of educational infrastructure. These high levels of educational infrastructure are shown in the graph below.

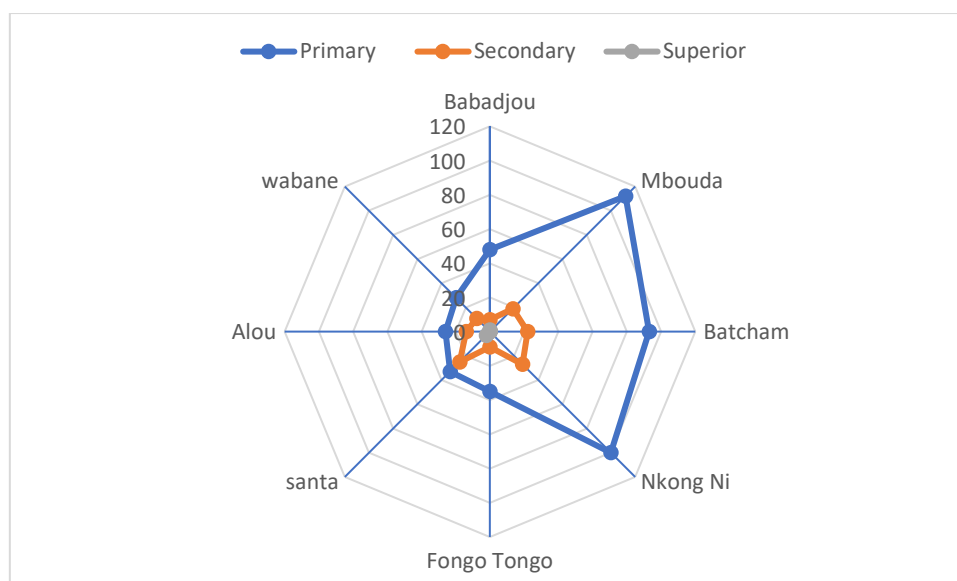


Figure 24 Education infrastructure in the communes bordering the Massif des Monts Bamboutos (2014)

In terms of health infrastructure, almost all the communes appear to be more or less well equipped, with the exception of Babadjou and Wabane.

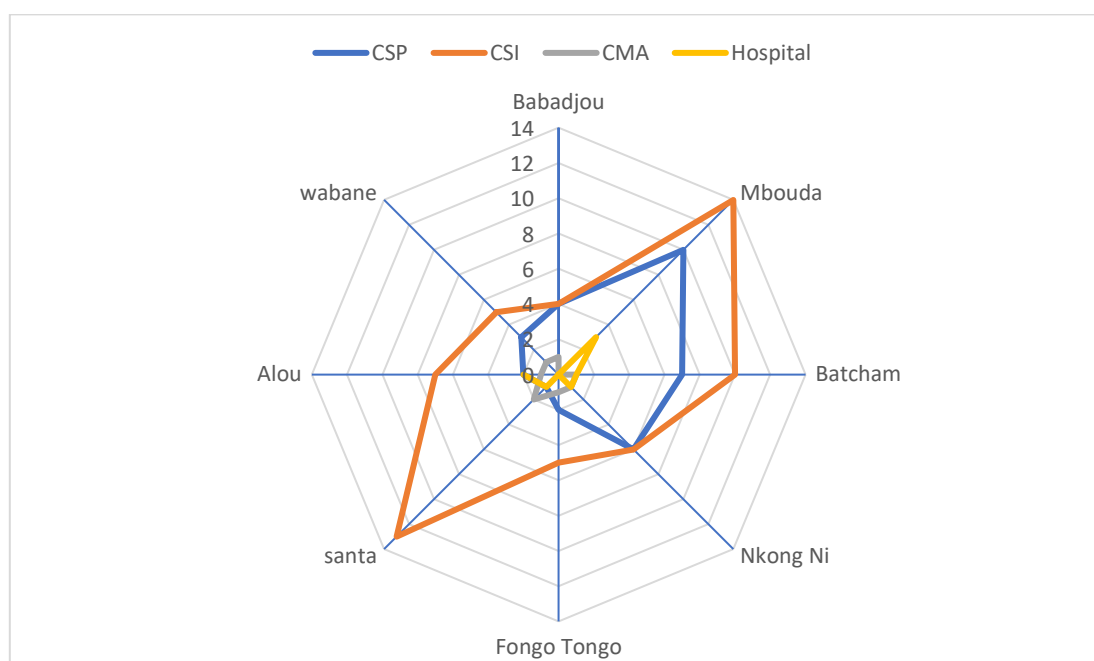


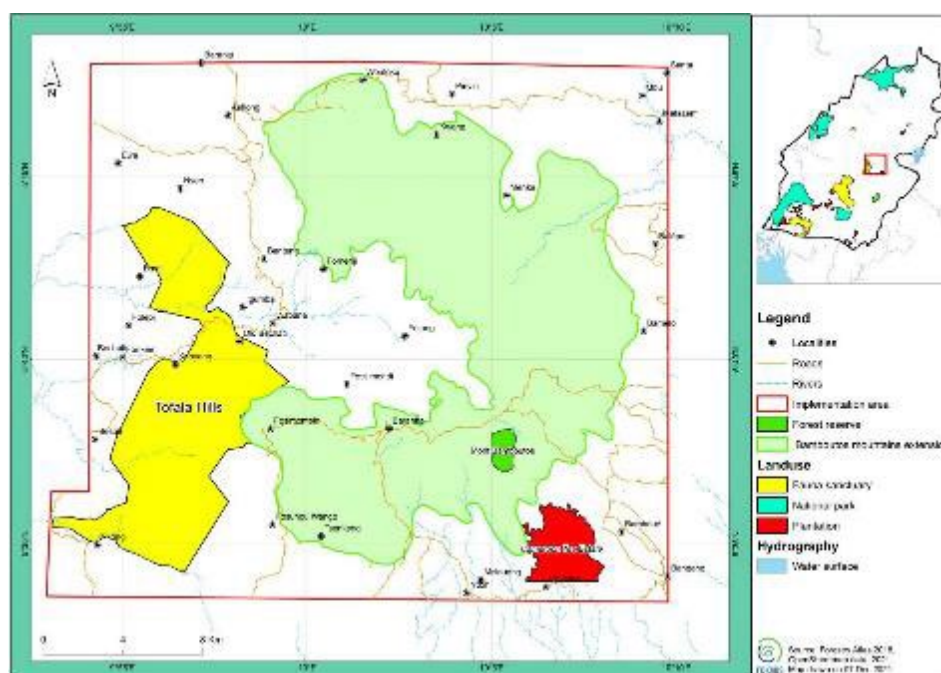
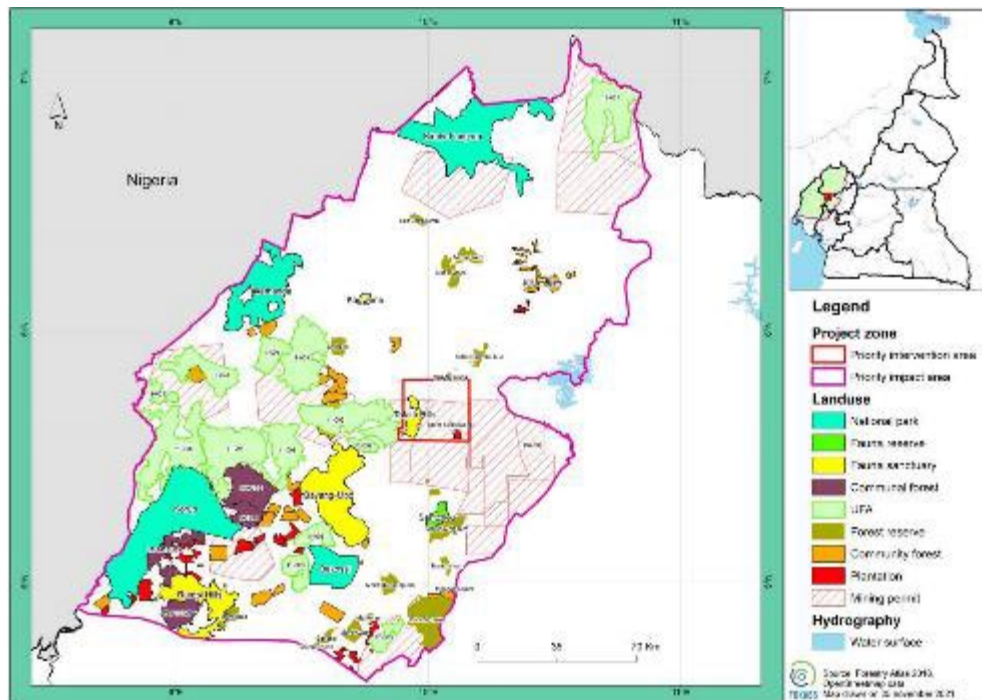
Figure 25 Health infrastructure in the communes bordering the Massif des Monts Bamboutos (2014)

4.2. SOCIO-ECONOMIC PROFILE OF THE BAMBOUTOS-BAKOSSI LANDSCAPE

4.2.1. SOCIO-CULTURAL AND ECONOMIC ENVIRONMENT

- ADMINISTRATIVE DIVISION

The Bamboutos-Bakossi landscape is located in West and South-West Cameroon and covers an area of 704,412.72 ha. It is an integral part of an impact zone that covers the entire Western High Plateaux.



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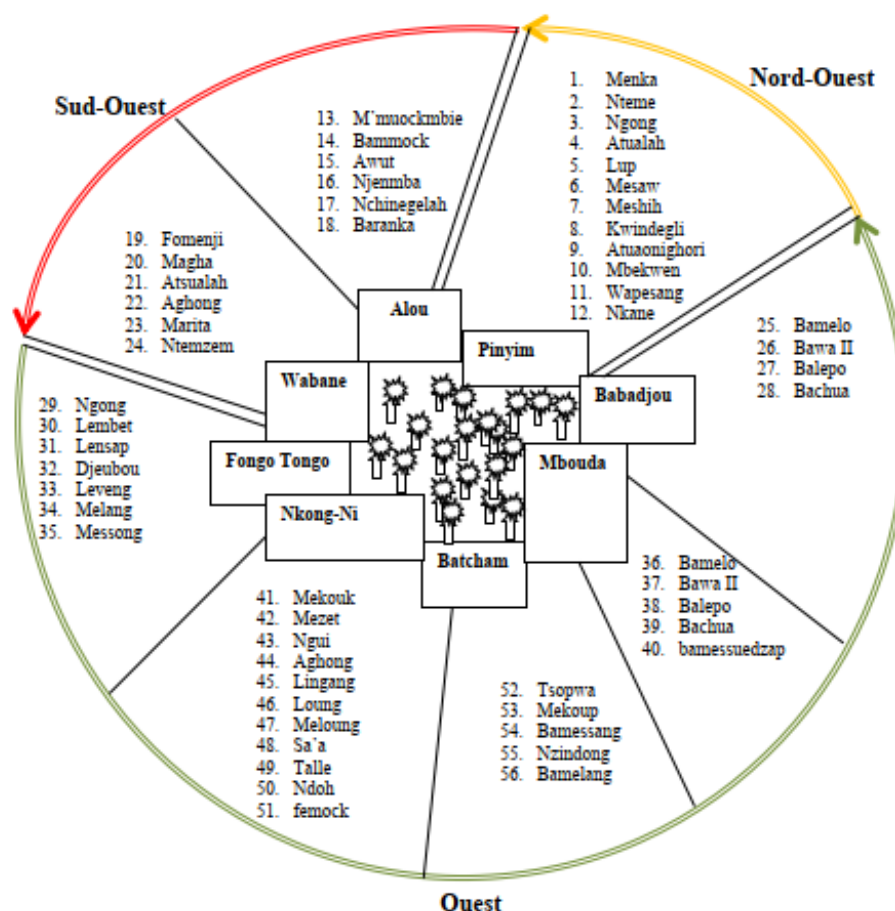


Figure 28 Distribution of riparian communities on the slopes of the Bamboutos Mountains
Source: ITTO, 2014

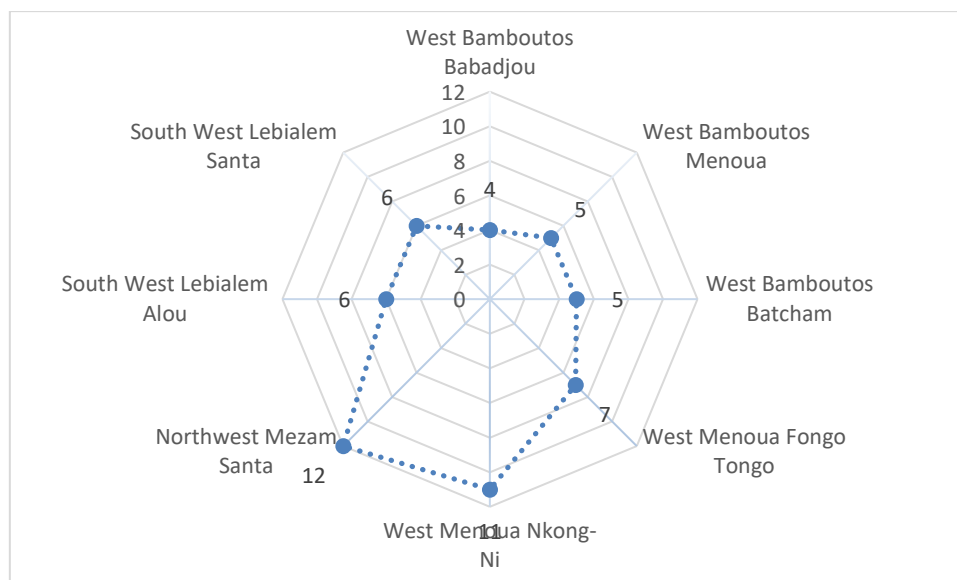


Figure 29 Summary of communities bordering the Bamboutos Mountains at administrative level
Source: ITTO, 2014

On the basis of official documents from the INS, MINADER's decentralised services, consultations at community level and scientific literature, the distribution of populations in and around the forest massifs of the Monts Bamboutos in 2021 is as follows:

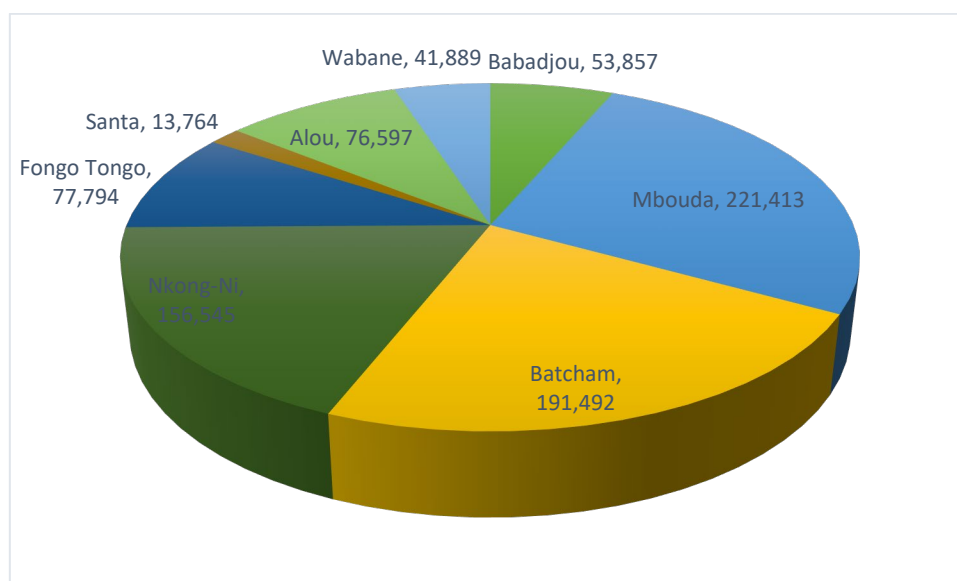


Figure 30 Demographic statistics for the communes bordering the Bamboutos Mountains
Sources: Fokabs, 2022 and ITTO estimates, 2022

Table 27 Demographic statistics by ethnic group in the Bamboutos-Bakossi landscape.

Villages consulted Bamboutos-Bakossi landscape	Populations by ethnic group	Estimated population in 2021
Ngangong I	Ngangong SB	724
Balepo	Balepo Peulh	98
Bamelo	Bamelo SB	6,289
Tsopia	Tsopia Peulhs	176
Tsopeua	Tsopeua SB	251
Messang	Messang SB	308
Bagading II	Bagading II SB	873
Balatchi	Balatchi Peulhs	100
Aghong	Aghong SB	2,148
Femock	Femock SB	1,175
Ndzih-Djutitsa	Ndzih-Djutitsa SB	1,854
Messong	Messong SB	9,797
Mmuock Fosimondi	Mmuock Fosimondi SB	248
	Total	

Source: Fokabs, 2022

Human densities in the Bamboutos-Bakossi landscape, averaging around 261 inhabitants/km², are among the highest in Cameroon. Several ethnic groups are present in the Bamboutos-Bakossi landscape. They are divided into several communities. Around 56 human communities inhabit these massifs, made up of Peulhs (sometimes called Mbororo) and communities bordering the massif. The Peulh are essentially pastoral breeders and constitute one of the main ethnic minority groups in the landscape. The Peulh community graze their cattle in the region, and the herders light bush fires in the grazing areas between January and March. This practice, which aims to regrow new grass at the start of the wet season, is illegal (Decree No 95/531/PM dated 23 August, 1995). The other communities living along the Bamboutos Mountains engage in forestry, fish farming, poultry farming, artisanal activities and, above all, farming, which are the main drivers of deforestation and degradation in this landscape.

Table 28 Administrative breakdown of target communities.

