

FORESTRY AND WILDLIFE IN THE WEST REGION

Diagnostic Report

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LIST OF ABBREVIATIONS

ANAFOR	National Forestry Development Support Agency
CARPE	Central African Regional Programme for the Environment
CIPCRE	International Circle for the Promotion of Creation
NPFD	Non-Permanent Forest Domain
PFD	Permanent Forest Domain
CF	Community forests
SF	Sacred forests
DTM	Domestic Timber Market
MINFOF	Ministry of Forestry and Wildlife
UICN	International Union for Nature Conservation

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1. THE WEST REGION'S FORESTRY AND WILDLIFE POTENTIAL

1.1. Natural Plant Formations

1.1.1. Inventory

The various plant formations in which the wood resources found in the West Region are originally natural or anthropogenic.

The zonal succession of vegetation is essentially a reflection of the climate. Due to the high population density (250 inhabitants /km² to 1300 inhabitants /km² depending on the village), it presents a general and deep transformation, which really illustrates the almost complete transformation of space. The existing vegetation of the latter contributes to most of the natural forest, except for the sacred forests located near each chiefdom.

Originally, according to Jacques-Felix (1951) and Letouzey (1968) who defined Cameroon's major phytogeographical domains, three major groups can be distinguished.

1.1.1.1. Forests and zonal savannahs

Located below the 1200 m isohypse, from bottom to top one can locate the:

a. Atlantic evergreen forest of medium altitude.

Called "Biafran forest", it is a rainforest dominated by vegetables. It goes up the southern foothills of the Bamiléké plateau where rainfall allows its installation, covers the south-east of the Menoua Division, the southern half of the Haut-Nkam Division and the south-west quarter of the Ndé Division.

b. Semi-deciduous or hemi-ombrophile forest with Sterculaceae.

It is characterized by the periodic lapse of its foliage. It is located immediately to the north of the previous one, on a narrow strip that starts from the centre of the Haut-Nkam Division and moves in an arc of a circle as it expands through the Ndé Division.

c. Savannah around the forest.

Perhaps the result of the destruction of the semi-deciduous forest, it covers the Tonga Region, the Noun plain and the eastern part of the Bamboutos Division. There are two types:

- Savannahs with *Pennisetum purpuruneum* which, according to the farmers, characterize the soils with high fertility. They are common on recently cleared land and on the wettest soils.
- Savannah at *Imperata cylindrica*. Vegetation with the poorest soils, present mainly in the upper part of the interfluvies.

The following forest species are found there: *Terminalia Glaucesens* or Guinea Pepper which grow in gallery forests and savannah, alongside *Albizia coriaria*, *Annona senegalensis*, *Bridelia ferruginea*. In the Tonga area, there are some species of *Lophira lanceolata* or False Shea. In some places, there are a few feet of *Ceiba pentrada* (cheese plants), planted before around villages, proving that the forest previously existed in the eastern part of the West Region (Letouzey, 1985).

1.1.2. Mountain and Semi-Mountain Formations.

They are the most original formations in the western highlands in terms of phytogeography. They occur above the 1200 m isohypse, so it is the plant formation that covers most of the Bamiléké area. The main species are as: *Albizzia gunnifera*, *Carapa grandiflora*, *Syzygium standii*.

Above 2000 m, on the Bamboutos Mountains, the ravines are occupied by a forest mainly made up of *Podocarpus milandjanius*, while the slopes have a meadow with *Spaobulus montannus* or *Bromus scabrda*. According to Jacques-Félix (1951), bushfires are the reason behind the forest-meadow juxtaposition.

1.1.2.1. Edaphic formations

These are a special case of azonale formations. Covering hydromorphic soils: such as the Mbo plain, Barnendjing marshes, Mifi marshes, Balessing marshes, talwegs. The peculiar species are: *Cyata maniana*, for the Mbo and Bamendjing marshes, and *Raphia vinifera* for the Highland marshes and talwegs.

1.1.3. Differentiated Pressure on Natural Plant Formations (Agriculture and Livestock)

Land use in areas covered by mountain and semi-mountain formations was governed by the following rules during the pre-colonial period:

- In the highlands, the main activity encountered was pastoralism carried out by the Mbororo indigenous peoples;
- In semi-mountainous areas, the Bamiléké bocage was found in a system dominated by a scattered habitat.

With the coffee boom in the 1950s and the boom in food crops, this period saw the end of the bocage in favour of live hedges. During this period, there was an extension of agriculture towards the top of the hills. The latter strewed the boundaries of the agricultural parcels and served as an access corridor to the concessions.

Following the massive destruction of livestock during the maquis period, the population explosion and the creation of roads and houses, pastures and long fallows on the hilltops were quickly taken over or shared and then cultivated.

Thus, some parts of the mountain ranges, such as the slopes and ramparts of the caldera, have lost their forests and meadows in favour of the settlement of settlers from the foothills and bottoms of the caldera, with Anglophone migrants overflowing the latter to move down to the Bamiléké side. This situation was particularly observed in the Bamboutos Mountains, Mount Mbapit.

The extension of agriculture on the hillsides has contributed to the sedentarization of Mbororo herders, who used to migrate seasonally to the plains/valleys. In response to the reduction of pastoralist areas, pastoralists are involved in making bushfires, which drastically reduce the trees that used to grow on the tops of the hills.

Clearing a multitude of small cultivated area units (<1 ha) is by far the most common, with more than 90% of total conversions taking place in all divisions except Ndé, Noun, and Haut-Nkam. Medium-scale conversions play an important role in these three divisions. From the multi-date analysis of high-resolution images, one can see that "elites" plant palm oil trees on plots of up to 20 ha in the southern part of the

Ndé Division. The development of palm groves is the main factor behind deforestation in this area. In Noun, medium-scale clearings are also observed along the Mbam corridor. These clearings are carried out alongside the planting of associated annual crops (maize and beans). The last clearing corridor is located in the Banganté-Tonga Kekem axis for coffee, maize and cocoa cultivation.

The western and southern escarpments of Bamiléké and Grassfields with dense forests or dripping nebelwalds are cleared by the inhabitants of the neighbouring chiefdoms. On the Fontem and Foréké "cliffs", between 1400 and 1600 m, the food fields on which cocoyam and plantain, and to some extent coffee, are cultivated keep increasing.

Edaphic forest formations are not spared by off-season agriculture, which has been booming over the past two decades. In the raffia, the basic element of social relations that provide wine, rachis, palms, etc., farmers indulged in market gardening products and potatoes, before uprooting palm trees and woody trees for full development. The impact of these agricultural activities on the water environment is not the same in the different divisions and varies according to speculation. Thus, the most affected divisions are Noun, Menoua, Ndé, Bamboutos for the cultivation of market gardening products; Menoua and Bamboutos for the cultivation of potatoes. Some villages such as Batié have specialized in cabbage production all year round. Over the past decade, the development of market gardening has been noted in the Ndé Division, around Banganté Town, where a permanent market has developed. The total conversion of marshes is tending to become more widespread in the West Region, with the increasingly widespread practice of off-season agriculture along rivers by populations.

1.2. Wildlife Resources

The wildlife resources found in the West Region are diversified according to the different agro-ecological zones there. However, the distribution of these species in the region is not uniform and is inversely proportional to population density. Thus, the richest areas are, in order of importance, the Atlantic evergreen forests, semi-deciduous forests, peri-forest savannah, and mountain and semi-mountain formations.

Forests and zonal savannahs are characterized by the importance of their primates, the main ones being (*Cercopithecus nictitans*, *Cercopithecus mone*, *Cercopithecus aethiops*, *Colobus guereza*, *Perodictus paw*, *Galago senegalensis*), artiodactyls (*Potamochoerus porcus*, *Tragelaphus spekei*, *Cephalophus monticola*, *Tragelaphus scriptus* and *Syncerus caffer nanus*), viverdes (*Viverra civetta*, *Genetta tigrina*), rodents (*Thrynomys swinderianus*, *Cricetomys gambianus*, *Atherurus africanus*). The density of these species is inversely proportional to the distance travelled from the main roads. One can realize the disappearance of dwarf elephants (*Loxodonta pumilio*) and *Colobus guereza*, formerly found in the Santchou area.

In addition to artiodactyls, the peri-forest savannahs house hippopotamuses that migrate between the Kouoptamo Subdivision and the southwestern part of the Foubot Subdivision. They are also located in the Magba area, around the Mappe dam.

The mountain formations are mainly full of rodents.

The main threats to wildlife are, in order of importance, agriculture, which is expanding over 93% of the region's surface area by fragmenting wildlife habitat, direct pressure from those seeking protein resources for their food, and climate change.