Departments	Borough	Villages consulted
Bamboutos	Babadjou	Ngangong I
		Balepo (Mbororo)
		Bamelo
	Batcham (Bangang)	Tsopia bororo
		Tsopeua
		Messang
	Mbouda	Bagading II
		Balatchi (Mbororo)
Menoua	Nkong-Ni	Aghong
		Femock
		Ndzih-Djutitsa
	Fongo-Tongo	Messong
Lebialem	Alou	Mmuock Fosimondi
	Wabane	Aghong

Source: Fokabs, 2022

Table 29 Density of targeted communes in the Bamboutos-Bakossi landscape

Boroughs	Population (2021)	Area (km) ²	Density inhab/km) ²
Babadjou	53,857	181	298
Mbouda	221,413	294	753
Batcham	191,492	185	1035
Nkong-Ni	156,545	225	696
Fongo Tongo	77,794	144	540
Santa	13,764	533	26
Alou	76,597	169	453
Wabane	41,889	1800	23
Total	833,351	3531	236

Source: Fokabs, 2022 and estimated from ITTO, 2014

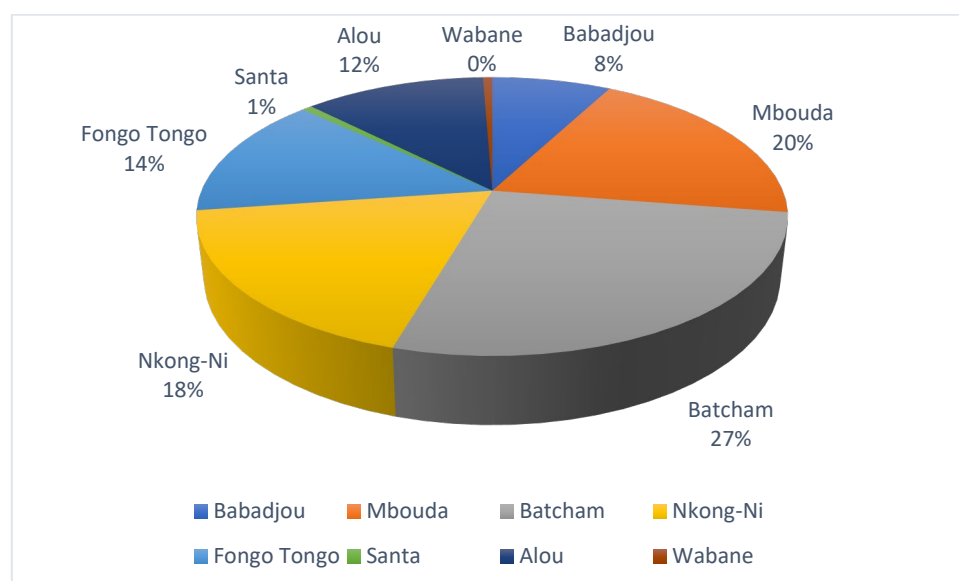


Figure 31 Population density as a relative percentage in the intervention site

Source: Fokabs, 2022 and estimate based on ITTO, 2014

In the Bakossi-Bamboutos landscape, there is considerable linguistic and socio-cultural diversity. This multicultural and multilingual melting pot is at the root of some mistrust among the populations. For example, there is mistrust between French and English speakers. The Mbororo do not trust the communities on the French-speaking flanks of the Bamboutos Mountains, but are much more inclined to socialise with the communities on the English-speaking flanks of the mountains.

Communities in the Bamboutos-Bakossi landscape derive their livelihoods from forest resources, in particular through the supply of water to towns (from catchment areas), agriculture, fishing, aquaculture and other activities based on biological biodiversity, and the exploitation of non-timber forest products and timber resources.

Income-generating activities include farming, livestock rearing, fishing, NTFP collection, mining, logging on the Bakossi side, fuelwood, handicrafts and petty trading. Generally speaking, income-generating activities are carried out throughout the year at certain times of the year.

- **TOURISM AND TOURISM POTENTIAL**

The Bamboutos Mountains have a picturesque landscape that could lend itself to the development of tourist sites. Tourist sites in Cameroon include :

- Mountains (mountain ranges) ;



Photo 21 Mountain massifs _summits of the Bamboutos_Balepo mountains (Mbororo domain). Source: Fokabs, 2022

- Traditional huts; these are located in certain village chiefdoms in the Western Highlands (West and North-West).
- Forests; these are located in certain chiefdoms in the villages of the West, North-West and East.



Photo 22. Chiefdom in the Bakossi-Bamboutos landscape.
Source: Fokabs, 2022.

- WATER RESOURCES

Strong demographic growth and the degradation of the vegetation cover by the multiplication of agricultural activities in the Bamboutos mountains to the detriment of the forests have resulted in a drastic reduction in the water table. This is reflected in the drying up of medium-sized rivers during the dry season and a considerable reduction in the flow of large rivers during the same period.

This increasing scarcity of water resources is being felt more and more, with repercussions at several levels. In terms of the forest ecosystem, certain species are disappearing in this area due to the drying up of watercourses.

- LAND TENURE AND ACCESS TO LAND

In the Bakossi-Bamboutos landscape, there are different mechanisms for accessing land and land tenure systems, with some differences from one locality to another:

Table 30 Modes of access to land.

Land terms and conditions	Modes	Comments
Types of access to land	- Donation/traditional leaders (land commission) - Anarchic occupation - Heritage - Rental - Buy - Sacred forest - Force - Concession	Purchase, donation by traditional chiefs, rental and inheritance are the most common types of land acquisition in the area.
Nature of property deeds	- Land title - Customary ownership certificates issued by traditional chiefs/donations - Deed of concession by the State - Deed of purchase/sale	Land titles and deeds of purchase are the most common forms of property ownership in the area.

Source: Field data, 2022

- GENDER-BASED VIOLENCE AND CONFLICT

The following types of conflict have been identified in the area: i) Agropastoral conflicts; ii) Land tenure conflicts between individuals, villages, neighbourhoods, regions and tribes; iii) Conflicts over the use of water resources on the slopes between farmers and livestock breeders; iv) Abusive use of pesticides by upstream farmers with harmful effects (pollution) on downstream farmers; v) Theft of goods; vi) Roads crossing land; vii) Bush fires; ,viii) Lack of knowledge of an acquisition; ix) Felling of eucalyptus destroying crops.

Agropastoral conflicts between farmers and herders are the main categories of conflict occurring in the Bakossi-Bamboutos landscape. The solutions envisaged during the consultations for the reduction or elimination of agro-pastoral conflicts consist of the materialisation of transhumance corridors.

- SECURITY CONTEXT

The security crisis in the North-West and South-West Regions remains a major contextual factor. The area regularly experiences incursions by armed separatist groups on the slopes of the Bamboutos Mountains, with a considerable impact on economic activities in the area, and even on public administrations. These incursions go hand in hand with land grabbing, population displacements with considerable effects on the environment, the level of poverty and unemployment in the area, etc.

- **TRADITIONAL CHIEFTAINCY**

The chiefdoms represent territorial entities characterised by a very high concentration of population. For example, in the chiefdoms of Batcham in the department of Bamboutos and Bafou in the department of Menoua, to name but two examples, the population density exceeded 700 inhabitants per km² in 2005, while at the same time it was 123.8 inhabitants per km² for the region as a whole.

- **HABITAT**

In the Bamboutos-Bakossi landscape, rural housing in the area used to be made of plant debris, sometimes combined with mud bricks. It gradually became covered in aluminium sheeting during the coffee-growing period and became more affluent during the crisis, with a significative evolution in terms of architecture, with modern rural housing built entirely of concrete and covered in tiles.

Today, the city penetrates discontinuously into the most remote countryside via housing. Housing clearly seems to be the main factor in the spread of the urban phenomenon in this area.

4.2.2. MAIN REVENUE-GENERATING ACTIVITIES

4.2.2.1. AGRICULTURE

Farming is the main activity practised by the working populations of the villages consulted. The agrarian landscape in the villages consulted is characterised by small farms (0.2 to 3 ha), with an average of 1.5 ha. Farming is carried out using slash-and-burn techniques and crop rotation. Subsistence farming is practised, with 75% of harvests used for sale and 25% for marketing. These proportions vary according to the type of crop (food crop or cash crop) and the agricultural speculation. There is intensive and permanent land use.

In the villages consulted, all soils are cultivated, including marginal soils such as mountain pastures and low-lying areas, all year round due to the introduction of off-season crops which require a lot of water. This is the case in the image below, where crops are irrigated using hose irrigation systems, the proliferation of which on the slopes of the mountain range is exacerbating the problem of water resources in the villages consulted, particularly in the dry season.



Photo 23 Off-season crops using irrigation systems.

Source: Fokabs, 2022



Photo 24 Crops in mountain pastures.

Source: Fokabs, 2022

Eucalyptus is mainly used as border trees for these fields, as well as being a source of timber.

Unsustainable agricultural practices such as slash-and-burn farming are also present in this landscape. The main staple crops grown by households are shown below; they are cultivated according to an annual calendar that takes account of favourable periods for certain crops.

	Jan	Fév	Mar	Avr	Mai	Jun	Jul	Aoû	Sep	Oct	Nov	Déc
Aliments de base												
Manioc												
Maïs												
Igname												
Riz												
Légumineuses (haricots)												
Pommes de terre												
Sources de revenu												
Vente produits agricoles vivriers	x x	x x	x x					x x	x x			x x
Vente café	x x	x x										x x
Travail occasionnel	x x	x x	x x		x x	x x	x x	x x			x x	x x
Vente bétail	x x	x	x	x	x	x	x	x	x	x	x x	x x
Vente volaille	x x	x x	x	x	x	x	x	x	x	x	x x	x x
Dépenses												
Cérémonies	x x	x x	x x				x x				x x	x x
Scolarité								x	x x			
Santé			x x	x x								x x
Légende												

Figure 32 Distribution of sources of income and agricultural products for households in the Bamboutos-Bakossi landscape. Source: FEWS NET, 2021

○ Cash crops

Coffee (*Coffea robusta*) is one of the main cash crops; however, due to the low profitability of this crop and falling prices, plantations are being abandoned.

○ Food crops

Food crops are grown in view of the increasingly high unemployment rate, which is reinforcing the urban exodus via slash-and-burn farming techniques in the villages consulted. A wide variety of food crops are grown, including plantain, cassava, maize, macabo and yams. There are also vegetables from market gardens, groundnuts, chillies, cucumbers and other crops such as potatoes and sugar cane, which are less developed in the area. These crops are grown mainly by women. Food crop production is divided between consumption (75% on average) and marketing (25% on average).

Potatoes, one of the main food crops, are grown in mountainous areas and in irrigated lowlands. Balatchi is one of the main potato-growing areas. Perennial crops include fruit trees (safout, mango, kolatier, etc.) and raffia; the main cash crop is coffee. Coffee production is declining due to poor sales on the markets.

Babadjou

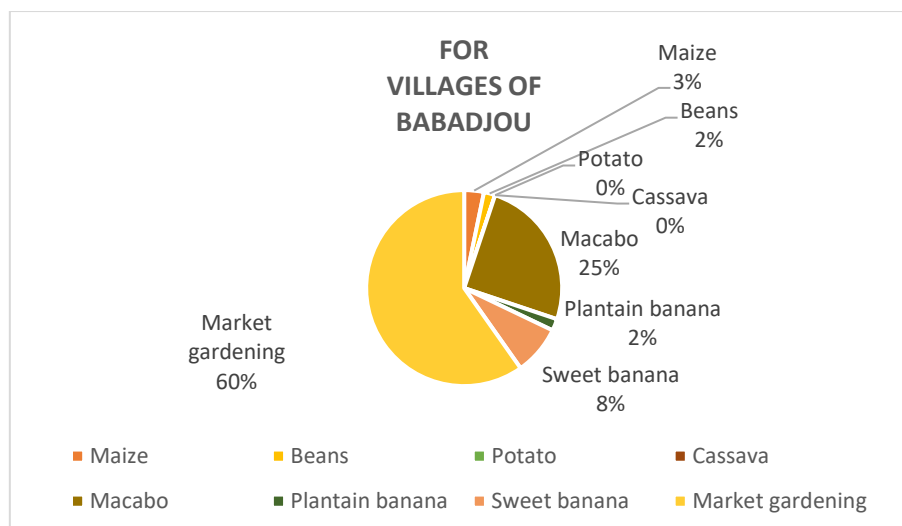


Figure 33 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

Mbouda

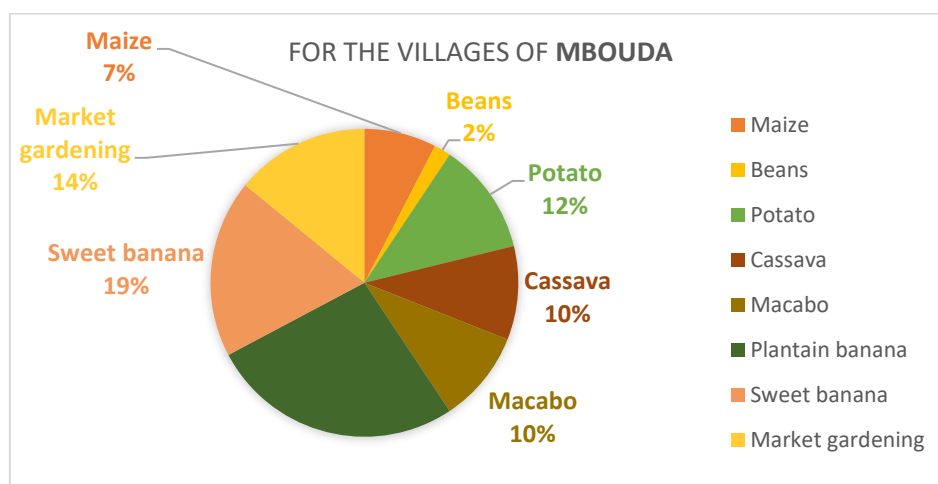


Figure 34 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

Batcham

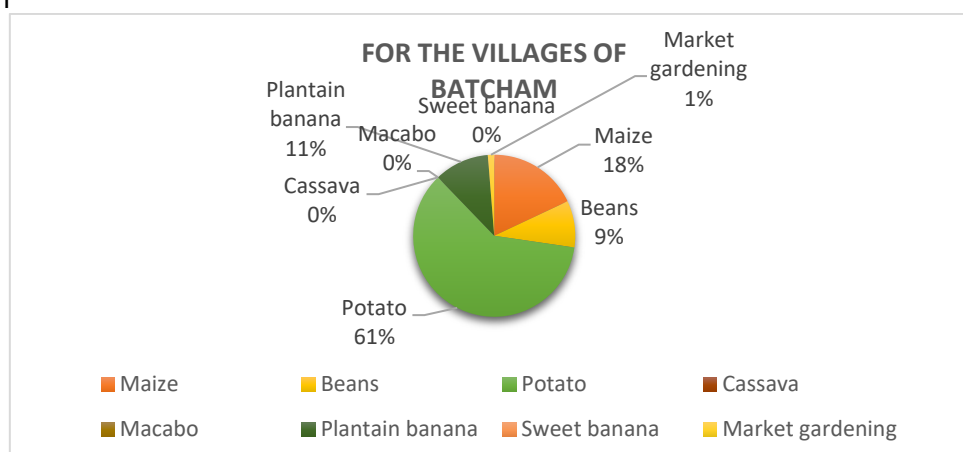


Figure 35 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

Nkong Ni

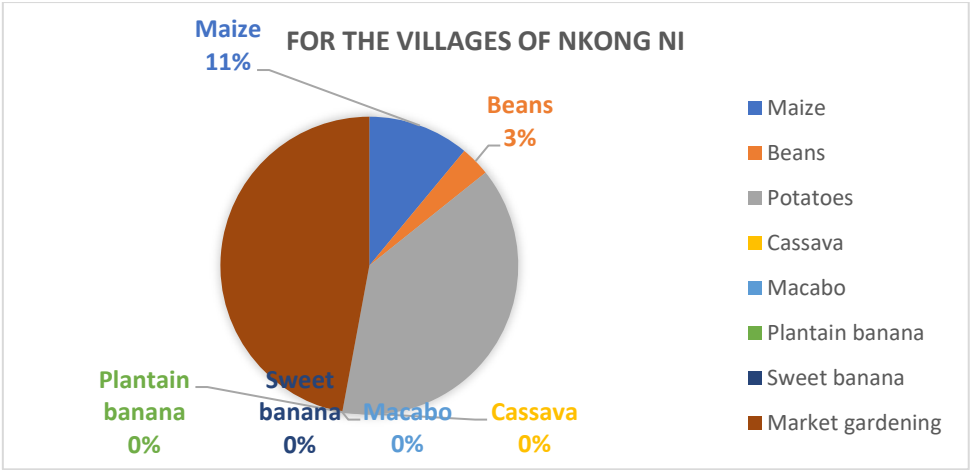


Figure 36 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

Fongo Tongo

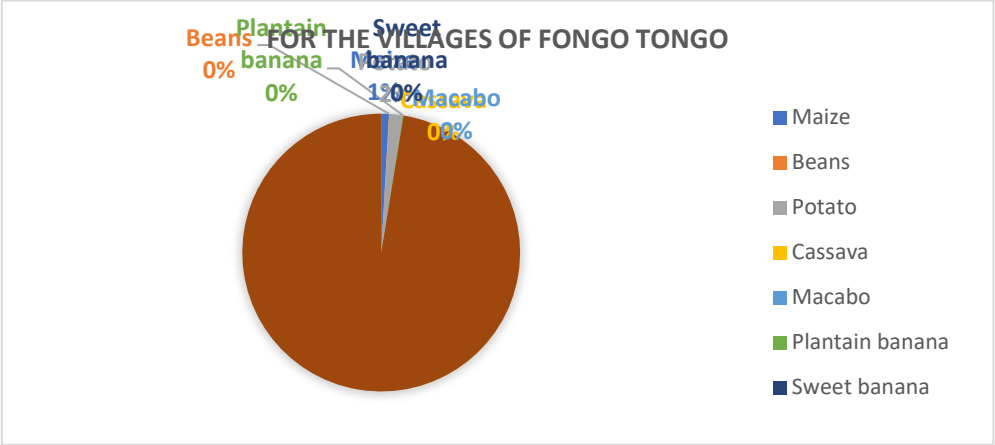


Figure 37 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

Santa

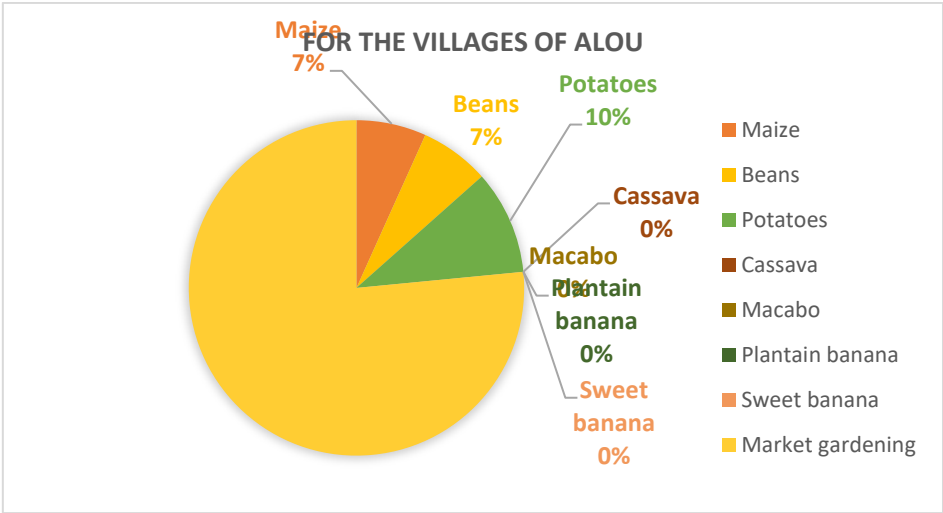


Figure 38 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

wabane

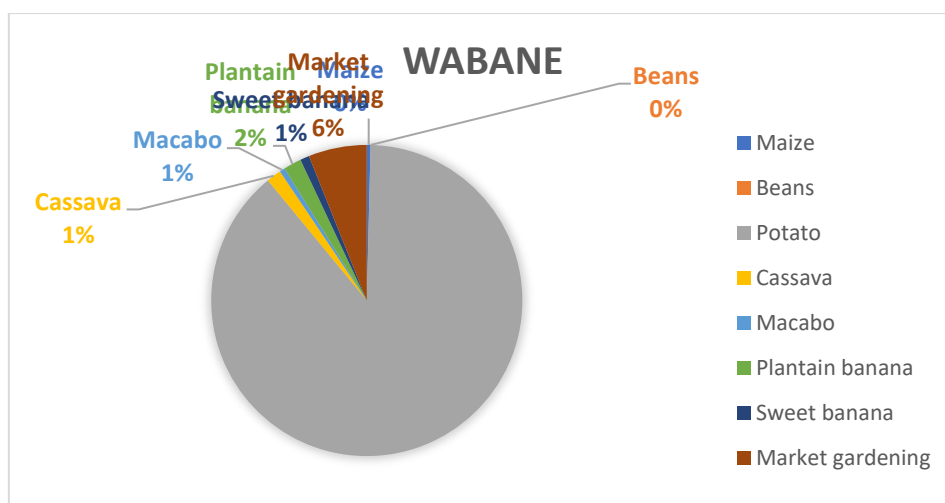


Figure 39 Distribution of crops according to average tonnage.
Source: Fokabs, 2022

Generally speaking, the above figures show that market garden crops and potatoes are the crops with the highest average tonnage in the villages consulted. In the villages belonging to the Babadjou district, market garden crops account for 60% of agricultural production, and 47% of total production in the villages belonging to the Nkong-Ni district.