2. MANAGEMENT OF WOOD AND WILDLIFE RESOURCES

Wood and wildlife resources are managed either directly by the State or through local populations.

2.1. Management of Forest and Wildlife Resources by the State

2.1.1. Zoning of Forest and Wildlife Resources in Cameroon

The table below shows the new legal status of forests and wildlife in Cameroon (Law 94/1 of 20/01/94) applicable in the West Region. The logic of this new forest code is dichotomous, based on the fundamental distinction between the forests of the Non-Permanent Forest Domain defined as opposed to the forests of the Permanent Forest Domain, which will remain strictly forests in the long term. The latter include State Forests (protected areas and especially production forests) and communal forests (those that have been classified on behalf of a municipality). Production forests are expected to become FMUs, Forest Management Units, which support the sustainable management of the mountain ranges. Each type of forest (state, communal, protection, etc.) is administered with the use of rules defined by regulatory texts that specify the customary and use rights recognized for local populations, as well as the nature of the activities (logging, research, etc.) authorized.

Permanent forests become the private domain of the State through this reform. Although the reformed code does not introduce a new category of forest, it generalizes the procedure for classifying forests for the benefit of this private domain. Thus, we move from a forest massif mainly a national domain whose products belonged only to the State, to a massif mainly a private domain of the State, wherein the latter ensures management and development.

Table 1: Legal framework for forests in Cameroon resulting from the January 1994 law

Vocation As defined in the 1995 zoning plan		PFD (classified forests or forests awaiting classification)	NPFD (forests called "agro-forestry belt")			
Administrative name	State-owned forests	Municipal forests	Community forests	Area of hunting interest with community management	Sales of cuts and small titles	OTHER FORESTS
Legal status	Private domain of the State	Private domain of the municipalities	Stripping of the national domain	Stripping of the national domain	Opportunistic titles	National domain forests, private forests

Vocation As defined in the 1995 zoning plan		PFD (classified forests or forests awaiting classification)	NPFD (forests called "agro-forestry belt")			
Displacements	Production forests, protection forests (National parks, wildlife reserves, areas of hunting interest, sanctuaries, zoos, production forests, protection forests, etc.)	Production forests, protection forests, etc.	Village co-management - forestry services): Defined by a 25-year management agreement between the community and the forest administration	Village co-management and services: Defined by a 25-year management agreement between the community and the forest administration	Co-management of forest administration and concessionaires	Affected areas (private forests) or awaiting allocation (registration for the benefit of individuals or communities)

Source: ZONGANG, adapted by Alain Karsenty: *Comparaison des législations et des réglementations dans les six pays forestiers d'Afrique Centrale*, Montpellier, CIRAD, 2006, p.2.

The issue of trees outside forests in the West Cameroon Region

The definition of forest by the Forest Law goes thus:

Article 2 of the said law, - "For the purposes of this law, "Forests are defined as land with a vegetative cover in which trees, shrubs and other species likely to provide products other than agricultural products are predominant".

Following this definition, the legal framework for forest management provided by the legislator does not apply to trees outside forests. "Trees outside forests" are therefore found in non-forestry lands-"other lands", i.e. those that are neither "forests" nor "other wooded lands". In other words, they are on land where the wood cover is less than 10% for a height of less than 5 m or less than 5% for a height of more than 5 m and also on all land with a cover of more than 10% but on areas of less than half a hectare in which linear formations such as shelterbelts and riparian strips are included. They are also found on land mainly used for agriculture, which, through the definition, is excluded from "forests", but not necessarily from "other wooded land".

The latter do not occur in forest plantations, let alone in natural forests. In the context of West Cameroon, trees outside the forest represent the wood trees found in mountainous, semi-mountainous, and edaphic formations. These wood plants can be used by communities for agricultural, forestry, pastoral, social and cultural purposes.

In the West Cameroon Region, it is therefore appropriate to separate forest management from tree management.

2.1.2. Forest Policy Implementation Framework

2.1.2.1. Deployment of forest administration at the regional level

The management of forest resources in the West Region is the responsibility of the Regional Delegation of Forests and Wildlife, which is headed by a regional delegate, who is assisted by four chiefs who are involved in the following areas: (1) forest, (2) wildlife and protected areas, (3) wood promotion and processing and (4) general affairs.

Mandate of the DR (organization chart)

The action of the DR is relayed in the divisions by the Departmental Delegates, who are in turn supported by 32 heads of forestry and hunting posts and the conservation service of the Santchou Wildlife Reserve. It is important to note that the area of competence of the heads of forest posts does not follow the administrative division of the Subdivisional offices.

2.1.2.2. ANAFOR National Agency, an escort

ANAFOR's activities in the West Region are carried out by the Cameroon wet savannah branch, which covers the West, North-West and Adamawa Regions. The headquarter is in Bamenda and the branch head is responsible for coordinating activities. In the field, the 05 silvicultural advisors are supposed to operate in the following towns in the West Region: Bafoussam, Foumban, Bangangté, Bafang, and Dschang. Till date, the Bafang branch is not functional due to the lack of staff. In the West Region, ANAFOR's staff consists of 04 branch heads who use temporary labour to carry out its activities.

Since 2013, ANAFOR has been empowered by MINFOF to ensure the production of plant material and to act as a silvicultural advisor to stakeholders. Thanks to the financial resources received from MINFOF, ANAFOR staff produce 300,000 plants annually in its nurseries. This plant production integrates the need of farmers and the requirements of the agro-ecological zone.

The species produced and popularized are typical of wet savannahs, they are compiled in the table 2. Although these plants are appreciated by the beneficiaries, their production does not follow a validated scientific/technical itinerary.

Table 2: Forest species popularized by ANAFOR's wet savannah branch

Forest species	Medicinal species	Ornamental species	Fruit species
Eucalyptus (<i>Eucalyptus saligna</i>)	Pygeum (<i>Prunus africana</i>) (seedlings and cuttings)	Filao (<i>Casuarina equisetifolia</i>)	Pear tree (<i>Persea americana</i>)
Podo (<i>Podocarpus manii</i>)		Pine (<i>Pinus kesya</i>)	Plum tree (<i>Dacryodes edulis</i>)
Grevillea (<i>Grevillea robusta</i>)		Cypress (<i>Cupressus lusitanica</i>)	Citrus fruits (<i>Citrus</i> sp)
Acacia (<i>Acacia mangium</i>)		Calistemon (<i>Calistemon viminalis</i>)	Casimango (<i>Irvingia gabonensis</i>)
Mahogany (<i>Antandrophagma angolensis</i>)		Royal Palm tree	Voacanga (<i>Voacanga amigdalina</i>)
Maesopsis (<i>Maesopsis iminii</i>)			

Source: www.anafor.cm

2.1.3. Civil Society/NGO

Many organizations work to support populations in the management of forestry and wildlife resources of the West Region. As of now, some of them have distinguished themselves like:

- CIPCRE
- The CEFAID whose objectives are: Support communities and other stakeholders in the sustainable management of natural forest resources; Ensure and promote the rights of indigenous people and vulnerable populations; Support communities to fight poverty (growth and employment); Improve community health, education and living conditions
- The CIRPEVER NGO
- Youth Action Network for Environment and Sustainable Development (RAJE-2)
- the Sustainable Development Association (ADD)

2.1.4. Inventory of Forest Management Units Supervised by the State

The forest management units encountered in the West Region, compared to the other regions of Cameroon, are few in both the Permanent and Non-Permanent Forest Domains.

2.1.4.1. Permanent Forest Domain

The Permanent Forest Domain of West Cameroon is mainly composed of forest reserves and a wildlife reserve. Their implementation precedes the 1994 Forest Act.

a. Forest reserves/reforestation areas

The forest reserves and reforestation areas encountered in the West Cameroon Region were set up before independence by the National Centre for Forest Development (CENADEFOR), and then during the post-colonial period by the National Office for Forest Regeneration (ONAREF) and finally by the National Office for Forest Development (ONADEF). The main objective of the development of these reserves for colonial and postcolonial administration was the conservation of the environment, and the production of timber for certain works (construction of public buildings, production of wooden poles for the extension of electricity and fixed telephone lines, etc.). The species planted were in order of abundance *Eucalyptus spp.* (80%, mainly in the Bamiléké area), pine in the Noun reserve, and cypress. It is also worth noting the establishment of a reserve in Menoua Division for the supply of pharmaceutical industries (Menoua Quinquina Reserve, and the reforestation of pygeum in the Bamboutos Mountains). The choice of the West Region for the establishment of these reserves was related to the ecological environment it offers for the development of these fast-growing species (low temperature and high relief).