In the villages we visited, we also noted the presence of the Cameroon Development Corporation, which uses hundreds of hectares in several localities such as Ndzihi-Djutitsa for tea growing.

In addition, the low-lying areas are developed and used for 2 to 3 cycles of market gardening (cabbage, potato, carrot, leek, aubergine, lettuce, etc.) per year. These villages, located in the Bamboutos mountain range, benefit from climatic conditions that are favourable to high-altitude crops. This area is one of the main suppliers of vegetable crops for the national and sub-regional markets.

In the villages consulted, there is a scarcity of arable land due to population growth and the extensification of cultivated areas, agriculture being one of the main generating activities in these communities. This extensification is partly responsible for the sawing of Eucalyptus, which has given way to agricultural practices.



Photo 25 Market gardening on the slopes of the Bamboutos Mountains.
Source: Fokabs, 2022

Potatoes are widely grown in the villages consulted, particularly on the slopes of the Bamboutos Mountains. An assessment of average production costs is presented in the figure below.

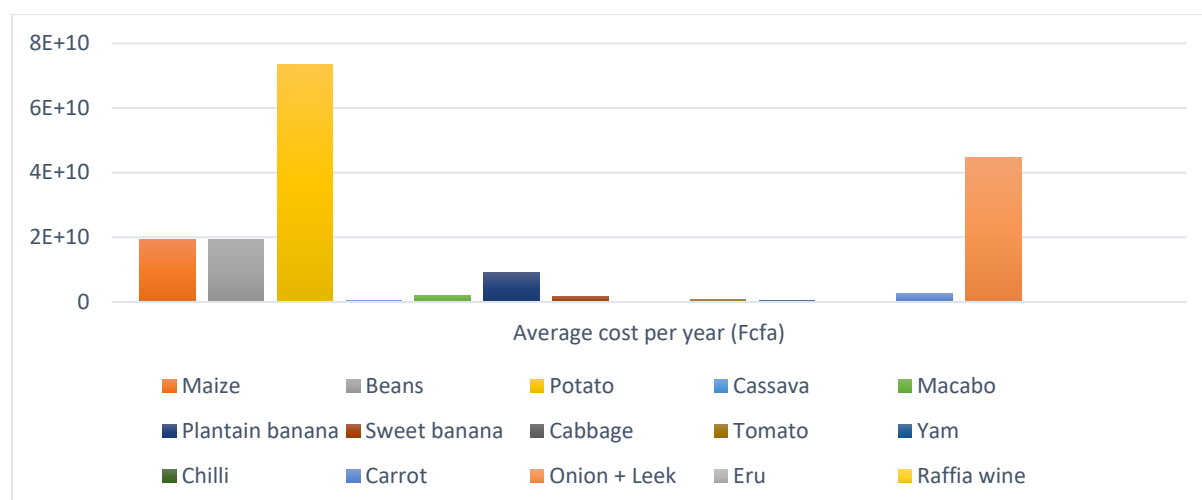


Figure 40 Assessment of average agricultural costs in the villages consulted
Source: Fokabs, 2022 and estimate based on ITTO, 2014

The populations of the villages consulted have also benefited from support for their agricultural practices in the form of programmes and support in the agricultural sector. These include: i) PAMAFECUL: Projet de production du matériel végétal pour l'intensification agricole; ii) PALFAR: Projet de riziculture; iii) Projet de développement des cultures fruitières.

Faced with the difficulties encountered in the agricultural sector, the main solutions identified during community and individual consultations are as follows.

Table 31 Challenges and solutions for the agricultural sector

Difficulties	Solutions proposed by the communities
Increasing scarcity of arable land	- Retrocession of unused land and agricultural intensification
Insufficient water	- Constructing reservoirs and creating water points
Difficult access to inputs	- Improving access to inputs
Traditional agriculture	- Building capacity in new farming techniques
Rough terrain	- Encourage the planting of Eucalyptus to fix the soil (outside the lowlands) - Encourage the planting of fruit trees in field paths, along roadsides and on concessions
Low productivity/	- Creating organisations to facilitate support e - Creating a seed supply-demand partnership

Source: Fokabs, 2022

4.2.2.2. BREEDING

The environment is conducive for the rearing of cattle and other animals (small ruminants and poultry): cattle, sheep and goats are widely reared. Poultry farming is ubiquitous. Poultry farming has one particularity: although poultry is marketed, this area is renowned for its egg production. It is not only the country's largest producer, but also a source of eggs for other countries in the African sub-region (FEWS NET, 2021). Other products include kola nuts exported to Chad, Sudan and Nigeria, and avocados sold in Gabon and the Central African Republic.

Livestock ownership varies greatly, even among the wealthiest households. Livestock farming in the Bamboutos-Bakossi landscape has a very high added value. In the villages consulted, cattle, sheep, goats, pigs and poultry are reared.

The Peulh, also known as Mbororo, specialise in cattle and goat rearing. The semi-Bantu populations raise pigs and poultry. Annual livestock production is summarised in the table below.

Table 32 Average annual livestock production in the communes bordering the Bamboutos mountain range

Speculation/ localities	Babadjou	Mbouda	Batcham	Nkong Ni	Fongo Tongo	santa	Alou	wabane	Total
Cattle	800	494	1200	1200	655	38000	NE	2000	44349
Sheep	500	1500	1000	NE	110	NE	400	1500	5010
Goats	500	1600	1125	800	2155	NE	2400	1800	10380
Pigs	7000	22000	15000	3000	1382	13000	1200	400	62982
Poultry	25 000	65 000	55 000	110000	4 585	NE	800	3 000	263385

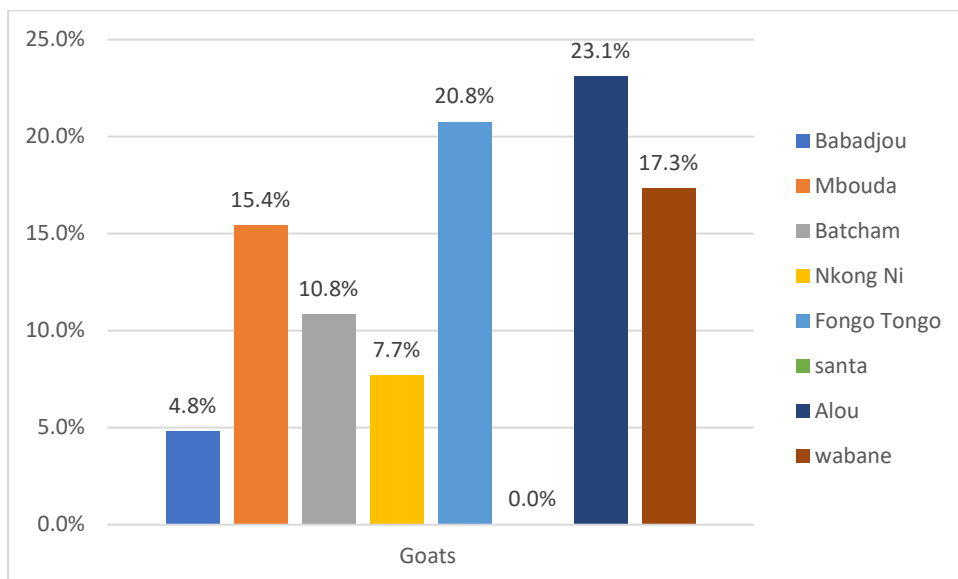
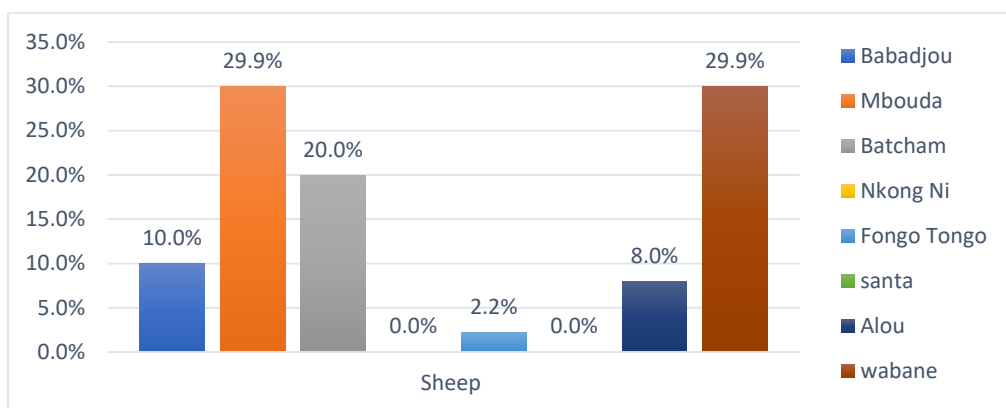
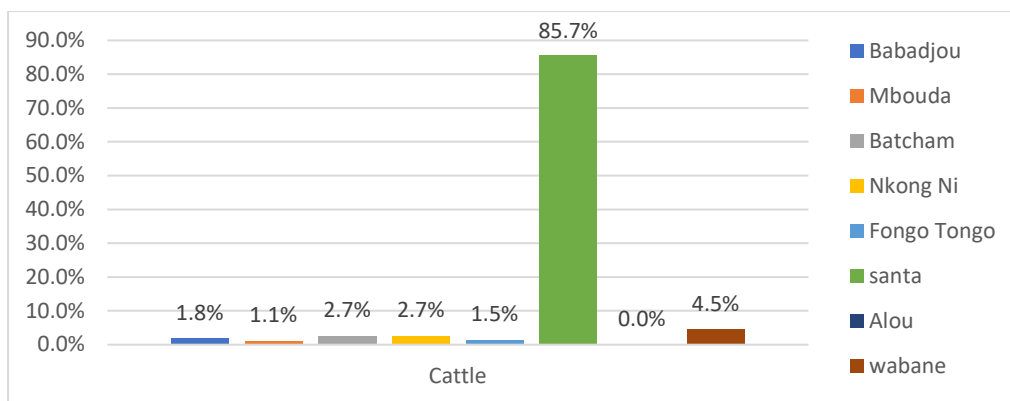
Source: Fokabs field data, 2022 and ITTO, 2014

Livestock farmers in the villages consulted, particularly the Mbororo, are required to pay a flat-rate annual tax of 3,500 CFA francs/head, a transhumance tax, an inspection tax and a market tax for the commune. To reduce the burden of paying these taxes, the Mbororo prefer to sell their livestock from the farms, with buyers travelling to the mountain tops.



Photo 26 Livestock on the summits of the Bamboutos Mountains.

Source: Fokabs, 2022



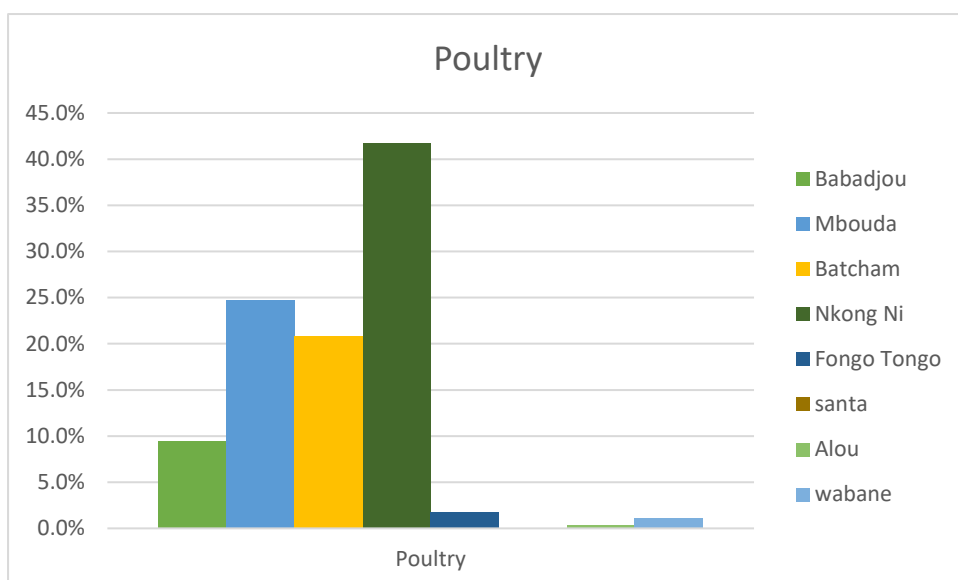
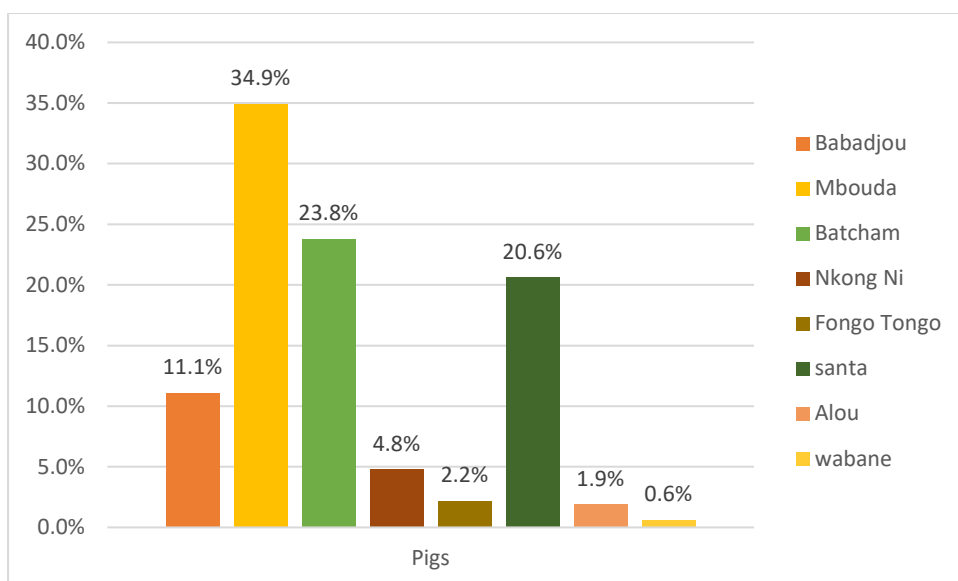


Table 33 Livestock production costs

Main speculations	Number of tonnes/litres per year	Average cost per tonne (FCFA)	Average cost per year (Fcfa)
Sheep	5010	25000	125250000
Goats	10380	25000	259500000
Pigs	62982	80000	5038560000
Poultry	263385	4000	1053540000
			13129200000

Source: Fokabs 2022 and estimate based on ITTO, 2014

In the cattle farming sector, the number of head of cattle has fallen considerably, from 8,000 to 4,000 in 2 years, due to the departure of breeders. This decline is explained by the recurrence of agro-pastoral conflicts due to the sedentarisation of the Mbororo. The sedentarisation of pastoralists has led to the destruction of crops by livestock, resulting in repression by farmers. These conflicts have had the effect of slowing down economic development in the villages occupied by sedentarised Mbororo and in which consultations have been carried out, weakening production among both herders and farmers.

The solution found by the Mbororo was to relocate their large livestock to other localities such as Ndé, Menoua and other grazing areas. This has resulted in a reduction in livestock numbers and a slowdown in economic activity in the villages consulted.

Other difficulties encountered in the livestock sector have been addressed through the following solutions identified during community and individual consultations.