The forest reserves created in the West would have a total area of 39,484 ha (DR/MINFOF/West Annual Report, 2016). This theoretical area is far from reality because, in the field, a study by Tchawa et al (1991) found that 90% of the area of these reforestation areas was invaded by farmers. This study also noted the total invasion of some reforestation areas and forest reserves. This is the case of the Bamougoum reserve planted with eucalyptus and which, after being entirely invaded by food crops, was unclassified in 1993.

After the institutional review of the forest sector in the 2000s, it was decided by mutual agreement between the Cameroonian Government and its technical and financial partners to close ONADEF in view of its limited performance in resource renewal. The State then ceases to be the central stakeholder in reforestation, and must now refocus on the development of strategies and ensure the regulatory function.

It is in this context that the National Forestry Development Support Agency (ANAFOR) was created in 2002. Its main mission is to provide direct or indirect support for the implementation of community and private plantation projects at their request and with their financing. As a precautionary measure, the security of reserves was entrusted to MINFOF's decentralised services, pending the establishment of an appropriate management framework. This mission was mainly given to the Departmental Delegate.

During the transition period, MINFOF's services did not put in place a real strategy for managing forest reserves, given that they did not have the necessary financial and human resources. No effective security measures against the invasion of populations and bushfires have been developed in the field.

In 2004, the Government of the Republic of Cameroon reaffirmed and materialized its commitment to decentralization by adopting a series of legislative texts that set the direction of decentralization and the rules applicable to municipalities. Following the progress noted in communal forestry in southern forests, MINFOF decided to transfer forest reserves to the CTDs requesting them in 2014. Some reservations have also been transferred to research institutions and ANAFOR. This transfer was made under an interim agreement of 03 years during which the beneficiaries are expected to draw up a management plan as required by forestry legislation.

As of now, updated information on the wood potential of reserves (volume and diversity), and the level of anthropization has not reached its apex for all reserves. An inventory by MINFOF in 2016 shows that:

- in Noun, the search for firewood and pine heartwood is destabilising the reforestation perimeters;
- in MIFI, fraudulent logging, agricultural practices, mining (sand and stone) and uncontrolled bushfires are the main sources of pressure on reserve resources. However, the DDFOF/Mifi services regularly carries out operations to eradicate these scourges;
- in Highlands, the planted stands are more or less mature, and are constantly subjected to bush fires. No activity has been carried out there for at least five years;
- in Bamboutos, the Bamboutos Mountains reserve is under pressure for livestock (cattle, goats and sheep) and agriculture (market gardening). The Bamendjing area is regularly attacked by populations in search of timber and energy;
- in Ndé, the construction of the Foubot-Bangangté road encroaches on the Noun plain reserve of about 2 ha, the residents and elites of the reserves constantly threaten to occupy the area, and they are brought to order by the divisional forest authorities;
- In Menoua, the Santchou reserve is part of the Foréké-Dschang massif and is the last natural forest relic of the West Region in the high altitude wet savannah ecosystem. It is under pressure from populations for hunting, housing construction and agriculture. The other reserves are invaded from 20 to 80%;
- in Haut-Nkam, the Métychié-Ngoum reserve has now been transformed into a large urban area, within which there are structures such as the Bilingual High School, Primary Schools, coffee husking units, markets and traditional chiefdoms. Others, on the other hand, remained intact because of the isolation. This is the case of the Maha Reserve in the Baku Subdivision. The Bapouh-Bana Reserve in the Bana Subdivision, which is a Eucalyptus forest of nearly 360 ha, is threatened both by bushfires and by the local population in search of various woodlands.

The following table presents the general situation of forest reserves and reforestation perimeters in the region.

Table 3: Inventory of forest reserves and reforestation perimeters in the West Region in 2016

Division	Name of the reserve or perimeter	Certificate of creation	Surface area	Localisation	Species	Wildlife Species	Observation:
	Melap Forest Reserve	Order No. 224 of 29 July 1947	1705 ha	3 km from Fouban Town	Eucalyptus saligna, Eucalyptus grandis, Gmelina arborea, Pinus kehsya, Pinus hondurensis, Pinus oocarpa, Canarium, schwenfurtii	/	<ul style="list-style-type: none"> - RF retroceded to ANAFOR in April 2015 - Underwent illegal exploitation by local residents - very rich in Eucalyptus and pine trees of exploitable age
	Koutaba Forest Reserve	Order No. 122 of 12 May 1934	400 ha	9 km from Fouban Town when heading towards Koutaba	Pinus kehsya, Eucalyptus saligna	/	<ul style="list-style-type: none"> - Underwent illegal exploitation by local residents - very rich in Eucalyptus and pine trees of exploitable age
	Kountchankap Forest Reserve	Order No. 431 of 28 December 1935	400 ha	18 km from Fouban Town on the Koutaba-Massamgam road	/	/	<ul style="list-style-type: none"> - Now reforested with iroko, mahogany and other species - FR totally invaded by local residents
	Mou Forest Reserve	Order No. 503 of 23 December 1947	1100 ha	In Kouoptamo and in the Kouoboum village	Eucalyptus, Pygeum, Gmelina, Mahogany	/	<ul style="list-style-type: none"> - Retroceded to the Kouoptamo municipality under interim agreement since 2012 - Receives MINFOF's support every year since 2013 - Perimeter claimed by the local populations as land inherited from their ancestors - all the plants planted in 2005 were destroyed by the populations
	Ngambouo Forest Reserve	Order No. 503 of 23 December 1947	1200 ha	Kouoptamo in Ngbetsouen	Eucalyptus, Pygeum, Gmelina, Mahogany	/	<ul style="list-style-type: none"> - Retroceded to the Kouoptamo municipality under interim agreement since 2012 - Receives MINFOF's support every year since 2013 - Perimeter claimed by the local populations as land inherited from their ancestors - all the plants planted in 2005 were destroyed by the populations

Division	Name of the reserve or perimeter	Certificate of creation	Surface area	Localisation	Species	Wildlife Species	Observation:
MIFI	Baleng Forest Reserve	Decree No. 53 of 01/03/1934 of the High Commissioner of the French Republic to Cameroon	309 ha	Baleng	Eucalyptus, Pygeum (<i>Prunus africana</i>), Pin (<i>Pinus sp</i>), Jatropa (<i>Jatropa cursus</i>)	/	<ul style="list-style-type: none"> - Silvicultural work began in 1934 - Between 1988 and 2001, the FR would have lost about 14.5% of its surface area - Enrichment operations were carried out from 2001 to 2015 - A BIP was granted and implemented in 2015 for the reforestation of 11.25 ha (12,500 plants) - the reserve is subject to co-management between the forest administration and the local village communities
	Kouabang Forest Reserve	Decree No. 93/390/PM of 27 April 1993 of the Prime Minister	141 ha	Kouabang	Pin (<i>Pinus sp</i>)		<ul style="list-style-type: none"> - This reserve has been classified as a compensation for the downgraded Bamougoum FR and covers an area of 40 ha, - The first reforestation was carried out in 2012 under the MINFOF/Bafoussam III Municipality and ANAFOR/Bafoussam III Municipality agreements, - The FR is the subject of an interim management agreement between the forest administration and Bafoussam III, - In 2014, this municipality received funding of XAF 7,000,000 for 7,000 plants. Implementation is underway
HIGHLANDS	Chengne Perimeter	Order No. 262 of 29/07/1947 of Decision No. 2002/D/MINFOF/SG/D F/CSRRVS of 21 August 2012	100 ha	Baham	Eucalyptus, Pin Pygeum, Wengué, Mahogany, Gméline	/	<ul style="list-style-type: none"> - Approximately 57.83 ha were available according to the 2013 CTFC report - The Pygeum, Wengué, Mahogany, Gméline species were planted during the 2014 and 2015 reforestation campaign - Subjects are poorly trained and scattered in new reforestation zones
	Bangou Perimeter	Order No. 262 of 29/07/1947 of Decision No. 2002/D/MINFOF/SG/D F/CSRRVS of 21 August 2012	25 ha	Bangou	Eucalyptus,	/	<ul style="list-style-type: none"> - Approximately 18.8 ha are available according to the CTFC report