Table 34 Solutions to difficulties in the livestock sector

Solutions	Description
Low-productivity breeds of cattle (struggling to produce 3 litres of milk a day)	- Encourage farmers to return to higher ground to improve the quality of their meat; -
Conflicts between farmers and livestock breeders	- Awareness-raising meeting between farmers and livestock breeders - Involvement of livestock farmers in pastoral activities
Grazing of low quality and quantity	- Favour forage crops - Le Bracaria - Raising awareness of forage crops - Development of fodder crops - Working directly with farmers
Pastoral school fields	- Creation of pastoral school fields
Transhumance corridors (agro-pastoral infrastructure)	- Marking out transhumance corridors - Marking the boundaries of farming and livestock areas

Source: Fokabs, 2022

4.2.2.3. FORESTRY

For reforestation purposes, silviculture plays an important role, particularly for the production of plant material that could be profitable. In the Bakossi-Bamboutos landscape, forestry is dominated by eucalyptus species, which account for more than 80% of other woody species. This dominance of eucalyptus on the slopes of the Mount Bamboutos is justified by 4 essential uses, notably in :

- Delimitation of cultivation plots ;
- Fencing to prevent agro-pastoral conflicts;
- Use as a windbreak ;
- Use as construction timber, timber and firewood.
- The highly hydrophilic nature of this forestry species (control of its population and gradual adoption of other alternative species).

One of the difficulties in this sector relates to the problem of involving the owners of private tree plantations. The forestry sector also has organisational problems, as in the case of the bamboo-raphia sector. This also partly explains the dominance of eucalyptus.

Eucalyptus has real potential for developing the local economy.

Table 35 Eucalyptus potential for the zone

Elements of characterisation	Description
Affordable eucalyptus costs	- For 1 ha of Eucalyptus: 2,500 plants - Price of a eucalyptus plant: between 250 fcs and 500 fcs - Total cost: between 300,000 fcs and 400,000 fcs
Level of profitability	- High return on investment
Level of social usefulness	- Electric poles (for Eneo) - Tables and benches (for classrooms)

	- Etc
Precaution	- Do not plant eucalyptus in low-lying areas

Source: Fokabs, 2022

4.2.2.4. HUNTING

As wild fauna resources have become very scarce due to the strong demographic growth in the area, there is very little hunting. The rare game that is caught is used for domestic consumption.

4.2.2.5. NON-TIMBER FOREST PRODUCTS (NTFP)

In the villages consulted, few NTFPs were mentioned during the focus groups. However, three NTFPs were identified as being an important source of income for the people who engage in this activity. These were raffia palm wine, black fruit, kola and *Prunus africana*. The table below lists these products according to their importance, as ranked by the people interviewed in the focus groups.

Table 36 Most important NTFPs according to the local population with high potential economic value in the Bakossi-Bamboutos landscape

N°	Local name	Scientific name	Average rank (n=6)	Frequency of quotation (n= 3 focus groups)
1	Raffia palm wine	<i>Raphia vinifera</i>	1.33	100%
2	Prunus	<i>Prinus africana</i>	1.0	33%
3	Black fruit	<i>Canarium schweinfurthii</i>	2.67	100%
4	Kola	<i>Cola anomala</i>	3.00	67%
5	Afframomum	<i>Afframomum</i>	4.7	60%
6	Biter kola	<i>Garcinia cola</i>	5.00	33%

Source: Fokabs, 2022

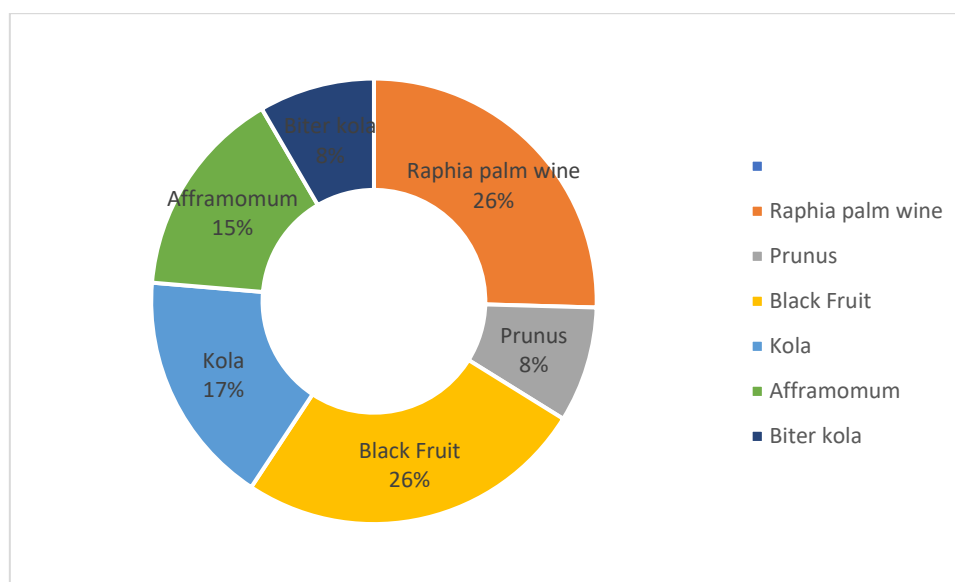


Figure 41 Most important NTFPs in the Bamboutos-Bakossi landscape.
Source: Fokabs, 2022

4.2.2.6. DEGRADATION OF THE MASSIF AND MINING

Some of the factors in the degradation of the massif linked to economic activities concern: i) the over-exploitation of former cultivated land; ii) the land management systems in the communities bordering the Mountain ; iii) the local methods of exploiting the land, which are marred by bad practices; iv) the socio-economic value placed on the land by these communities.

Mining is an important activity in the Bakossi-Bamboutos landscape. It takes the form of sand quarries (Tchouou, Mekoue Leuh sand quarries, etc), stone quarries (Ntoungha, Djingha, etc) and laterite quarries.

Tourism in the Bamboutos-Bakossi landscape is virtually non-existent. This is probably due to the fact that this activity is becoming increasingly neglected as a result of the degradation of the heritage, visitor infrastructure and lack of planning. However, tourism, particularly ecotourism, may offer better opportunities to complement or replace failing local development practices.

4.3. BASELINE AND PROJECT SCENARIOS FOR THE MAIN INCOME-GENERATING ACTIVITIES

4.3.1. BASIC SCENARIO

This section presents the baseline scenario of the socio-economic analysis in the Bamboutos-Bakossi landscape. It is a scenario favourable for the extension of plantations and crops into forest land.

Trends in agricultural yields are determined by taking into account the likely increase in cultivated areas in the Bamboutos-Bakossi landscape in the absence of projects.

4.3.1.1. AGRICULTURE

The Business As Usual scenario shows that between 2021 and 2026, cultivated land is likely to increase by just 0.22% and 98.4% of forest land remains stable, i.e. a decrease of 19,844.55 hectares by 2026 (Table 37). This is likely to occur in the less rugged south-eastern parts of the Bamboutos-Bakossi landscape, as in the Bamboutos area forest land has almost entirely given way to plantations and crops, even on the hillsides.

Table 37 Baseline scenario between 2021 and 2026

Category	Year BAU					
	2 021	2 022	2 023	2 024	2 025	2 026
Forest	569073.69	565 104.78	561 135.87	557 166.96	553 198.05	549229.14
Cropland	35726.31	38 486.85	41 247.38	44 007.92	46 768.45	49528.99

Between 2026 and 2031, cultivated land is likely to increase by 2,760.536 ha/year by 2031 compared with the reference year of 2026. Around 96.90% of forests are likely to remain stable, i.e. a decrease of 3968.91 hectares/year over the same period.

Table 38 Matrix of land use transition probabilities in 2031

Category	Forest	Mosaic crop and grassland	Cropland	Built up area	Water surface
Forest	0.969	0.0257	0.0045	0.0006	0.0003
Mosaic crop and grassland	0.1583	0.8065	0.0284	0.0066	0.0002
Cropland	0.013	0.0406	0.9402	0.0062	0

The evolution of agricultural yields and incomes (potatoes and market garden crops) in the Bamboutos-Bakossi landscape will therefore be a function of the increase in cultivated land in this landscape. According to this scenario, the probable yields and incomes expected by 2026 and 2031 will be higher than in the reference year 2021.

4.3.1.2. NON-TIMBER FOREST PRODUCTS (NTFP)

The quantities of non-timber forest products collected will also be influenced by the increase in the area under cultivation. The increase in NTFPs production and income will slow down by 2026 (Table 39 38 and). The quantities harvested will fall considerably due to the disappearance of forests and savannahs.

Table 39 Trend in Infp production

Years	Black fruit(Kg)	Kola(Kg)	Raphia wine (L)
2020	55	183	1460
2021	60	190	1500
2022	65	197	1540
2023	70	204	1580
2024	75	211	1620
2025	73	218	1660
2026	70	225	1700
2027	67	232	1740
2028	64	239	1780
2029	61	246	1820
2030	58	253	1860
2031	55	260	1900

Table 40Trend in income from nfl products

Years	Black fruit(Kg)	Kola(Kg)	Raphia wine (L)
2020	13000	52000	175000
2021	15000	57000	300000
2022	17000	62000	425000
2023	16500	67000	550000
2024	16000	68000	569000
2025	15500	67000	543000
2026	15000	66000	517000
2027	14500	65000	491000
2028	14000	64000	465000
2029	13500	63000	439000
2030	13000	62000	413000
2031	12500	61000	387000

4.3.2. PROJECT SCENARIO

The project scenario for the Bamboutos-Bakossi landscape shows a likely downward trend in agricultural yields and income as a result of the implementation of project activities, in particular the restoration of degraded land in the Bamboutos intervention site. Two phases will also characterise this scenario: a decline in agricultural production and then a recovery.

- Decline in agricultural yields

The fall in yields will be due to the reduction in cultivated areas. This reduction in cultivated areas will be due to the implementation of activities to restore degraded landscapes, which will impose limitations on the extension of plantations in forest and savannah lands. This will have a considerable impact on household food security and subsistence incomes, as these are essentially agricultural areas that derive their income from farming.

The limitations imposed by restoration will be partly offset by the practice of agroforestry. Agroforestry will also have a major role to play in boosting farm incomes and yields, as shown in tables 41 and 42 below.

Table 41 Cost-benefit analysis of agroforestry based on fruit trees: case of avocado (1 ha)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 7	Year 8	Year 9	Year 10
Cash out											
Land rental (100,000 Fcfa/ha)	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Purchase of 150 seedling /2000 Fcfa	300,000	0	0	0	0	0	0	0	0	0	0
Purchase input (fertilizer, pesticide)	25,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Clearing	50,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Operating costs	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
Total cash out	835,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Cash in											
Production (tonnes)	0	0	0	5	8	10	10	10	10	10	10
Selling price (Fcfa/ton)	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Total cash in	0	0	0	750,000	1,200,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Balance (cash in - cash out)	-835,000	-500,000	-500,000	250,000	700,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Cumulative balance (most be positive)	-835,000	-1,335,000	-1,835,000	-1,585,000	-885,000	115,000	1,115,000	2,115,000	3,115,000	4,115,000	5,115,000
IRR Total Net Cash Flow	26%	%									
Payback Period	5	No. of years									
NPV			1,761,701								

Table 42 Cost-benefit analysis of agroforestry: the case of eucalyptus

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cash out										
Land rental (100,000 Fcfa/ha)	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
Purchase of 2000 seedling /500 Fcfa	1000000	0	0	0	0	0	0	0	0	0
Clearing	50000	25000	10000	0	0	0	0	0	0	0
Maintenance of the plantation	50000	25000	0	0	0	0	0	0	0	0
Operating costs	360000	120000	60000	60000	60000	60000	60000	60000	60000	60000
Total cash out	1560000	270000	170000	160000	160000	160000	160000	160000	160000	160000
Cash in										
Proportion of trees exploited (%)	0	5	5	15	25	10	15	10	10	5
Production (number of stems)	0	100	100	300	500	200	300	200	200	100
Selling price (Fcfa/stem)	0	500	1000	2500	4000	5000	7500	10000	15000	20000
Total cash in	0	50,000	100,000	750,000	2,000,000	1,000,000	2,250,000	2,000,000	3,000,000	2,000,000
Balance (cash in - cash out)	-1,560,000	-220,000	-70,000	590,000	1,840,000	840,000	2,090,000	1,840,000	2,840,000	1,840,000
Cumulative balance (most be positive)	-1,560,000	-1,780,000	-1,850,000	-1,260,000	580,000	1,420,000	3,510,000	5,350,000	8,190,000	10,030,000
IRR Total Net Cash Flow	37%	%								
Payback Period	4	No. of years								
NPV	4,211,750									

- Recovery phase: increase in agricultural production increase

This phase will depend on the efforts made by beneficiaries to intensify farming, one of the project's main activities, in order to boost production and achieve a significant level of income. The project should enable farmers to settle down and increase their productivity by providing more appropriate agricultural inputs and building the capacity of farming associations and cooperatives in ecological agriculture (crop rotation, composting, use of improved seeds, etc.). These agricultural intensification measures must take place on land that is already being farmed (fallow land and plots of land in use), or on land that is earmarked for agriculture under land use plans.

4.4. MAIN ISSUES IN THE BAMBOUTOS-BAKOSSI LANDSCAPE

4.4.1. ECONOMIC ISSUES

The development of forestry represents a major economic challenge for the people of the Bamboutos-Bakossi landscape. There are many private owners of tree plantations. Involving them in the development of the forestry sector by increasing supply would be beneficial for the local economy. However, the main barrier to be overcome lies in the transition from the legal status of private plantations to that of private forests. Private plantations do not benefit from a certain degree of legality when it comes to selling timber products. On the other hand, the status of private forest allows trade in timber products to be carried out legally. Restoration activities in the Bamboutos-Bakossi landscape would promote the development of the local economy through the involvement of private plantation owners, job creation and new sources of income for local people.

- DEVELOPMENT OF ECOTOURISM

The Bamboutos Mountains offer enormous potential for the development of ecotourism.

4.4.2. ENVIRONMENTAL ISSUES

Environmental issues take the form of biophysical and ecological issues.

- DEGRADATION OF THE MOUNT BAMBOUTOS MASSIF

The need for agriculture and firewood has stripped the mountain, exposing it to erosion and the risk of landslides. This phenomenon is exacerbated by the use of bush fires for agriculture and sometimes hunting.

- INCREASING SCARCITY OF WATER RESOURCES

One of the major environmental issues in the Hauts Plateaux area is the preservation of water resources. The forest massif of Mount Bamboutos is the water tower of the West Cameroon region. However, for some years now, the massif has been subject to anthropogenic and natural pressures in the form of denser eucalyptus plantations (living hedges), which are drying out the massifs and lowering the water table, and the silting up of the Bamendjing water reservoir due to rain erosion on the summits. The result is recurring water shortages in the area and the drying up of watercourses. This shows just how serious the problem of water resources is in the highlands.

- CLIMATE CHANGE

Another major environmental issue concerns climate change in the Western Highlands. The Bamboutos Mountains act as a climate regulator in this region. There are cross-cutting solutions to the threat posed by agriculture in the Bakossi-Bamboutos landscape: the use of organic matter to fertilise the soil, and the use of agricultural varieties that are resistant to climate change.

4.4.3. HEALTH AND SAFETY ISSUES

Security issues relate to the potential impact of incursions by secessionists from the English-speaking part of the Bamboutos Mountains that could disrupt project activities. For example,

the potential for developing activities in the Commune of Babadjou could be hampered by these incursions into the Commune, thereby depriving the local population of potential sources of income and reducing poverty in the Commune.

4.4.4. SOCIO-CULTURAL ISSUES

The diagnosis of the current situation of the tourist industry showed that the national parks, the diversity of landscapes, cultures and culinary arts, the expanses of lakes, the areas of hunting interest, etc., offer the Bakossi-Bamboutos landscape an eco-tourist attraction and make it a tourist destination of choice. However, a major challenge lies in taking account of the Mbororo minorities through the development of mechanisms to promote their integration in the face of the changes brought about by the project.

The massifs of the Bamboutos Mountains are also the lifeblood of the local populations and of many towns in Cameroon and Central Africa.

4.4.5. SOCIO-POLITICAL ISSUES

The socio-political issues in the Bakossi-Bamboutos landscape are diverse but convergent. The degradation of the mountain ecosystem of the Bamboutos Mountains, caused by climatic variability, the fragility of this particular ecosystem and demographic pressure, justifies the renewed interest of the international community and the Government of Cameroon. The diversity of the problems in this area attracts a multiplicity of players and initiatives. As a result, many programmes and projects are focused on this area, with no real coordination of actions and activities between the various programmes, projects and stakeholders (NGOs, international organisations, MINADER, MINEPDED, etc.).

Faced with this abundance of initiatives and players, the consultations revealed the need to set up a platform for exchanges bringing together all the players operating in the Bamboutos Mountains in order to create a synergy of actions. This platform would also have the advantage of carrying out large-scale monitoring and evaluation of the various initiatives underway or proposed in the Mount Bamboutos, with feedback in the form of monthly or quarterly meetings.

In the Bamboutos - Bakossi landscape, most of the forest reserves are unclassified; they have no classification deeds, only creation deeds, some of which date back to the 1940s. For other reserves in the area, the deeds of creation cannot be found. As a result, there are countless difficulties in securing and preserving permanent forests.

The solutions collected during the individual and community consultations concern the finalisation of the process of transferring the selected reserves to the town halls, the drawing up of acts of creation and classification according to the needs of the reserves, and the drawing up of development plans where necessary.

5. WAZA LANDSCAPE

5.1. PROFILE OF FORESTS AND BIODIVERSITY IN THE WAZA LANDSCAPE AND SURROUNDING AREA

The Sudano-Sahelian impact zone of the project is a formation of wooded, shrubby and grassy savannahs that encompasses several categories of permanent forest representing a total area of 3,506,344 ha, i.e. 9 parks, 2 protection forests, 26 areas of hunting interest and 5 hunting areas managed by the community (Figure 42 and Table 43).

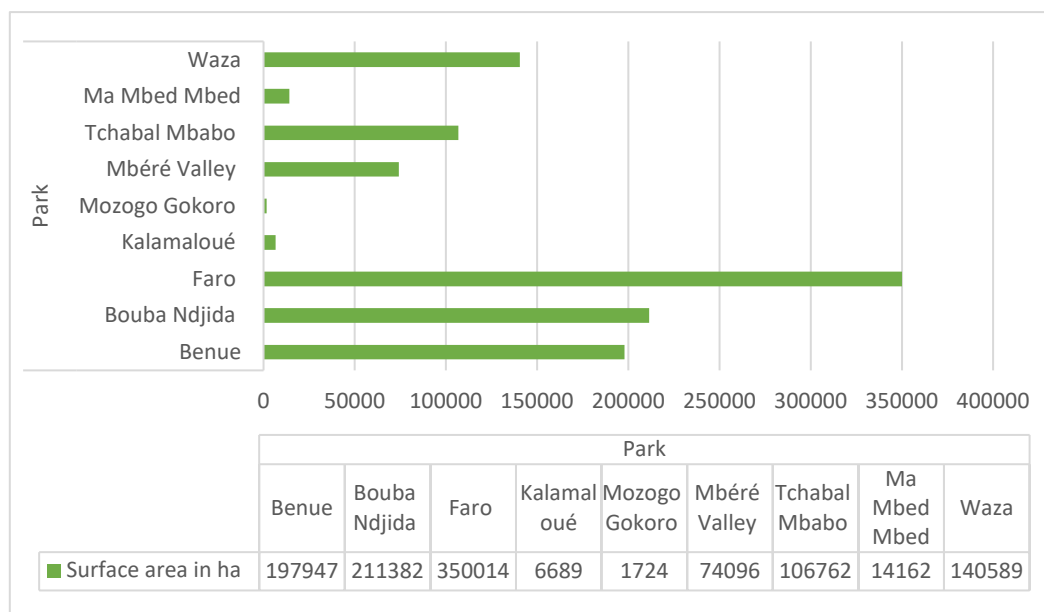


Figure 42 Surface area of National Parks in the impact zone.

Source: Fokabs, 2022

Table 43 Categories of permanent forest in the project's Sudano-Sahelian impact zone

Categories	Quantity	Surface area in ha
Parks	9	1103365
Protected forests	2	17432
Areas of hunting interest	26	2200425
Hunting areas managed by the community	5	185122
Total		3506344

Source: Fokabs, 2022

In the Waza landscape, the vegetation as a whole takes the form of Sahelian appearance, characterised by a thorny steppe of the genus *Acacia seyal*, strewn with *Balanites aegyptiaca*, which covers a grassy plain rich in annual and perennial grasses (Table 44 and Figure 43).

Table 44 Species with at least 100 individuals inventoried by zone

Zone	Scientific names	Families	Absolute abundance
West of the park	<i>Acacia seyal</i>	Fabaceae	5266
	<i>Anogeissus leiocarpus</i>	Combretaceae	859

	Balanites aegyptiaca	Zygophyllaceae	1888
	Combretum aculeatum	Combretaceae	836
	Combretum molle	Combretaceae	2257
	Guiera senegalensis	Combretaceae	4416
	Terminalia laxiflora	Combretaceae	526
East park	Acacia polyacantha	Fabaceae	116
	Acacia seyal	Fabaceae	3586
	Balanites aegyptiaca	Fabaceae	140
	Piliostigma reticulatum	Fabaceae	188

Source; Jiagho et al., 2016

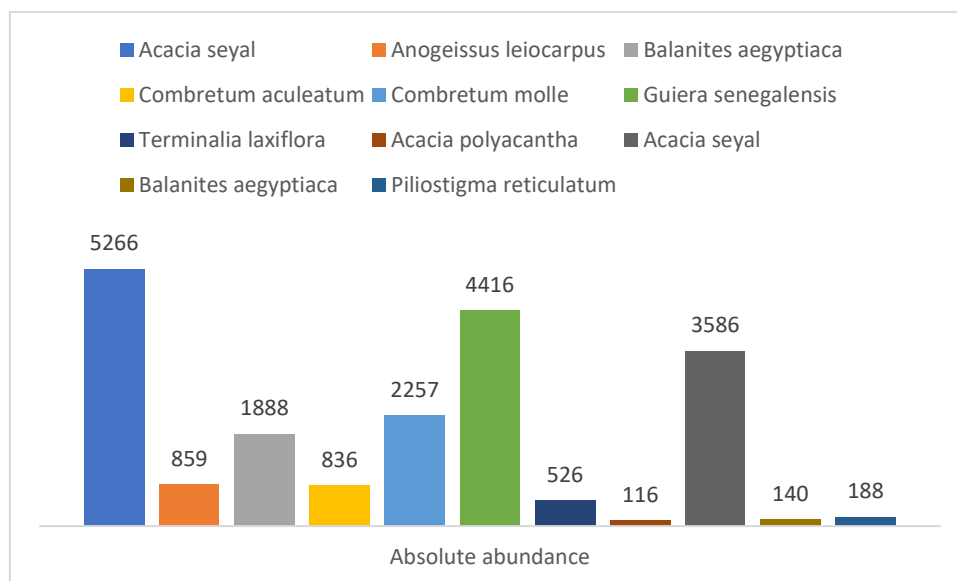


Figure 43 Woody species in the Waza landscape
. Source : Fokabs, 2022

This type of vegetation is made possible by the climate that prevails in the Waza landscape (Table 45). It is a semi-arid climate due to the landscape's location in the Sudan-Sahelian zone. This climate is characterised by a long dry season lasting between 7 and 8 months (October-May), interspersed by a period of haze lasting around 1.5 months (December-mid-January) and a short rainy season lasting 3 to 4 months (June-September). Maximum temperatures are between 40°C and 45°C in April-May and minimum temperatures between 18°C and 20°C in December-January, with average annual rainfall of 650 to 700 mm and average temperatures around 25°C.

Table 45 Distribution of plant formations in the WNP and its periphery

Location	Type of vegetation	Surface area of the park	Woody species
West	Treed vegetation	31%	Combretum molle, Anogeissus leiocarpus, Balanites aegyptiaca, Guiera senegalensis, Acacia seyal
Centre	shrubbery	27%	Acacia seyal, Balanites aegyptiaca, and some Piliostigma reticulatum
East	Grassy plain	42%	Sorghum arundinaceum, Hyparrhenia rufa, Oryza longistaminata, Ischaemum afrum, Vetiveria nigriflora, Panicum anabaptistum, Echinocloa spp.

Source: MINFOF, 2014

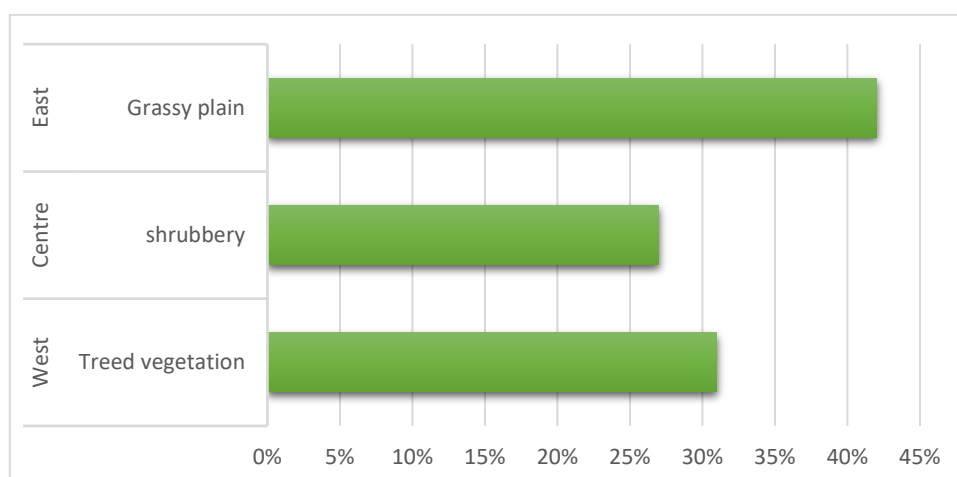


Figure 44 Distribution of plant formations in relative percentages.

Source: MINFOF, 2014

The soil type of this landscape also favours the particular vegetation of the Waza landscape (Figure 44). The characteristics of these soils are described in table 46 below.

Table 46 Topographical and soil characteristics in the PNW landscape

Topography and soil	Features	Notes
Relief	- Slightly uneven	
Altitude	- Between 300 and 310 m	- East to West - Low gradient in the yaérés
Mountain range	- Three inselberg hills of Waza	- Granite nature
Types of soil	- Tropical ferruginous ;	- Covered by a forest rich in Combrétacées
	- Planosols	- Dry forest cover with Anogeissus leicarpus associated with Lannea humilis
	- Vertisols	- Covered by shrub savannah with Acacia seyal
	- Hydromorphic	- Rich in clay, they form the floodplain known as the "yaéré", - Piliostigma reticulatum, - Balanites aegyptiaca, - Ziziphus mauritina, - Tamarindus indica etc

Source: MINFOF, 2014



Photo 27 *Acacia balanites* estate_Waza National Park.
Source: Fokabs, 2022

A recent study by Jiagho and Kabelong (2013) and IUCN (2014) gives an idea of the composition of woody species both on the periphery and inside the Park (see appendix). *Acacia balanites*, for example, can be found (photo 27).

Figure 45 below shows the vegetation composition of Waza.

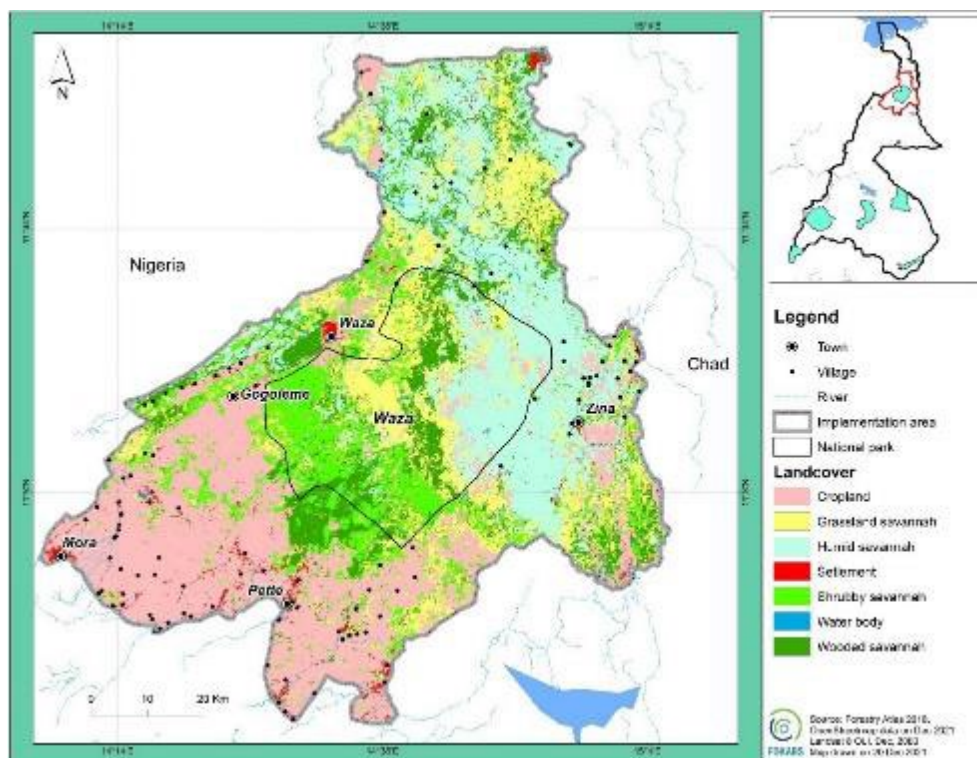


Figure 45 Vegetation cover of the Waza landscape. Source: Fokabs, 2022

In addition, communities living near the Waza National Park (WNP) collect various non-timber plant products in the park. The main NTFPs collected in the vicinity of Waza National Park and in the Yaérés include straw (e.g. *Andropogon* sp.) for roofing and making seccos, doum palm (*Hyphenae thebaica*) leaves for making mats, fences, ropes, etc., fruits such as jujube

(*Zizyphus mauritiana*), wild dates (*Balanites aegyptiaca*) and tamarind (*Tamarindus indica*) for local consumption, honey and gum arabic (from acacia trees).

Honey and plants used for their medicinal virtues exist in the area, but current production is unable to satisfy the medical sector, given that much of the production is consumed locally. What's more, gum arabic and honey could help boost the local economy by strengthening existing value chains and maintaining the cover of these species.

In terms of fauna (table 47), Waza National Park has an exceptional and diverse concentration of wildlife. There are herbivores, carnivores, rodents, primates, insects, reptiles, birds, etc. (See Appendix). In addition, the WNP is home to a large avifauna made up of more than 370 bird species, including more than 71 species of waterfowl, around twenty of which are migratory (Dodman et al. 1996). However, considerable changes are underway in the number and type of wildlife species found in this protected area.

Table 47 Status of wildlife species in the Waza landscape

Population status	Causes	Wildlife species
Missing	Changes in habitat, poaching and rinderpest	- Buffalo, (<i>Syncerus cafer cafer</i>), - Cob defassa (<i>Kobus ellipsiprymnus</i>), - Cheetah (<i>Acinonyx jubatus</i>) - Red-flanked duiker (<i>Cephalophus rufilatus</i>) - Harnessed guib (<i>Tragelaphus scriptus</i>)
On the brink of extinction	Changes in habitat, poaching and rinderpest	- Grimm's duiker (<i>Sylvicapra grimmia</i>) - Wild cat (<i>Felis silvestris</i>)
In decline	Capture of giraffons, poaching and burning of acacia foliage	- Giraffe (<i>Giraffa camelopardalis</i>) - Lions (<i>Panthera leo</i>)
Stable	Anti-poaching campaign	Elephant
Currently being restocked	Anti-poaching campaign	- Civet (<i>Civettictis civetta</i>), Serval (<i>Leptailurus serval</i>), - Fox (<i>Canis aureus</i>)
Growing	Strengthening protection efforts	- Buffalo cob (<i>Kobus kob</i>) ; - Damalisque (<i>Damaliscus korringum</i>) - Hippotragus (<i>Hippotragus equinus</i>) - Ostriches
Undetermined		- Elephants (<i>Loxodonta africana</i>)

Source: Fieldwork, adapted from MINFOF, 2014

However, due to the migratory phenomena of fauna and avifauna, the reports of extinction or decline observed for certain species need to be verified, particularly in terms of methodology, shifting of inventory periods, etc. Poaching is a major threat in the Waza Ramsar site. The survival of populations of lions (*Panthera leo*) and antelopes such as the Buffon's kob (*Kobus kob*) is seriously threatened (Scholte, 2013).

Traditional hunting is carried out in the Waza landscape for local consumption. However, there is also poaching for commercial and socio-cultural purposes. In the Waza area and its periphery, guinea fowl (*Numida meleagris*), mock ducks, Buffon's cob (*Kobus Kob*), damalisque (*Damaliscus konnigun*) and hypotragues (*Hippotragus equinus*) are the species most poached by local people (MINFOF, 2014). The seasonal migration of certain species out of the Park to the Yaérés during the dry season is another factor that increases the poaching rate.

Waza National Park is not watered by a permanent stream; only natural and artificial ponds can hold water during the rainy season to water animals during the next dry season (MINFOF,

2014). Some of these ponds are fed by floodwater from the River Logone. The eastern periphery of the park contains both artificial and natural ponds. In addition, this sector of the WNP is watered by semi-permanent streams, notably the Logamatya and Loromé-Mazra, where animals take refuge outside the park over distances of up to 100 km.

The park also has a water resource problem. The presence of water in the park depends on rainfall and flooding from the Logone or the Mandara Mountains. However, as a result of climate change and the reduction in rainfall, the ponds dry up more rapidly between March and June, closely followed by the arrival of the dry season. During this period, the yaérés zone has a few permanent pools until the next rainy season.

5.2. SOCIO-ECONOMIC PROFILE OF THE WAZA LANDSCAPE

5.2.1. SOCIO-CULTURAL AND ECONOMIC ENVIRONMENT

- ADMINISTRATIVE DIVISION

The Waza Landscape is located in the Far North region of Cameroon, with a total area of 655 789.50 ha. This landscape essentially covers the Waza National Park (PNW) and its periphery as shown in Figure 46. It extends between latitudes 11° 03' and 11° 30' North and longitudes 14° 28' and 14° 56' East, and forms an integral part of the project impact zone which covers the entire Sudan-Sahel zone of the country.

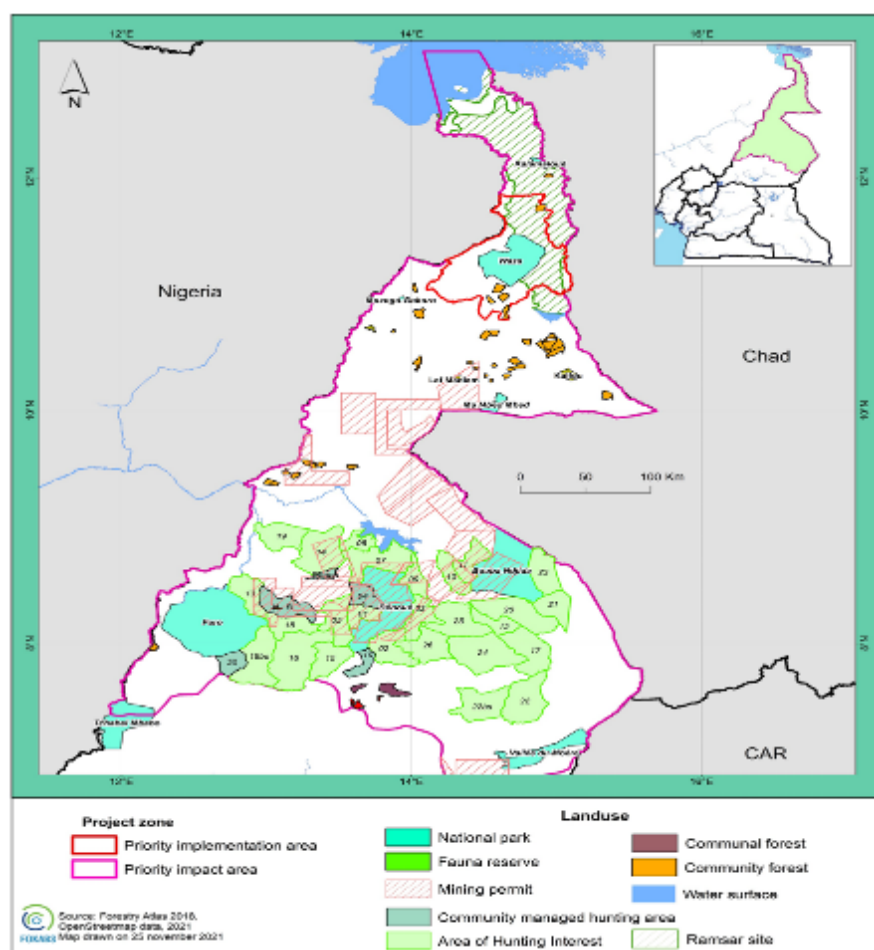


Figure 46 Spatial presentation of the project's Sudano-Sahelian impact zone
Source: Fokabs, 2022

The Waza landscape (Figure 47) is located in the Far North region of Cameroon, in the Arrondissement of Waza, Département of Logone et Chari. Its periphery extends into the Arrondissements of Zina (Logone et Chari Department) and Pétté (Diamaré Department).