Division	Name of the reserve or perimeter	Certificate of creation	Surface area	Localisation	Species	Wildlife Species	Observation:
BAMBOUTOS	Mount Bamboutos Forest Reserve	/	222ha27a	Mount Bamboutos	Eucalyptus saligna, Imperata sp, Bracharia sp	Monkeys, Gambian pouched rats, Hedgehogs	<ul style="list-style-type: none"> - This FR was reforested in 1957 with E. saligna, - It is about 90% anthropized, - The animals encountered are those of class C
	Bamendjing reforestation perimeter	No. 76/96/PM of 19/03/76	145ha27a43 ca	Bamendjing (Galim) point A: X: 10°28'45"; Y:5°44'15" point B: X: 10°29'00"; Y:5°44'15"	Eucalyptus, Gmelina, Pin, Pygeum	Monkeys, does, hedgehogs, porcupines	<ul style="list-style-type: none"> - These species were introduced in 1986, - The natural vegetation extended over 77ha in 2012, - The 2013 and 2014 agreements of the Galim town hall in Pygeum should cover 38%, but has been decimated by bushfires and the town hall lacks maintenance.
NDE	Noun Plain Forest Reserve	Decree No. 79/506 of 08/12/1979	1400ha	Bangangté	Gmelina (Gmelina arborea), Pin (Pinus palulas)	/	<ul style="list-style-type: none"> - Reserve transferred to ANAFOR - Highly invaded
	Balengou Forest Reserve	Decree No. 79/506 of 08/12/1979	312 ha	Bazou	Eucalyptus	/	<ul style="list-style-type: none"> - In 2015, 5000 Eucalyptus trees were planted with support from 2012
	Baloumgou Forest Reserve	Order No. 5 of 03/12/1934	169 ha	Baloumgou	Eucalyptus	/	<ul style="list-style-type: none"> - In 2015, ENEO undertook a 1.5 ha clearing to cross a high voltage line without authorization.
	Bapouh-Bana Forest Reserve	Spreads over 3 divisions		Ndé, Highlands and Haut-Nkam	Eucalyptus	/	<ul style="list-style-type: none"> - Transferred to the Bangangté municipality, which has just received 13,500,000 euros in 2016 to support reforestation
	Noufam Perimetre	1979	3ha 40a	Bangangté town	Eucalyptus	/	<ul style="list-style-type: none"> - 90% of the land by Medumba
MENOUA	Foreke Dschang Reserve	No. 262 of 27/07/1947	2200 ha	Dschang	/	/	<ul style="list-style-type: none"> - 90% occupied
	Signal Reserve	No. 053 of 09/03/1934	42ha	Dschang	Pinus keshya Eucalyptus saligna	/	<ul style="list-style-type: none"> - More than 90% occupied
	Foreke-Dschang Protected slope reserve	No. 063 of 06/06/1956	100m depth around the cliff	Dschang cliff	Bambou from China	/	<ul style="list-style-type: none"> - 50% occupied
	Baloum Perimetre	/	85 ha	Baloum	Eucalyptus and Pinus		<ul style="list-style-type: none"> - 50% occupied
	Bansoa Perimetre	/	30ha	Bansoa	Eucalyptus, Cypress		<ul style="list-style-type: none"> - 80% occupied
	Sonkeng Perimetre	/	65ha	Bamendou	Eucalyptus, Sipo and Podocarpus		<ul style="list-style-type: none"> - 20% occupied
	Bamendou Perimetre	/	27ha	Bamendou	Eucalyptus and Pinus		<ul style="list-style-type: none"> - 80% occupied

Division	Name of the reserve or perimeter	Certificate of creation	Surface area	Localisation	Species	Wildlife Species	Observation:
	Fongo-Tongo Perimetre	/	14ha	Fongo-Tongo	Eucalyptus		- 30% occupied
	SANTCHOU Wildlife Reserve	In Forest Reserve by Decree No. 262 of 29/07/1947 of the High Commissioner of the French Republic to Cameroon In AP of 3rd Category by Order No. 3335/A/SETOUR/DFP N/SFPN of 28/09/1987	7000ha	Santchou: 9°58' and 10°6' East longitude and 5°11' and 5°19' North latitude	Iroko (<i>Milicia excelsa</i>), Padouk (<i>Pterocarpus soyauxii</i>), Ilomba (<i>Picnantus angolensis</i>), Dabéma (<i>Piptadéniastrum africana</i>), Parassolier (<i>Musanga cecropioides</i>), Bété (<i>Mansonia altissima</i>), Yellow Moambé, Polycias fulva, Eribroma oblongum, Azobé (<i>Lophira alata</i>), Teak (<i>Tectona grandis</i>), Fake dates (<i>Phoenix reclinata</i>), Dragon Tree (<i>Mitragyna ciliata</i>), Pandanus candelabrum Rikio (<i>Uapaca guinéensis</i>), Fraké (<i>Terminalia ivorensis</i>)	Yellow-backed Cephalophinae (<i>Cephalophus silvicultor</i>), Blue Cephalophinae (<i>Philantomba monticola</i>), Vervet (<i>Chlorocebus tantalus</i>), Common genet (<i>Genette genetta</i>), Civet (<i>Viverra civetta</i>), Bosman potto (<i>Perodicticus potto</i>), Patas (<i>Cercopithecus patas</i>), Varan (<i>Varan niloticus</i>), Brush-tailed porcupine <i>Taurocyon persa</i> , olumba albinucha, Nectarinia iccinigaster Black Milan, Common Budula, Great Black-headed Hornbill, Yellow-billed Hornbill, Touraco	<ul style="list-style-type: none"> - Its flagship fauna (Elephants and dwarf buffaloes) has not been seen for more than a decade, - However, indications of mammalian fauna activity remain detectable, - its birdlife is impressive with about 161 species of birds, - The FR is one of two sites in Cameroon that are important for bird conservation, - The main threats are deforestation, extensive agriculture, housing construction, poaching, fraudulent sawmilling, land sales and transfers by traditional chiefs
HAUT-NKAM	Metchié-Ngoum Forest Reserve	No. 262 of 27/07/1947	6500ha	/	/	/	- Occupied at almost 90%
	Tséna-Nkam FR	No. 262 of 27/07/1947	2.600ha	/	/	/	/
	Mongoué-Nkam FR	No. 262 of 27/07/1947	1200ha	/	/	/	<ul style="list-style-type: none"> - signing of a XAF 7 million reforestation agreement - 1st funding 60%
	Maha FR	No. 262 of 27/07/1947	460ha	/	/	/	- 20% occupied
	Moa FR	No. 262 of 27/07/1947	300ha	/	/	/	<ul style="list-style-type: none"> - signing of a XAF 7 million reforestation agreement - 1st funding 60%
	Fiba-Mahou FR	No. 262 of 27/07/1947	6.500ha	/	/	/	- Straddling between Haut-Nkam (400ha) and Nkam (6100ha)

Division	Name of the reserve or perimeter	Certificate of creation	Surface area	Localisation	Species	Wildlife Species	Observation:
	Bapouh-Bana Perimeter	Classification procedure in progress	4800ha	/	/	/	- -360ha reforested
KOUNG-KHI	Bandjoun Reserve	Unknown Classification Order	10 ha	/	/	/	/
	Noutcha Reforestation Perimeter		20ha	/	/	/	/

From the table, a look back shows that:

- The protected areas of the region are not exceptionally rich in terrestrial fauna, the areas where signs of animal presence have been detected are the Santchou Reserves, the Bamboutos Mountains and the Bamendjing Reforestation Perimeter;
- Some emblematic species have not been seen for more than a decade, such as Buffaloes and Dwarf Elephants in the Santchou Plain;
- Some areas, because of their rich birdlife, have been designated as Key Biodiversity Areas by IUCN; they are the Santchou Wildlife Reserve, Bamboo Mountains, and Mount Bana. In these sites, rare or endemic bird species have been found;
- Bushfires, the search for firewood, extensive agriculture, housing construction, poaching, fraudulent sawing, sales and land transfers by traditional chiefs, are all reasons for encroaching on reforestation reserves and perimeters in the region;
- The decline in vegetation and wildlife cover is almost uniform throughout the region, with consistently high intensity at all sites.

b. Creation of forests by early municipalities

Some municipalities in the West Cameroon Region have engaged in projects to set up communal or intermunicipal forests. Unlike the communes in the forest area that create CFs on a national domain initially occupied by dense forest, those in the West Region are, in most cases, forced to create the forest (create forest plantations). The municipalities of Fouban in Noun, Demdeng in Koung-Khi and Tonga in Ndé have been involved, since 2010, in the creation of communal forests by planting. These initiatives have not been completed due to the constraints faced by CTDs. The establishment of a plantation by a municipality is an expensive operation that requires expertise that is difficult for the municipalities to mobilize. In addition to technical constraints, the establishment of a forest plantation requires access to and security of large areas of land, in a context of land scarcity and concomitant demand for agricultural uses by communities in a context of high population density.

2.1.4.2. Non-permanent forest domain: Community Forests (CF)

In the West Region, only two community forest development projects have been completed. Community forests have not yet been exploited despite the existence of simple management plans that need to be revised. The legal bodies are SPREFOGMA for the Malantouen CF in the Noun Division and GEFBAFKO for the Baboutcha Fongam Komako CF in the Haut Nkam Division.

This low level of public support for the concept of community forests seems to be due to the scarcity of existing natural forests and the inadequacy of the governance system advocated by the State, which contrasts with the traditional management systems practised by the populations of West Cameroon.

2.1.4.3. State actions in favour of the stakeholders

The State supports the region's stakeholders in reforestation through the annual programme of support for reforestation and renewal of forest plantations. The beneficiaries of this support are registered with the Ministry of Forestry and Wildlife. They are the municipalities, GICs, associations, cooperatives and some traditional chiefdoms.

From 2012 to 2016, XAF 490,500,000 were allocated to the municipalities in the region for reforestation and plantation renewal. During the same period, XAF 66,000,000 were allocated to GICs, Associations and Cooperatives for the same reasons. Similarly, chiefdoms also benefited from this support to the tune of XAF 22,000,000.

However, despite this substantial support, remarkable difficulties are hindering the achievement of the communes' reforestation objectives. The GICs, Associations and Cooperatives benefiting from this support are not active in the field because of poor working coordination with the municipalities concerned. Observations by officials of the regional delegation of forestry and wildlife also reveal a decline in the number of plants planted by traditional chiefdoms and associations. This failure does not seem to be due to the incompetence of the latter, given their proven experience and mastery of silviculture. The main reason for this failure would be the complexity of the procedure for accessing the financial resources at their disposal, which ends when rainfall no longer allows for the efficient production of the plans.

The following table presents the funding status of municipalities, associations, GICs, cooperatives and chiefdoms from 2012 to 2016 for reforestation and plantation renewal in the West Region.

Table 4 : Funds meant for municipalities, associations, GICs, cooperatives and chiefdoms, from 2012 to 2016, for reforestation and plantation renewal in the West Region

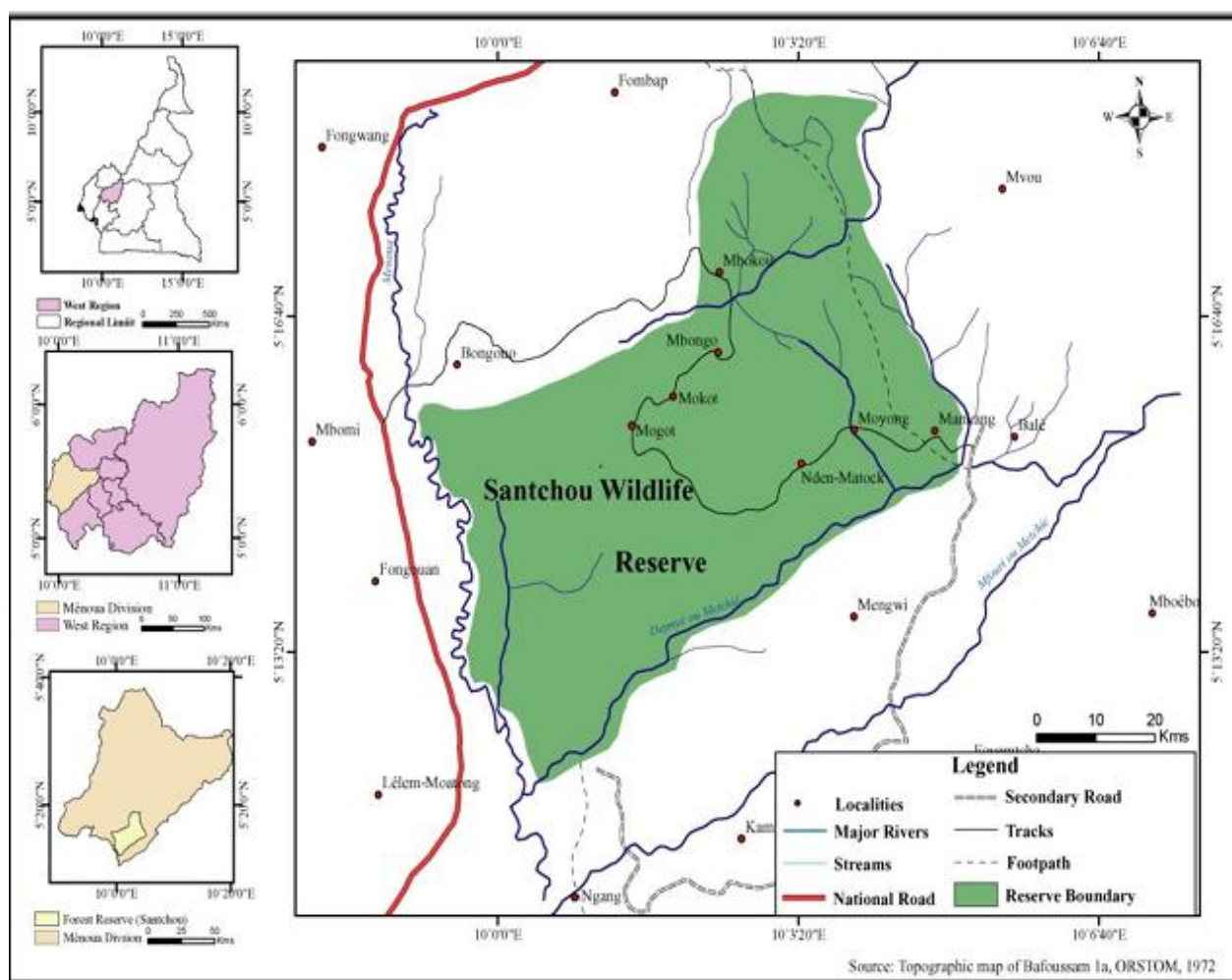
Period	Support for reforestation (XAF)		
	Municipalities	GIC/ASS	Chiefdoms
2012	45 000 000	15 000 000	2 000 000
2013	106 000 000	15 000 000	6 000 000
2014	106 000 000	15 000 000	6 000 000
2015	106 000 000	15 000 000	6 000 000
2016	127 500 000	6 000 000	2 000 000
Total	490 500 000	66 000 000	22 000 000

Source: DR/MINFOF/West, 2018

2.1.4.4. Case study: Santchou Wildlife Reserve

By Order No. 262 of 27 July 1947, the Santchou Reserve was created, "*with a view of promoting natural reforestation and carrying out reforestation and protection work*". It was therefore originally a forest reserve. But by Order of 29 September 1987, it will be converted into a wildlife reserve, because of the variety and density of its animal population, and particularly the strong presence of dwarf elephants and buffaloes, (which are now extinct because of human pressure and interference), and of various endemic bird species that are still present and have suffered less from human presence.

The reserve also hosts a variety of monkeys (*Cercocebus*, *Cercopithecus*, etc.) and other animal species, among which: the Gabonese viper (*Bitis gabonica*), the python (*Python* sp), the sitatunga (*Tragelaphus spekii*), the harnessed Guilb (*Tragelaphus scriptus*), the wild boar (*Sus scrofa*), the porcupines (*Hystrix* sp), the Varans (*Varanus* sp), which are now endangered.

Map 1: Santchou Forest Reserve (source: Meli & Meli, 2015)

According to Birdlife International (2015), the vegetation of Santchou Wildlife Reserve is a mixture of Sterculiaceae and Ulmaceae, semi-deciduous forests, shrub savannahs, sub-mountain forests, swampy forests and grasslands. Forest species include *Mitragyna ciliata*, *Lophira alata*, *Khaya ivorensis*, *Milicia excelsa*, *Mansonia altissima*, *Terminalia spp.*, *Klainedoxa gabonensis*, *Prunus africana*, an emerging formation of *Polycias fulva*, and a grass formation including *Pennisetum*, *Eleusine*, *Andropogon spp.* and *Imperata cylindrica*.

About 161 bird species have been recorded as of now in the reserve, including the *Hirundo fuliginosa* restricted range. The Santchou Wildlife Reserve is reportedly one of two important bird and biodiversity conservation areas (ZICOs) in Cameroon, dominated by the Guinean-Congolese forest biome species *Phyllanthus atripennis*.

Santchou Wildlife Reserve, over a considerable part of its perimeter, is bordered by other protected areas, wildlife reserves and national parks. To the west and northwest, it is bordered by Banyang Mbo Wildlife Reserve, to the southwest by Bakossi Mountains Nature Reserve and to the southwest by Mount Manengouba National Park. Altitudes in the reserve range from 800 to 1400 m above sea level. Almost $\frac{3}{4}$ of the wildlife reserve is a fault escarpment that is part of the Bamiléké Plateau that progresses towards Bafang, and that originates from past tectonic activities, including part of the Santchou Depression (paleo-continental or inland sea), resulting from the same tectonic activities. (Figure 2). The reserve is surrounded by four main rivers: the Alouno River to the north, the Nkam to the west, the Metché to the

south and the Alouo to the east. These highlands and lowlands are areas of high biodiversity endemism with several endemic bird species at risk.