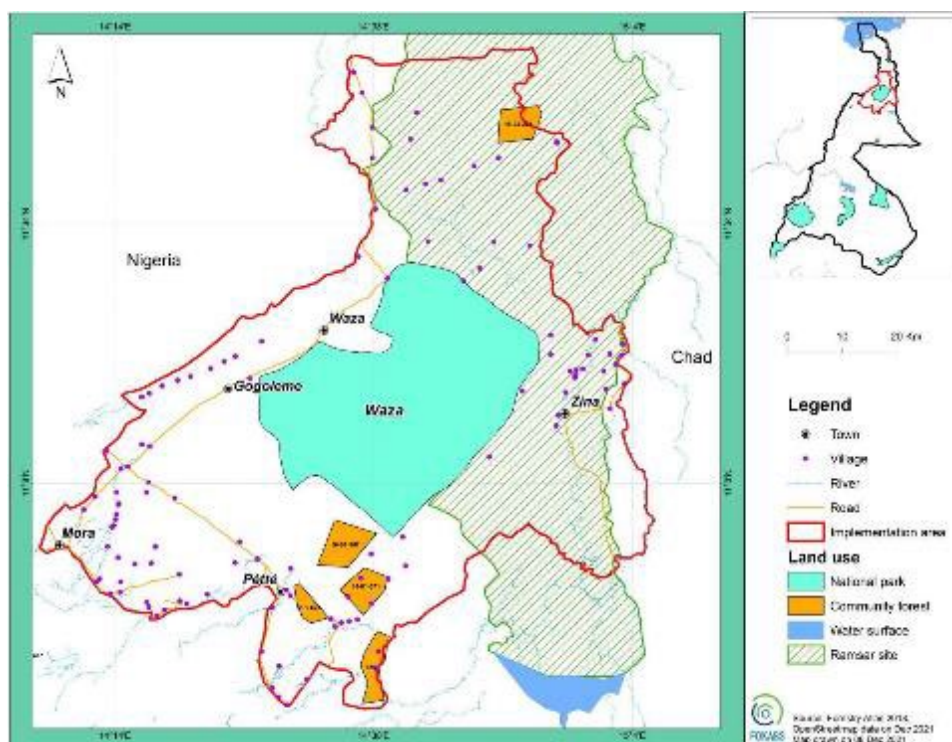


Figure 47 Waza intervention site
Source : Fokabs

This protected area has been a UNESCO Biosphere Reserve since 1982 and a Ramsar site since 2006. This change in status (Figure 48) reflects the importance accorded by the international environmental community to this protected area on the basis of its rich biodiversity and the benefits of its sustainable management for people and ecosystems.



Figure 48 Evolution of the status of the WNP

- INDIGENOUS PEOPLES AND ETHNIC GROUPS

Human density in the Waza landscape and its outlying area, at around 118.2 inhabitants/km², is one of the highest in Cameroon. The Waza area is a "crossroads" for the Far North region, which is one of the most densely populated regions in Cameroon, as well as in the Sudan-Sahel region. It is largely multi-ethnic and comprises 13 ethnic groups: Kanouri or Bornoï or Sirata, Arab, Kotoko, Mousgoum, Peuhl, Mafa, Toupouti, Moufou, Mada, MOUNGANG, Haoussa, Sara and Kera) spread across forty-eight villages and the town of Waza (MINFOF, 2014).

The people of the Far North had to adapt to the creation of the Waza hunting reserve, which later evolved into a National Park (PNW). The protected area led to the eviction of several villages and encampments of fishermen and herders that remained inside the Park, which was once densely populated. Only the village of Baram (mostly fishermen) remains within the WNP. In terms of human settlement, the Park area now represents a large empty space

marked by an uneven distribution of population. However, in recent years, as a result of strong demographic growth, the riparian population of the protected area has increased considerably.

The Waza landscape extends over 3 divisions and 3 sub-divisions, as shown in table 48 below:

Table 48 Distribution of localities bordering Waza National Park

Arrondissement (communes)	Waza (City Waza)	Zina (Zina ville)
Communities (neighbourhoods/villages)	Awaram, Bakié, Goneri, Kidjimatari, Lariski, Walassa, Waza garrou	Zina I, ZINA II

Source: BUCREP, 2010

Mayo Sava Department Diamaré Department

Arrondissement (communes)	Mora (mora ville)	Petté (small town)
Communities (neighbourhoods / villages)	Amcheli - fike, Amtchali tingola Amtchalia, Atchali namja wasa, Gare, Manawatchi, Massere iii, Mehe, Mora, Mora amtchali samari Mora djermé, Mora fike I, Mora fike ii, Mora galbi i (wadawai), Mora galbi v, Mora igagoua I, Mora igagoua ii, Mora massere ii, Mora vowawa, Mora walkame, Saré sultanat wandala, Barkama hamidou Mora sandalé ii	Amma haïri, Badadaï, Bagarissé mango, Djadjel kalhali, Djafourwo Djouta bembal, Djouta boundou Eréo, Fadaré wouro habirou Foftourou, Fardaré, Garré, Korniré wadi, Kournougnou, Kourwama dogo, Kourwama yaya, Kourwamayel, Louggueo ou yidi ou yoldeo, maya, mbordam wanko Tchakamadje, Tchalinga, Téro Toutka, Woïka, Wouro abba yaya Wouro bouldoumdjé, Wouro faourou, Yakatao, Yoldé naggué Yoldé ngarba

Source: BUCREP, 2010

Table 49 Summary of riparian communities in Waza National Park.

Regions	Far North			
Departments	Logone and Chari		Diamaré	Mayo Sava
Communes	Waza	Zina	Mora	Pette
Communities	7	2	23	31

Source: BUCREP, 2010

Figure 49 shows the distribution of riverside communities in the Waza landscape.

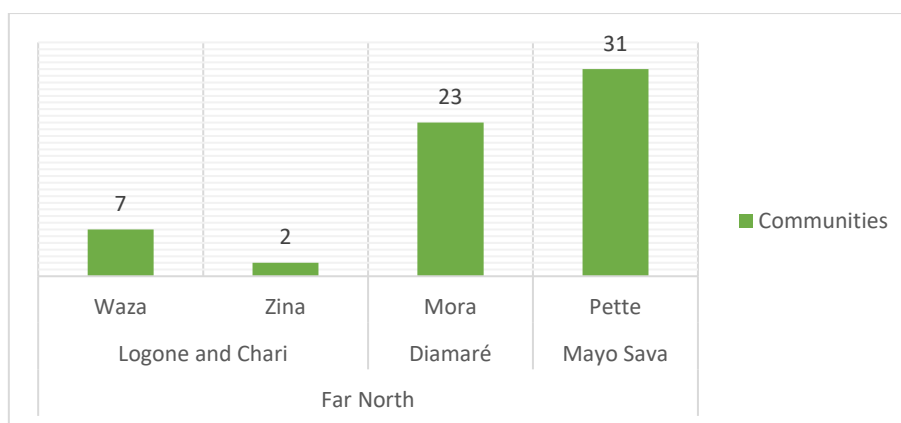


Figure 49 Distribution of riparian communities in the Waza landscape.
Source: Fokabs, 2022

Table 50 shows the demographic statistics for the target localities.

Table 50 Demographic statistics in the target localities of the Waza landscape.

Departments	Borough	Villages/ Neighbourhoods	Estimated population (2021)	Percentage by rounding
Logone-et-Chari	Zina	Zina	2,683	10%
Logone-et-Chari	Zina	Lougouma	460	2%
Logone-et-Chari	Waza	Waza	2,402	16%
Logone-et-Chari	Waza	Niwadji	830	2%
Logone-et-Chari	Waza	Djeguere	303	0%
Diamaré	Pette	Badadaï	371	1%
Logone-et-Chari	Waza	Diguina	562	4%
Diamaré	Pette	Pette	16,574	45%
Mayo Sava	Mora	Mora	25,567	14%
Logone-et-Chari	Waza	Bakié	1,915	13%
Total				

Source: Field data, 2022

Based on the use of official documents from the INS, the decentralised services of MINADER, consultations at community level and scientific literature, the distribution of populations in and around Waza National Park is shown in table 51 below.

Table 51 Population of men and women in the target localities.

Boroughs	Men (2021)	Women (2021)	Total population (2021)
Zina	1,328	1,354	2,683
Lougouma	233	227	460
Waza	1,190	1,211	2,402
Niwadji	412	417	830
Djeguere	153	149	303
Badadaï	206	165	371
Diguina	293	268	562
Pette	8,290	8,284	16,574
Mora	12,76	12,798	25,567
Bakié	973	943	1,915
Total	25,852	25,817.05	51,669

Source: Field data, 2022 and Bucrep

The distribution of the indigenous populations consulted is as follows (Figure 50):

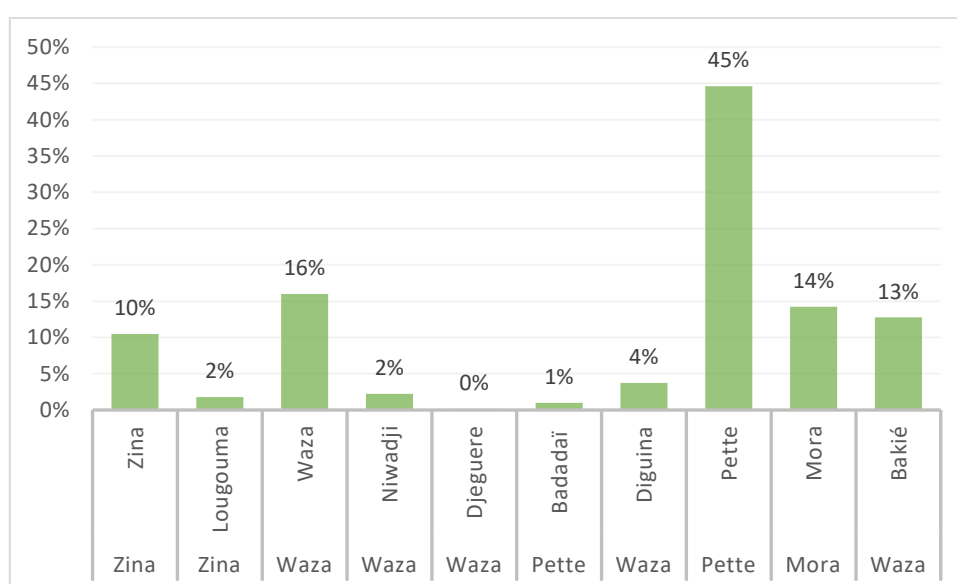


Figure 50 Relative percentage of the population of the villages consulted in relation to the districts.

Source: Field data, 2022

- CRAFTS

Handicrafts have developed considerably in the villages consulted. It represents a significant source of income. There are an increasing number of blacksmiths who make knives, machetes, arrows, milking guns, axes, etc. There are also weavers in the area, and local people use palm leaves for mats, straw for roofs and fishing tools, and bark for ropes.

- WATER AND MINING RESOURCES

The villages consulted are characterised by limited water resources. Water has become a determining factor in the survival of wildlife species and human communities due to its increasing scarcity.

In terms of mineral resources, oil explorations have been carried out around ten kilometres from Waza Park.

- TOURISM AND TOURISM POTENTIAL

Since 2012, around 3,000 visitors have visited the park each year compared to very high attendance in the past (Jiagho, 2018). This visitation appears to have been declining for less than a decade. In the 1970s, the WNP was one of Cameroon's national parks, with the highest density of wildlife and the largest number of tourists coming to admire the elephants, lions and giraffes. However, a number of events have affected the attractiveness of the area and reduced the park's visitor numbers (almost zero since 2014): i) the construction of the Maga dam in 1979; ii) the hydrological rehabilitation of the Waza Logone floodplain in 1997-2000; iii) poaching; iv) climate change, and; v) insecurity in the area. These factors have led to a sharp drop in the number of people visiting the park since the 1990s. Growing insecurity has only exacerbated an already existing situation.

- LAND TENURE AND ACCESS TO LAND

The land tenure system in the villages consulted is traditional. It is controlled by traditional chiefs, who remain influential. Like modern legislation, customary law plays an important role in the management of natural resources and land at local level. Access to land in the villages is regulated by customary law.

This is exercised by the traditional authority at village level, which is its legitimate custodian.

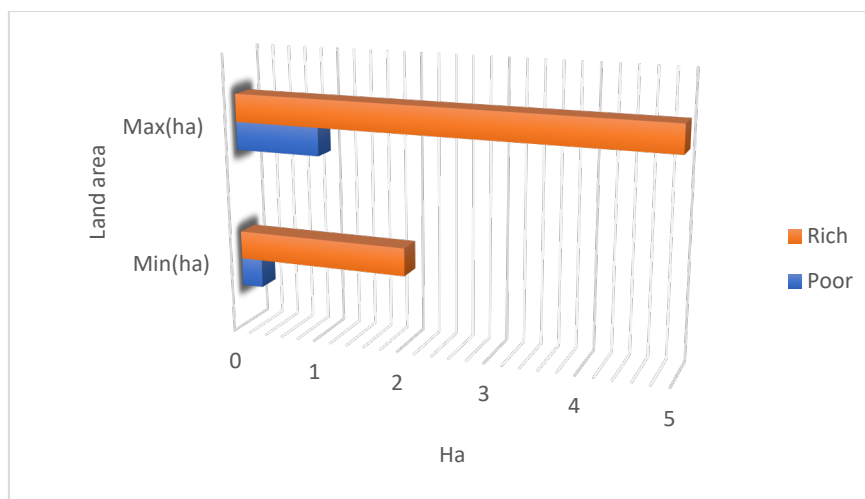


Figure 51 Land ownership by rich and poor.
Source: Fokabs, 2022

Less well-off rural households own an average of 0 to 0.5 ha of land. Wealthier households own an average of 2 to 5 ha of land (Figure 51).

- INFRASTRUCTURE

In terms of road infrastructure, roads around the WNP provide easy access to the park. The WNP is located 120 km, or 2 hours' drive, from Maroua. Access to the park via the neighbouring districts (Petté and Zina) is by unsealed road. As a result, the condition of some of the access roads to the park does not motivate tourists to visit the WNP.

With regard to educational infrastructure, the distribution by commune of infrastructure dedicated to education in the Waza landscape reveals an insufficient level of educational structures compared to the population occupying this territory. With a school enrolment rate of 48%, the commune of Waza has 01 nursery school, 10 primary schools, 01 high school (MINFOF, 2014). The commune of Zina has 08 parents' schools, 18 public primary schools and 01 lycée d'Enseignement Général. As for the commune of Petté, it has 15 primary schools and 01 secondary school.

In the Waza landscape and its periphery, health cover is not non-existent, but it is very poor: there is the Waza Health Centre attached to the Mora District Hospital, two Integrated Health Centres (IHCs) in Zina, the Swiss Social Foundation Centre and the Alagarno Health Centre in Petté. There are few medical facilities in the area around the park, and the low rate of use is due to the poverty of the local population and the preference for traditional medicines.

- HABITAT

As far as housing in rural areas is concerned, the grouped nature of family concessions (Saré) is very noticeable. There are also hamlets of nomadic and sedentary farmers and herders along the communication routes. In urban centres, particularly Maroua, the density of housing is remarkable, with a gradual slackening of the central core towards the periphery.

- GENDER, CONFLICT AND INSECURITY

In terms of gender, women and children are the most vulnerable populations in the villages consulted, and indeed in the Sudano-Sahelian zone as a whole. The strong traditionalist roots in all these villages mean that, in terms of rights and duties, women and children have fewer rights than men, but more duties. The traditionalist realities in these predominantly Muslim villages indicate the high vulnerability of women and children in the villages consulted.

In terms of security, the pillars of the local economy (livestock farming, agriculture, cross-border trade and tourism) are currently being severely disrupted by the Boko Haram phenomenon. In some of the villages consulted, agricultural activity has been severely

disrupted by repeated incursions by the insurgents. The pastoral economy is suffering the same fate due to the disruption of seasonal transhumance and the increasing despoiling of shepherds who dare to venture into high-risk areas. The tourism sector is also experiencing an unprecedented decline.

In terms of conflicts, we note the following :

- Conflicts between livestock farmers and wildlife: These result from the intrusion of livestock into the protected area during transhumance; the herds are thus victims of predation by wild carnivores (lions, hyena, jackal) on the Waza-Logone plain; in the Waza National Park, for example, conflicts between men and lions have occurred regularly in six villages, resulting in the slaughter of lions. As a result, the lion population in the Park has fallen from around 50-60 specimens to 14-21 animals.
- Conflicts between farmers and wildlife (Tables 52 and 53): these result from the damage perpetuated by elephants and baboons during their migratory movements in the peripheral zone of the park in the dry season in search of water and in the rainy season in search of quality fodder.
- Conflicts between farmers and herders; These conflicts stem partly from the damage caused by cattle seeking pasture in fields with standing crops (FEWS NET, 2019). This situation is also justified by the general transhumance observed in the dry season of cattle herds from the North, Chad and the Central African Republic.

Table 52 Example of crop raiding by elephants:

Location	Administrative Units	Speculation	Areas	Date
Waza National Park	Bogo district	Maize, watermelon, groundnuts, potatoes, manioc, millet, fonio	209.5 ha	October 2007
	Dargala district: 6 villages	Sorghum, cowpea, cotton	17.5ha	November 2007

Source: ITTO, 2014

Table 53 Examples of conflicts between farmers and wildlife

Parc National de Waza : partie nord	Goulfey, Fadjé, Afadé, Kalakafra, Waza, Zigué, Khalkoussam, Mara, Logone Birni	Décembre-juin Saison sèche	Extrême-Nord
Parc National de Waza : partie sud	District de Dargala et Arrondissement de Bogo : Folou, Midjivin, ko	Juin-décembre Saison des pluies	Extrême-Nord

Source: ITTO, 2014

Conflicts between farmers, herders and park authorities are recurrent in the region due to demographic pressure, deforestation and occupation of grazing land (MINFOF, 2014).