Forest cover losses between 1987 and 2013 were recorded as follows:

- 12.90% of mountain forest has been degraded in favour of cultivated plots
- 6.3% of mountain forest for the benefit of built areas
- 10.42% of plains for the benefit of cultivated plots and
- 7.33% of plains for the benefit of built areas
- The built area represents 38.09% of the change in land cover/use.

Figure 1: Escarpments that make up the relief of the reserve (Google Earth images, 2013)



A study was conducted in 2013 by IUCN on the threats facing the reserve, and showed that agricultural expansion and other human intrusions into the reserve were severe and rapid, and were the cause of the degradation of 90% of the reserve's area. The summary of the results can be found in the following table

Table 5: Pressure on the Santchou reserve

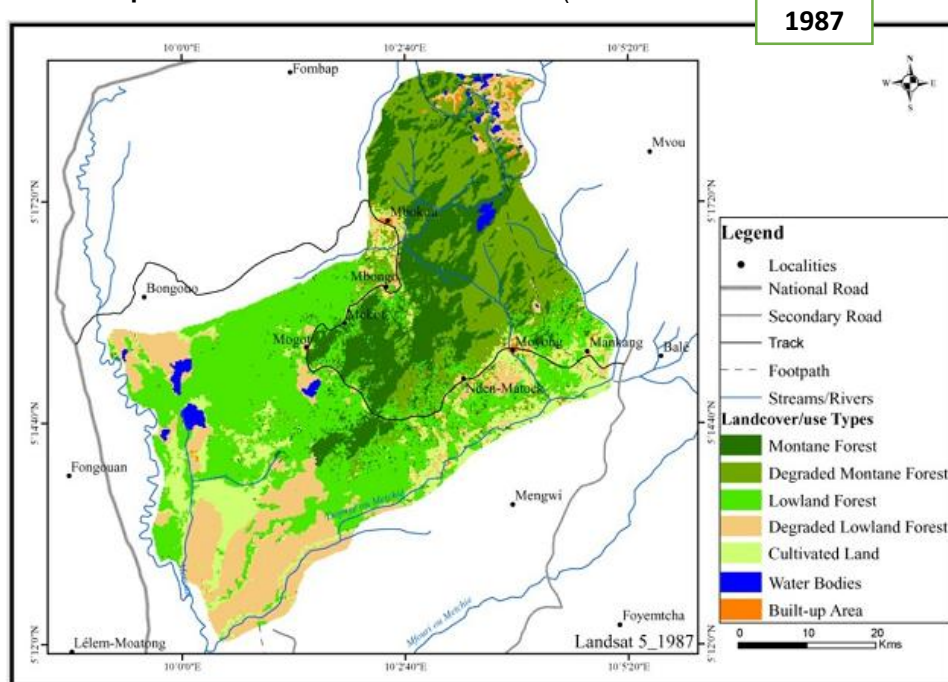
Threats on the reserve (pressure)					
Level 1 threat	Level 2 threat	Timing	Scope	Severity	Result
Agricultural expansion and intensification	annual and perennial non-timber crops - small farms	Ongoing	The entire surface area (>90%)	Very rapid to severe deterioration	Very high threat
Trespassing and human disturbances	work and other activities	Ongoing	The entire surface area (>90%)	Very rapid to severe deterioration	Very high threat

Source: BirdLife International (2018)

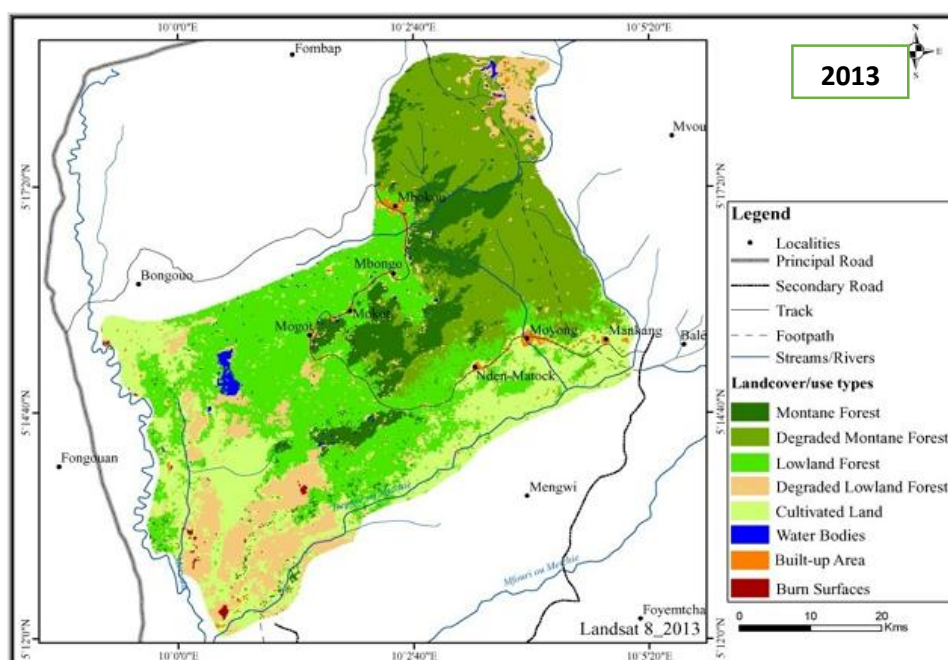
Seven village communities live in the reserve, and two others in the buffer zone, namely Bale and Ngang. The occupied areas are so large that it would be unrealistic to envisage a peasants' exodus, especially since, as recognized by the Colonial Administrator in his 1947 decision, villages already existed in the reserve at the time of its creation. At its own time, and in the same decision, the colonial authority had advocated the demarcation of these village enclaves. But in the meantime they have increased enormously, due to the demographic explosion and human activities (industrial and food crops).

Between 1987 and 2013, a period in which a reliable analysis was carried out by researchers from Dschang University, there were glaring changes in land use.

Map 2: Land use of the reserve in 1987 (source: Meli & Meli, 2015)



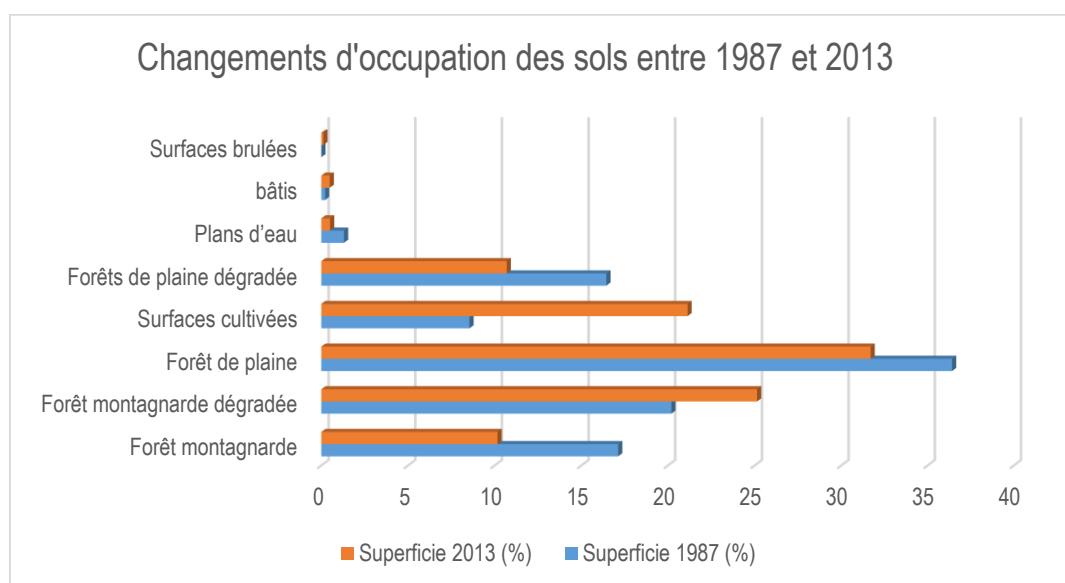
Map 3: Land use in 2013 (source: Meli & Meli, 2015)



An assessment of the changes recorded then revealed that most of the strata in the reserve had experienced degradation, with slight differentiation between strata.

The figure below shows the land use changes in the reserve between 1987 and 2013, obtained after a diachronic analysis of Landsat images between the two periods.

Figure 2: Land use changes on the reserve



The observation of the figure clearly shows that the areas of lowland forests have considerably decreased, while on the other hand, the cultivated areas, mountain forests, degraded forests and buildings have increased. This reflects the preponderance of human presence in the landscape of the reserve.