- RELIGION AND CULTURE

As the villages are essentially Muslim-occupied, many areas of everyday life are governed by this cultural identity. Despite the predominance of Islam in these villages, Kanouri, Arab choas and Kotoko dances can be observed. The local people practice donkey racing and traditional wrestling. There are also Kanouri, Kotoko, Mousgoum Arab choas and Peul cultural festivals.

As far as food is concerned, Muslims in the area do not eat pork or alcoholic beverages. However, the consumption of rice porridge, chai, bilibili and many others is deeply rooted in their customs.

The local people in and around Waza use doum palm leaves for mats, straw for roofs and bark for ropes. Blacksmiths make knives, arrows, machetes, milking rifles, axes and so on. There are also weavers in the area (Minfot, 2014).

- **TRADITIONAL CHIEFTAINCY**

There are three types of traditional chiefdoms in the Waza landscape:

- First-degree chiefdoms (Logone Birni and Pétté) ;
- Second-degree chiefdoms (Waza, Zina and Ngamé);
- Third degree chieftaincies (Mahe).

These various chiefdoms are managed either by a Sultan or a Lamido, depending on the local context, known as "Blama'a".

5.2.2. MAIN INCOME-GENERATING ACTIVITIES

The people of Waza live mainly from agriculture, livestock farming and fishing, all of which are concentrated around rivers and streams that provide pasture, water and arable land.

5.2.2.1. AGRICULTURE

In the villages consulted, farming is one of the main activities practised by the working population. The agrarian landscape in the villages consulted is characterised by farms of 0 to 0.5 ha for the poor and 2 to 5 ha for the better-off households.

In the flood plain zone, the soils are clayey and silty, moist and fertile. This favours the production of sorghum in the dry season (the main crop), as well as market garden produce and maize. These are off-season crops. The following crops were identified during the community consultations (Figure 52): red millet, maize, niebe, cotton, onions, sorghum and rice. The average number of annual cycles is 3 for most of these crops, including off-season crops.

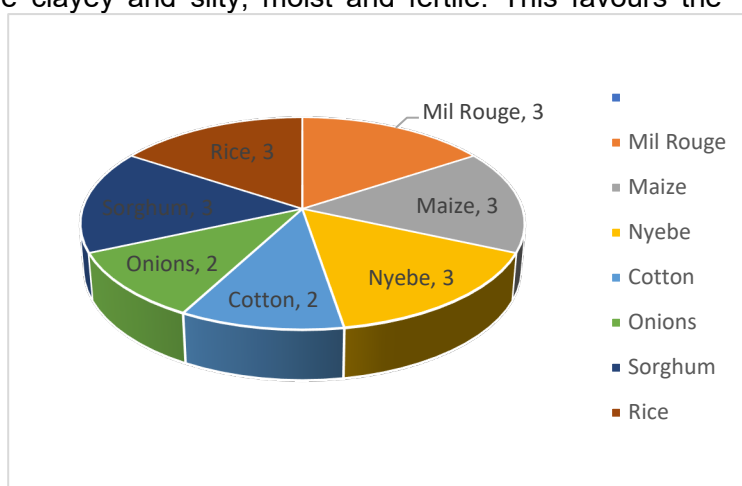


Figure 52 Main agricultural crops and annual cycles.

Source: Field data, 2022

In terms of agricultural yields in the villages consulted, cotton is the crop with the highest yields, as shown in Figure 53 below:

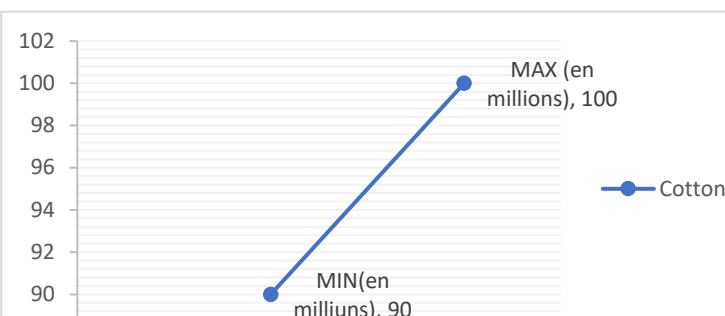


Figure 53 Annual cotton yields in the villages consulted

Source: Field data, 2022

The main food crops are cereals, particularly rainfed sorghum, small millet, muskuwari, maize, cowpeas, groundnuts, okra, Guinea sorrel, voandzou, sesame, and rice s (Figure 54). The cultivation of these crops is strongly correlated with rainfall in this zone.

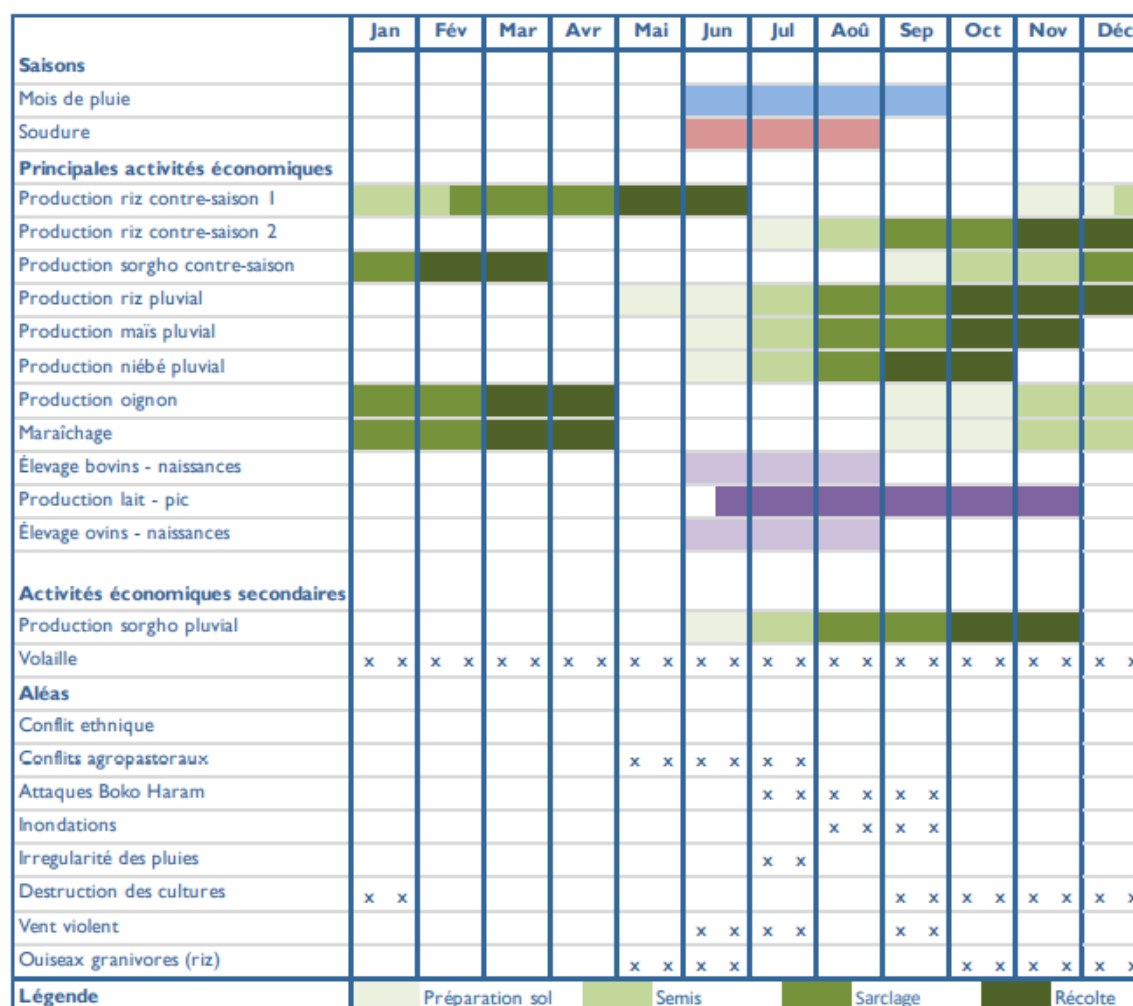


Figure 54 Annual distribution of agricultural activities in the Waza landscape.
Source: FEWS NET, 2021

At the same time, rice and groundnut cultivation in particular have declined in favour of the emergence of other sectors such as onions, yams and cowpeas, production of which is said to have doubled in the last decade (Republic of Cameroon, 2021).

The 400 to 600 mm of annual rainfall is sufficient to produce rainfed sorghum and maize, as well as cowpeas and rainfed rice. Irrigated rice production is also significant, with two harvests a year.

Figure 55 shows the annual yields in the localities consulted in the Waza landscape.

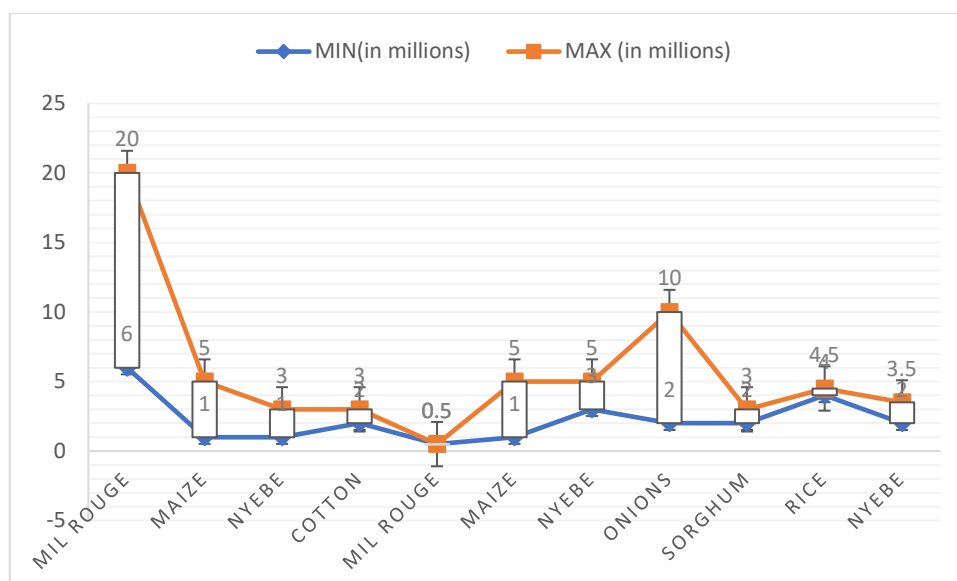


Figure 55 Annual yields of the main crops in the villages consulted.
Source: Field data, 2022

The average area cultivated varies from one crop to another. However, the results show that sorghum, finger millet, cotton and cowpea occupy the largest areas (Figure 56).

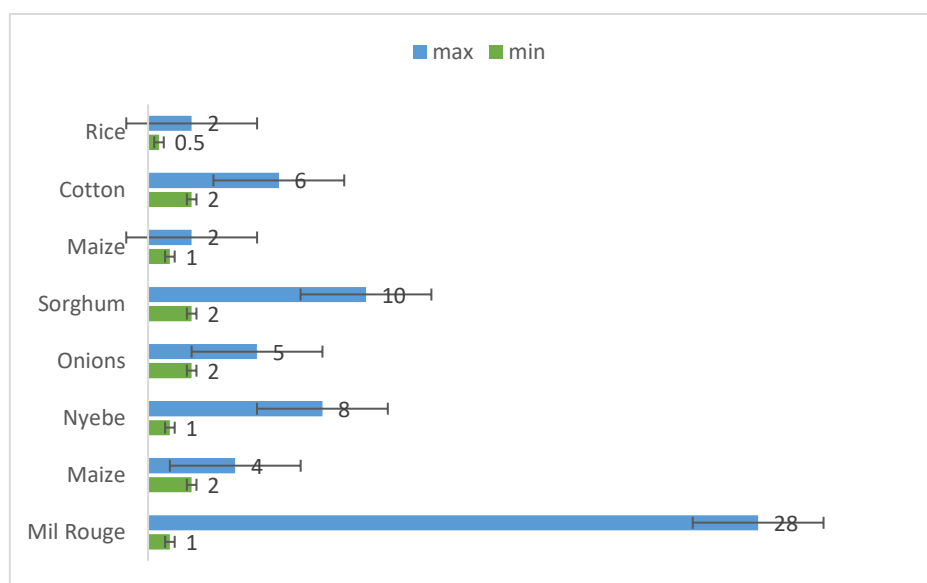


Figure 56 Minimum and maximum areas cultivated per year.
Source: Field data, 2022

The crop with the highest average annual costs per hectare is onions. It is closely followed by cotton, red millet and sorghum (Figure 57).

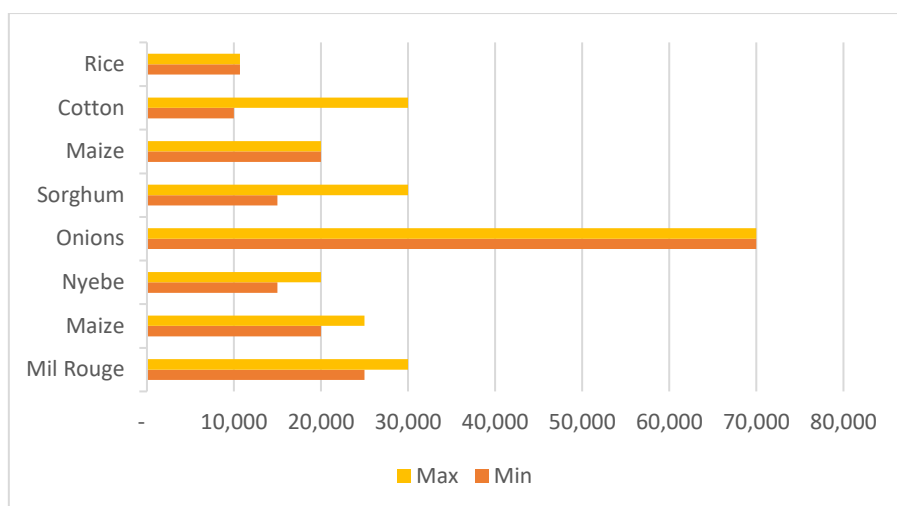


Figure 57 Average costs per hectare for the main crops.
Source: Field data, 2022

However, the agricultural sector in Landscape Waza is experiencing a number of difficulties that are hampering its take-off. Table 54 below provides a summary of these difficulties and possible solutions.

Table 54 Solutions to difficulties in the agricultural sector in the selected village economies.

Difficulties	Solutions
Delayed rains	Making available and optimising the distribution of climate information and forecasts by the ONACC
Destruction of plots by livestock	Create collaboration platforms between the decentralised services of MINADER and MINEPIA in the Far North region and the Logone and Chari departments.
Lack of technical advice	Disseminate sustainable agricultural techniques (SMART) through capacity building
Increasing scarcity of water resources	Promoting sustainable use of water resources
High cost of agricultural inputs	Technical support for farmers
Decline in farm yields	Support for agricultural inputs Encouraging SMART farming practices
Destruction of plots - Bush fires.	Organising people into specialised socio-professional groups
Presence of insects, caterpillars, mice	Fertiliser subsidy

Source: Fokabs, 2022

5.2.2.2. BREEDING

As far as pasture is concerned, the increase in flooding is encouraging the return of the protein grasses *Vetiveria nigrita* and *Echinochloa pyramidalis*, which are replacing less valuable woody species such as *Sorghum arundinaceum*.

The main livestock products in the villages consulted are cattle (especially oxen), horses, poultry (mainly chickens) and goats (especially sheep and goats), as shown in Figure 58.

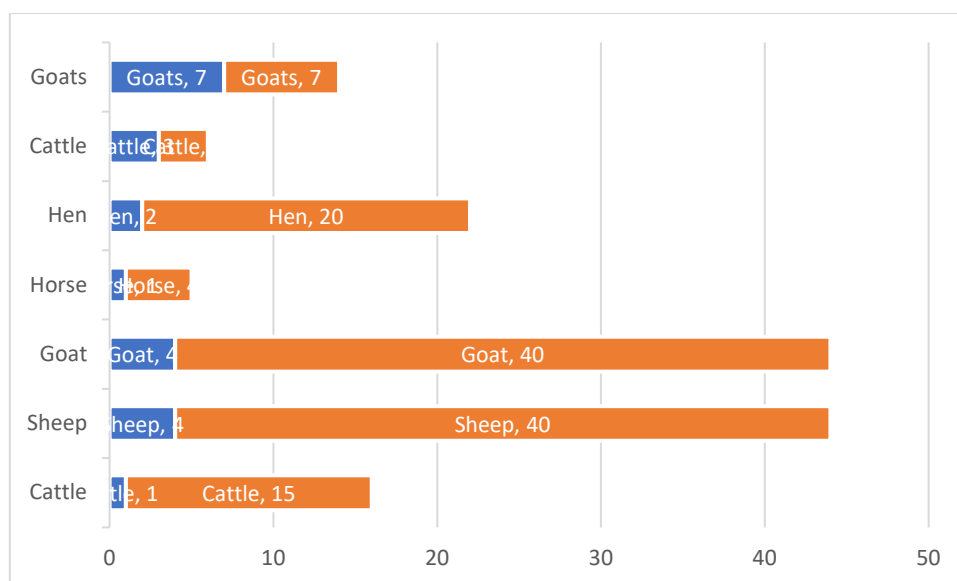


Figure 58 Average number of head for each livestock species.
Source: Fokabs, 2022

Based on the consultations in the selected villages, it appears that the costs attributed to cattle rearing are the highest, with specific costs for sheep and horses, as shown in Figure 59.