Factors causing changes in the reserve's forest cover

In an article published in 2017, Elvis Mbeng & Umaru Hasan Buba (2017) identify the main reasons for the gradual disappearance as:

- Ignorance, lack of knowledge and misinformation are the causes of the rapid degradation of this natural reserve. The population has confused the creation of the Santchou Reserve with the conservation efforts of the public authorities to remove them from their lands, the main source of their livelihoods and cultural identity. In the local context, they imagined large-scale evacuations or lived in a fenced and enclosed area with wildlife, so that the exploitation of the reserve became a defensive action against such prospects;
- large food and cash crop plantations now occupy a large part of the reserve and, according to the population, their existence has accelerated over the past decade due to the sedentarization of foreigners from the West, North and South-West Regions. These lands were sold by the indigenous population to these foreigners according to some sources. Thanks to bushfires, particularly in the mountain savannah area, large areas have also been cleared for planting;
- a very old human presence. At the time of the creation of this reserve, several villages were already located in the demarcated area, but their size has increased due to the population explosion and the settlement of migrants from neighbouring areas, particularly in the West. Demand for firewood and other wood products from local craftsmen and construction work has

accelerated the destruction of forest cover. According to some people, chainsaws can be heard almost daily for logging and expansion of existing plantations;

- the exploitation of medicinal plants and poaching have also contributed to the degradation of the reserve due to the growing demand from neighbouring villages and towns;
- the widespread poverty and the presence of many unemployed youths could explain the reasons for the activities responsible for the rapid degradation of the reserve;
- the abandonment of ancestral customs by the new generation, due to the mixing of populations of diverse origins. The disappearance of elephants in the reserve is also attributed to the youths' adoption of Western culture. They refused to be introduced to the tradition of their ancestors, that is, to keep "totems", because one or both of the parents are not natives of the area, or because they do not see its value.

2.2. Management of Wood/Forest and Wildlife Resources by Communities

2.2.1. Management of Wood Resources by Communities

Two forest formations of anthropogenic origin are observed in the West Region Cameroon: sacred forests and private forests. These formations are found in mountain and semi-mountain formations.

2.2.1.1. Sacred forests

Some forest areas remain under human pressure in the region, protected by a series of prohibitions that are partly religious. These various wooded sanctuaries found in the Bamiléké area occupy the eastern part of the Grassfields. Two main types can be distinguished, namely chieftaincy forests and forests associated with a sacred place.

a. Chieftaincy forests or sacred forests,

They are essential components of the Bamiléké chiefdoms. They are always attached to the chief's palace. These different spaces can be more or less wooded, which explains the variations observed from one chiefdom to another: some chiefdoms have only one forest, but in others, several small distinct woods coexist in the immediate environment of the palace. The different sectors of the chieftaincy "forest" therefore occupy a space that begins near the palace and goes down to the watercourse below. These forests are managed by men with mystical powers and home different secret societies. They can be considered as an integral part of the royal palace, the "heart" of each chiefdom and the woody resources present in this massif are fully protected.

Among these spaces with specific functions are first of all the royal cemetery (fam/fem), the box or boxes containing the skulls of the deceased chiefs, as well as, in some chiefdoms, the enclosure used for the initiation of the chiefs and their assistants (laakam). In the lowest part of the forest (towards the watercourse), there are trees linked to the other sacred trees located in the different courtyards of the palace and in the main square of the chiefdom (Ceiba pentandra, Ficus aganophila...). If that the chief's palace is relocated for any reason, a new forest is then created near the new site.

b. Forests associated with a sacred place

These are sanctuaries dedicated to the tutelary deities of the territory or to the ancestors. This type of sanctuary is found at different scales in the territory, and first of all at the level of concessions: during a new installation, a specialist in rituals identifies the tree sheltering the tutelary divinity of the place, which

thus becomes the sacred tree of the concession. Generally speaking, it can be seen that the larger the sacred site, the larger the associated forest massif. Thus, lineage shrines often consist of only one tree, small sacred neighbourhood sites are surrounded by a grove, and large sites are surrounded by a wood.

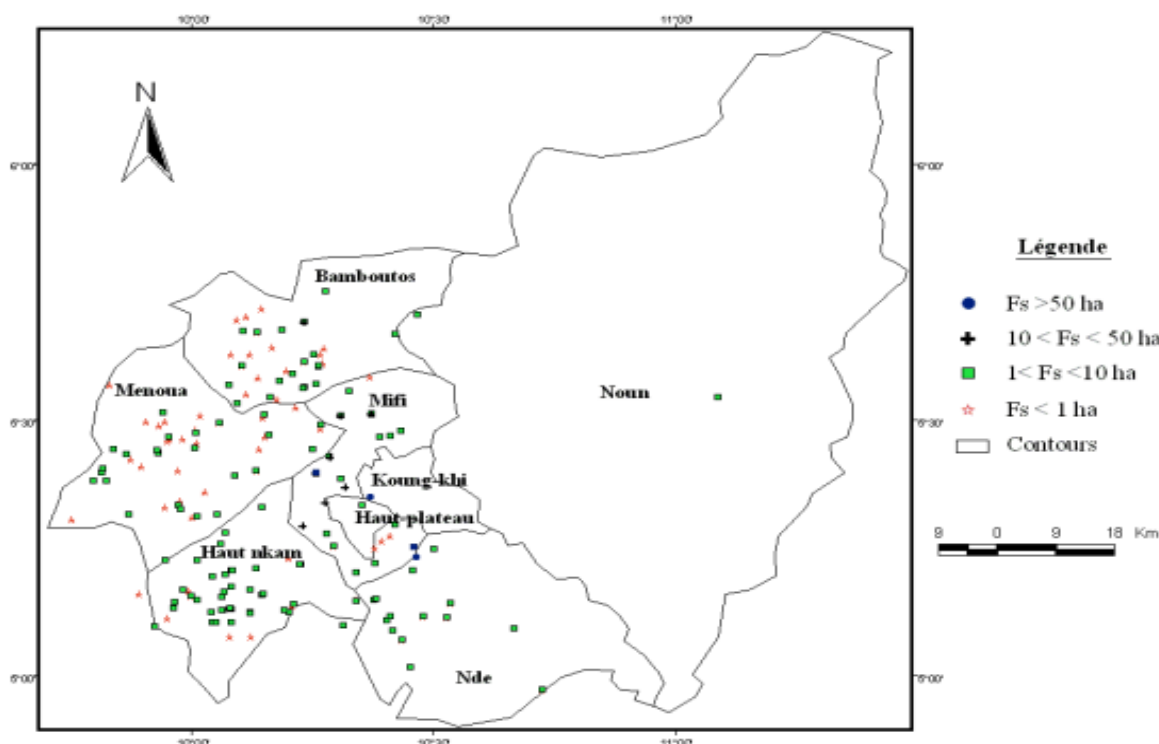
A study by CARPE-UICN (2010) identified about 310 sacred forests, covering an area of about 900ha. The sizes of the latter vary from 1 to 90 ha, depending on the importance given to ancestral deities by members of a village community. The vast majority are in the Bamboutos and Haut-Nkam Divisions. The largest areas were observed in the Koung-khi and Highlands Divisions. The MIFI and Noun have the least amount of sacred forests in the West Region. This small number seems to be explained in the MIFI by the socio-cultural changes recorded due to urbanization and economic development (only the chieftaincy forests resist). In the Noun, this small number is explained by the belief system based on the Islamic religion since the foundation of the Sultanate, which has not integrated the sacred forests.

Table 5, illustrated in Figure 1, summarizes some information from the sacred forests of the West Region per division.

Table 6: Summary of some information from the sacred forests in the West Region

Division	Number of sacred forests	Approximate total surface area
Bamboutos	71	96.1
Haut-Nkam	59	96.9
Highlands	38	237.809
Koung-khi	10	238.26
Menoua	69	94.8
Mifi	15	65.8
Ndé	46	54.31
Noun	2	2
Total	310	885.779

Source: CARPE-UICN, 2010

Map 4: Map of the location of sacred forests in the West Region (Sources: CARPE-UICN, 2010)

The sacred forests, which constitute an ancient and traditional conservation system, have made it possible to preserve some relics of forests that recall the forest past of the West Region. However, the small size of most of these sacred forests limits their ability to provide biodiversified habitats and the number of wildlife has decreased. These forests are now threatened, their conservation status, which is based only on a collective awareness of the traditional sacredness, is now being challenged by younger generations, who no longer have the same respect for cultural and traditional values. The absence of a legal status defined by law, or of land delimitation and security, allows all abuses by populations constantly seeking arable land for agriculture. Indeed, the lack of formal measures to control access and prevent their conversion to other land uses is a critical gap in the region's conservation strategy. Without a legal status, sacred forests have limited financial resources for their conservation and are therefore vulnerable to the degradation and continuous loss of biodiversity.