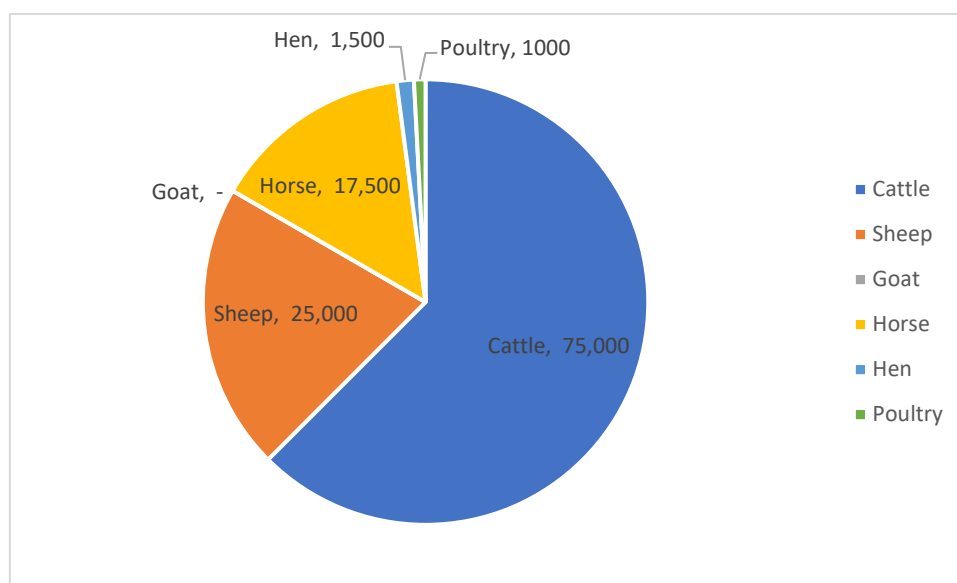


Figure 59 Average livestock production costs in the villages surveyed.
Source: Fokabs, 2022

The populations of the villages consulted depend more on the sale of livestock and much less on the sale of crops. The cattle, zebus of the Mbororos breed, are transported by truck to markets of Nigeria and Gabon, as well as to the major cities of Cameroon like Yaoundé and Douala, where small livestock are also transported.

However, due to incursions by Boko-Haram, owning cattle has become a risky practice, and the annual transhumance of herds to the lake region and to Logone-Birni and Zina in the south has been reduced.

The villages consulted are characterised by rich pastures due to the high soil humidity, and by the presence of large numbers of cattle. There are three livestock farming systems in the area (Figure 60): nomadic, transhumance and sedentary.

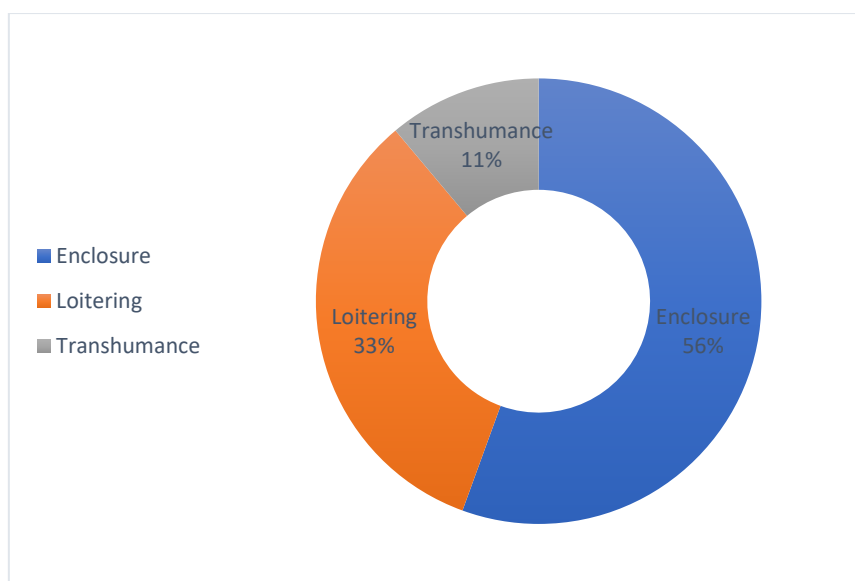


Figure 60 Livestock farming systems in the villages surveyed.
Source: Fokabs, 2022

Generally speaking, in the Far North region, livestock breeds include: cattle (zebus or *Bos indicus* and bulls or *Bos taurus*); sheep; goats; pigs and poultry (Minfof, 2014). The vast majority of livestock farmers are sedentary agro-pastoralists who entrust their herds to shepherds during transhumance.

In the dry season, there is a general transhumance of cattle herds. These may be herds belonging to Cameroonian farmers or originating from Chad or Nigeria. Local herds may also move within the same area in search of abundant pasture.

In 1974, the total area of pastureland was 7 million hectares for 160,000 head of cattle (Figure 61).

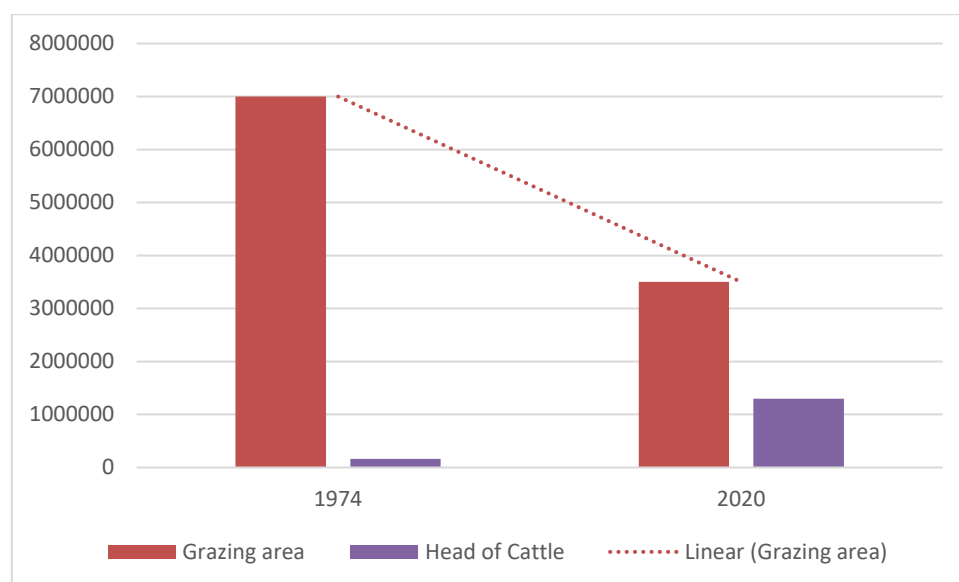


Figure 61 Comparative change in pasture area and cattle numbers: 1974 and 2020
Source: Adapted from MINPOSTEL, 2021

The livestock sector is experiencing several problems (Table 55), namely: agro-pastoral conflicts in transhumance areas; human-wildlife conflicts (in and around the WNP); diseases (rinderpest or swine fever); shortage of veterinary products, low rate of marketing; degradation

and inadequacy of pastures; theft of livestock (MINFOF, 2014). In the villages consulted, the main difficulties and solutions are presented below:

Table 55 Difficulties and solutions to livestock farming in the villages consulted.

Difficulties linked to breeding	Solutions recommended during consultations
Difficult access to fodder and high cost of oil cakes	Promotion of Ranch Com. with forage fields, water and other livestock facilities
Lack of water in the area	Promotion of biogas - electricity and heating
Insecurity (destruction of livestock)	Fence around the Park
Difficult access to forage	Fodder plantation
Conflicts with farmers	Promotion of Ranch Com. with forage fields, water and other livestock facilities
Diarrhoea caused by too many flies	Promotion of biogas - electricity and heating
Insecurity	
Difficult access to forage	
Drying	

Source: Fokabs, 2022

5.2.2.3. FISHING AND FISH FARMING

The villages consulted offer some fishing opportunities. Fishing is practised in the river system of the Logone, the yaérés using fishing canals and also in Lake Maga. It is estimated that more than 12,000 tonnes of fresh fish are harvested annually from the Logone floodplain and 2,000 tonnes from Lake Maga (IUCN-Waza Logone Project, 2000). The main species found in the area are catfish, eels and carp. However, as a result of the drought and the increase in the number of fishing channels, the quantities fished have fallen considerably. The problem is particularly acute in the Yaérés, which no longer act as breeding grounds during flood periods due to overexploitation (MINFOF, 2014).

5.2.2.4. FIREWOOD

The collection of firewood is a major factor causing deforestation in the area. People in and around the WNP experience it the most. Some people collect firewood for commercial purposes. This confirms the findings of Jiagho (2009), who placed the collection of firewood as the third most important driver of deforestation, ahead of agriculture and livestock. Local people collect wood (mainly acacia) to smoke fish and/or meat for sale and for family use (firewood).

5.3. BASELINE SCENARIO AND PROJECT SCENARIO

5.3.1. BASIC SCENARIO

This section presents the baseline scenario of the socio-economic analysis in the Waza landscape. This is a scenario that favours the extension of plantations and crops into forest land.

Trends in agricultural yields are determined by taking into account the likely increase in cultivated areas in the Waza landscape in the absence of projects.

5.3.1.1. AGRICULTURE

The Business As Usual scenario shows that between 2021 and 2026, the loss of wet savannah is estimated at 2 439.85 ha/year. Plantations and crop fields will increase in area by around 4 804.95 ha/year (Table 56).

Table 56 Baseline scenario between 2021 and 2026

Category	Year BAU					
	2021	2022	2023	2024	2025	2026

Humid grassland savannah	236204.5 5	233764.70 4	236204.5 5	236204.5 5	236204.5 5	224005.32
Cropland	210025.0 8	214830.03 6	210025.0 8	210025.0 8	210025.0 8	234049.8 6
Grassland	107414.7 3	106532.56 8	107414.7 3	107414.7 3	107414.7 3	103003.9 2
Forest	88811.28	87051.74 4	88811.28	88811.28	88811.28	80013.6

Between 2026 and 2031, it is possible that plantations and crop fields will increase in area by around 4 729.02 ha each year, i.e. a probability of 0.83% between now and 2031 compared with the reference year of 2026 (Table 57). Forests will be converted by around 16.29% and will lose an area of 1 533.64 ha/year by the same date.

Table 57 Baseline scenario between 2026 and 2031

Category	Year BAU					
	2026	2027	2028	209	2030	2031
Humid grassland savannah	224 005.32	221 878.35	219 751.38	217 624.41	215 497.44	213370.4 7
Cropland	234 049.86	238 777.88	243 505.91	248 233.93	252 961.96	257689.9 8
Grassland	103 003.92	101 928.42	100 852.92	99 777.42	98 701.92	97626.42
Forest	80 013.60	78 479.96	76 946.33	75 412.69	73 879.06	72345.42

Changes in agricultural yields and incomes (Table 58) in the Waza landscape will therefore be a function of the increase in cultivated land in this landscape. According to this scenario, the probable yields and incomes expected by 2026 and 2031 will be higher than in the reference year 2021.

Table 58. Trends in agricultural yields in the Waza landscape

Years	sorghum	Red millet	But	Niebe	Cotton	Neem
2020	1.5	13	3	1.5	2.5	5.5
2021	5	20	5	3	3	6
2022	8.5	27	7	4.5	3.5	6.5
2023	12	34	9	6	4	7
2024	15.5	41	11	7.5	4.5	7.5
2025	19	48	13	9	5	8
2026	22.5	55	15	10.5	5.5	8.5
2027	26	62	17	12	6	9
2028	29.5	69	19	13.5	6.5	9.5
2029	33	76	21	15	7	10
2030	36.5	83	23	16.5	7.5	10.5
2031	40	90	25	18	8	11

Table 59 below shows the agricultural price ranges that are likely to apply in the Waza intervention site, based on the assumption that prices will remain constant, although the inflation that is currently rife throughout the country is already noticeable in this area.

Table 59 Price ranges for agricultural commodities

Years	sorghum	Red millet	But	Niebe	Cotton	Neem
Min	10000	12000	10000	10000	25000	4000
Max	25000	20000	25000	80000	-	

5.3.2. PROJECT SCENARIO

The project scenario for the Waza landscape shows a likely downward trend in agricultural yields and incomes as a result of the implementation of project activities, in particular the restoration of degraded land in the Waza intervention site. Two phases will also characterise this scenario: a decline in agricultural production and then recovery.

- Decline in agricultural yields

The fall in yields will be due to the reduction in cultivated areas. This reduction in cultivated areas will be due to the implementation of activities to restore degraded landscapes, which will impose limitations on the extension of plantations in forest and savannah lands. This will have a considerable impact on household food security and subsistence incomes, as these are essentially agricultural areas that derive their income from farming.

The limitations imposed by restoration will be partly offset by the practice of agroforestry. Agroforestry will also have a major role to play in boosting farm incomes and yields, with the main agroforestry products shown in table 60 below.

Table 60 List of main agroforestry products in the Waza landscape

N°	Comm on name	Scientific name	Responde nts		Quantity sold by households involved (kg/year)		Averag e selling price (Fcfa/kg)	Income generated per year by households involved (Fcfa)	
			n	%	Min	Max		Min	Max
1	Mango	<i>Mangifera indica</i>	34	32%	30	40	500		20 000
2	Goyava	<i>Psidium guajava</i>	15	14%	20	30	267	5 330	8 000
3	Papaya	<i>Carica papaya</i>	14	13%	5	20	150	2 250	3 000
4	Lemon	<i>Citrus limon</i>	10	9%	15	30	235	3525	7 050
5	Cashew	<i>Anacardium occidentale</i>	5	4,5%	35	50	100	3 500	5 000

- Recovery phase: rise in agricultural production rise

This phase will depend on the efforts made by beneficiaries to intensify farming, one of the project's main activities, in order to boost production and achieve a significant level of income.

The project should enable farmers to settle down and increase their productivity by providing more appropriate agricultural inputs and building the capacity of farming associations and cooperatives in ecological agriculture (crop rotation, composting, use of improved seeds, etc.).

These agricultural intensification measures must take place on land that is already being farmed (fallow land and plots of land in use), or on land that is earmarked for agriculture under land use plans.

5.4. MAIN ISSUES IN THE WAZA LANDSCAPE

The issues presented are major problems linked to the project's objectives and arising from community consultations and discussions with key players in the landscape.

5.4.1. ECONOMIC ISSUES

The economic issues at stake in the Waza landscape mainly concern the potential for developing ecotourism. The WNP is the country's leading eco-tourism destination. In 2015, the WNP was visited by an average of 3,500 tourists a year. The development of ecotourism will be a source of job creation and income.

In terms of poverty, Jiagho (2009) has shown that the main income in this area comes from natural resource exploitation activities, although it remains insufficient. He shows that between 42% and 60% of households in the area live below the poverty line, with incomes below the national average of between 37% and 53%.

5.4.2. ENVIRONMENTAL ISSUES

The major environmental issues relating to the WNP are diverse.

The first challenge relates to concerted management for the preservation of biological resources between the countries bordering the WNP landscape. This lack of organisation in the control of natural resources has led to increased poaching, deforestation and the roaming of wild animals, especially pachyderms.

Despite its high profitability and job-creating potential, cotton growing is widely criticised for its impact on the environment. It therefore requires the use of sustainable techniques to optimise crop profitability and preserve biodiversity.

5.4.3. HEALTH AND SAFETY ISSUES

In the landscape of Waza and its periphery, in 2018 and 2019, the security climate deteriorated considerably, particularly due by the Boko Haram sect (which began in 2014) in the Far North region. This has facilitated the circulation of ammunition and weapons, which are fuelling major poaching operations in and around the park.

In addition, the climate of insecurity has had the effect of ruining the efforts of the public authorities to develop tourism in the area: tourist flows have fallen considerably, the infrastructure has been abandoned, tourism-related income has plummeted, and unemployment has risen in the area.

This security context has also had an impact on people's livelihoods and food security in and around Waza (Republic of Cameroon, 2021).

The Baram village, which remains inside the park, is a haven for a large number of poachers. In terms of security, this poaching presence represents a real challenge for animal biodiversity in the park and its surrounding area.

5.4.4. SOCIO-CULTURAL ISSUES

At a socio-cultural level, the issues at stake take the form of the low level of involvement of local people and other stakeholders in the preservation of biodiversity in Waza National Park. This weakness is due to poverty, the population's heavy dependence on natural resources and the resurgence of human-wildlife conflicts. It is exacerbated by the low level of local support for the process of drawing up the texts governing the management of conservation areas.

Furthermore, the implementation of the project will be accompanied by a mixing of populations and habits. Local populations will have to adapt to these changes.

5.4.5. SOCIO-POLITICAL ISSUES

The socio-political and institutional issues concern the level of collaboration between public administrations and the conservation service in terms of repressing infractions and socio-economic development issues for local populations. There is little collaboration on issues relating to agriculture, livestock farming, planning, etc.

In addition to this lack of cooperation, there are insufficient logistical resources, an insufficient number of human resources and difficult working conditions, which do not contribute to optimising the control of natural resources in the Waza National Park.

CONCLUSION

The Waza, Bamboutos-Bakossi and Dja Lobéké landscapes contribute significantly to the livelihoods of people in and around these landscapes by providing essential goods and services. The main benefits derived by local communities are fuelwood, NTFPs, , timber, water for agriculture, fodder for livestock, etc.

As such, the protection of these landscapes is very important and requires particular attention. This study was carried out with the major objective of: i) Assessing the existing situation of the proposed project area; ii) Identifying and analysing current or potential socio-economic changes in the three landscapes; iii) Determining the main drivers of these changes, the issues at stake and the recent implications for the sustainable management of permanent forests in these three landscapes.

The main conclusions and some recommendations can be summarised as follows:

The Dja-Lobéké landscape, a picturesque area, is in a wide range of attractive sites for hunting, the conservation of artistic and folkloric treasures with a multitude of ethnic groups, and traditional values. It is an ideal landscape for the development of ecotourism. In addition, this landscape, with its Nki, Boumba-Bek and Lobéké parks and the Ngoyla wildlife reserve, is under pressure from the exploitation of natural resources through agriculture, with the use of bush fires and the extensification of cultivated areas, fishing, the collection of NTFPs, unsustainable and illegal logging, poaching and mining. The need to secure these permanent forests is vital for the survival of the ecosystems and local populations.

The Bakossi-Bamboutos landscape, including the forest massifs of the Monts Bamboutos, has impressive natural potential. However, the problem of dwindling water resources needs to be addressed by promoting sustainable water resource management practices in this fragile landscape. In addition, the effects of climate change, coupled with those of insecurity in the North-West and this landscape is vital because it promotes the survival of many communities in this area, especially those of the Western Highlands insofar as it is a site of great biological wealth with multiple social, cultural and economic virtues.

The Waza landscape, and in particular the Waza National Park, is home to an exceptional diversity of flora and fauna, with which the local populations interact on a daily basis. However, the dynamics and density of populations in the Sudano-Sahelian zone are increasing the pressure on natural resources, which have already been weakened by climate change, and reducing the capacity of ecosystems to perform their ecosystem functions. In addition, the security problem posed by the incursions of the Islamic sect Boko Haram into the landscape is hampering efforts to combat climate change and contributing to a slowdown in local economies. Sustainable and secure solutions therefore need to be found to preserve the ecosystems in this landscape.

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