2.2.1.2. *Peasant silviculture and agroforestry*

a. *A valorization of endemic woody species*

- Taking into account woody species

Planting trees has always been a traditional activity for the people of West Cameroon. Trees to be used as groves and live hedges were planted in the 1950s. Live hedges have always played a fundamental role in the production of wood resources, the feeding of populations and the supply of medicines. In cropping systems, hedges are also used as an anti-erosion strip, which also acts as an access barrier for rambling animals.

Some local species are enriched in the hedges so that some of their parts can be harvested to meet food needs and supply the raw material to artisans/sculptors.

The following species have been identified in the different strata of agroforestry systems: *Canarium scheinfurthii* (fruit productive, handicraft, work, medicinal), *Cordia millenii* (handicraft, work, medicinal), *Croton maerostachyus* (service), *Albizia gummifera* (fire, work), *Croton macrostachyus*, *Ficus Ovata*,

- Valuing raffia crops

The raffia trees occupy the marshy lowlands, and in addition to their very important ecological, cultural and economic roles, they also play a significant role in the production of firewood. Kamga (2002) reports that they are planted generally at 6m x 6m away from each other (277 stalks/ha), and can produce, thanks to their high pruning system, stalks whose grape variety produces a good wood of about 2736 stumps/ha/year. Set at 8 stumps/faggot and 6 bundles making a stere, one gets 57 steres/ha/year.

The production cycle for palm wine is relatively long, compared to that of woody plants. The raffia of hydromorphic valleys begins to produce from the 10th year onwards, while the production of those of undrained slopes must wait at least until the 15th year. The longevity of the raffia palm production cycle depends not only on genetic differences, the influence of altitude, soil, hydrology and climate but also on the maintenance of the extraction outlet.

The stakeholders in the different stages of the raffia wine sector are the first people who can have access to the advantages or suffer the disadvantages of this sector. These are rural producers, commercial intermediaries, traders and final consumers. These groups of stakeholders are far from being homogeneous in terms of their respective roles and tasks.

The rural and urban market involves different types of stakeholders who handle complex and varied distribution channels with the markets and the stakeholders. Permanent sales outlets are located in both urban and rural areas. A permanent raffia wine market developed in Babadjou town in the Bamboutos Division.

Notwithstanding the modernization of traditional society and the proliferation of modern beverages (beers and other liqueurs), raffia wine remains one of the strong symbols of the tradition of the Grassfield people. As much as it seals the alliance between families during wedding celebrations, strengthens the bonds between the members of a meeting, makes it possible to make a pact or to put an end to a dispute. It plays a role in traditional pharmacopoeia. With regard to the recognized commercial aspect, there are four types of chains: producers-consumers, producers-traders-consumers, producers-middlemen, salesmen-traders-consumers.

b. An intelligent adoption of the introduced species

The introduction and spread of fast-growing alien species has been carried out among farmers by the forestry administration, which was subsequently assisted in this task by development projects. The objective is to enable the latter to improve their incomes through the production of stakes, poles and sawyers. The concomitant development of plots by farmers near those set up by State services in certain vulnerable areas, particularly on the fairly steep ridges and slopes of the Bana, Batié and Chengne hills (Baham), etc., has been noted. Since 2010, the State has provided direct support to farmers organized in GICs as part of the national reforestation programme. Between 2012 and 2016, XAF 66,000,000 were handed over to the GICs by the State.

The first large-scale development projects are the Western Highlands Project funded by the World Bank, the Rural Forestry and Agroforestry Support Project funded by the African Development Bank, etc.). Small scale projects have been supported by some NGOs

The fast-growing species are those to be popularised. This decision was made following the failure observed in the savannah area, the introduction of local species that did not resist the open savannah environment. Among the species that have not adapted, we find mahogany with large leaflets (*Khaya grandifoliola*), dibetou (*Lovoa trichilioides*), Iroko (*Milicia excelsa*), ilomba (*Pycnanthus angolensis*, etc.).

The main specie chosen by the farmers to be popularised is Eucalypts sp. Eucalyptus *E. saligna* and *E. grandis* have acclimatised perfectly and have occupied large areas. From the introduced species, hybrids (notably *E. grandis* and *E. saligna*) adapted to the region have been created naturally. Research by Fonweban and Houllier (1997) estimates eucalyptus productivity at 15 to 20 cubic metres per hectare per year (m³/ha/year). In addition to planting, some eucalyptus trees are also planted as live hedges, which not only materialize land boundaries, but also stabilize the soil along fragile tracks, prevent the intrusion of livestock (belonging to the Bororo) into the crop fields; pruning operations throughout the growth cycle allow a wide range of products to be produced

It is worth noting the mastery of technical routes by farmers whose transmission of know-how is intra-generational. The latter has acquired additional knowledge through training organised within the framework of development projects.

Most eucalyptus plantations are treated in coppice fertility (cutting trees and one or more shoots, on each stump, according to the needs) allowing a harvest of products "on demand" spread over time and space.

Table 7: Products collected in a forest plantation during the different growth phases

Growth year/phase	Collected products	
1 (first thinning and depressing)	Perch	firewood and tree stakes for agricultural and domestic use, perches from 3 to 6 centimetres (cm) in diameter,
3-5	Stakes	The stakes (from 12 to 20 cm in diameter at the base and 6 to 12 m in length) are the second product
6 to 10 years	Poles? Billons?	Poles (straight trunks from 25 to 35 cm diameter at the base and about 15 m long) are exploited at the right age.
Throughout the entire life cycle	Branches, leaves	Recovery of crowns, improperly shaped wood, cutting waste and finally, stumps, throughout the life of the people.

While eucalyptus cultivation has been successful, the results obtained from pine have not been satisfactory. Indeed, before it matured, the only intermediate product being the branches for fir trees, had a fall in demand. This situation followed the decline in purchasing power observed among consumers in urban centres from the 2000s, who decided to focus on reusable artificial firs. On the other hand, the use of pine wood, which is sensitive to fungi and insects, in traditional construction has never developed in the region. For nearly ten years, it has been used to decorate ceilings, through the use of panelling. The sponsors of these constructions are mostly elites, who have considerable financial income. The main limitation of this valuation is the lack of mastery of drying techniques by craftsmen. The emergence of this sector, if confirmed, could boost interest in pines.

As of now, a census of peasant plantations organized by the Regional Forest Service is being finalized. This will make it possible for one to obtain information relating to the geographical coordinates of the plantations, the species planted, the surface area, the age, etc., in each division. It appears from the field surveys that the main silvicultural basins are the Divisions of the Highlands (Bangou), the Ndé (Bagangté Subdivision), the Menoua (Fongo Tongo Subdivision), the Noun for pine production (Bangourain and Kouoptamo Subdivision)..

3. WOOD VALORIZATION AND MARKETING

Most households in the region use wood, both for construction works and for domestic energy production.

3.1. Energy Wood (Firewood and Charcoal)

Wood energy plays an important role in households. Although studies show that domestic gas is more economical, wood energy allows the cooking of certain essential meals of western populations that require a high calorific value. Pockets of natural forests and trees kept in the fields are increasingly pressurised because demand is constantly increasing and the renewal of the wood resource is not proportional to the cut.

In addition to the availability of wood in agricultural concessions, some of the fuel wood in the local market comes from the North-West Region of Cameroon. This region is famous for its vast eucalyptus plantations. Some sources of supply are also found in Bamboutos, Ndé and Noun.

3.1.1. Procurement of Stakeholders

The demographics and accelerated urbanization of the West Region are radically transforming the social benchmarks of urban populations, but domestic energy consumption patterns are not quick to change. Following this situation, one can say that wood energy remains the main source of energy available to all stakeholders.

Two products are involved in wood energy in the West Region: firewood and charcoal. Two main stakeholders stand out in the field for the production of these products: entrepreneurs and processors or small producers.

Entrepreneurs are the fewer but they are the professionals in the sector. They employ transformers for production, pre-finance production and deliver products to wholesalers. In some cases, depending on their turnover, some entrepreneurs buy the production of independent transformers. Transformers are temporary and amateur producers trained in the field who, in some cases, have another secondary activity.

3.1.1.1. Internal procurement

Several environments constitute the sources of supply, notably the private domain (live hedges, groves, fruit trees, state and private plantations) and the national domain (savannahs and forests). The supply of fuel wood is often linked to the shifting agriculture of the producer or owner and, to the selective cutting of forest quality species and woodlands, which produce quality coal.

As far as sampling points are concerned, the savannah ecosystem is the most represented, followed by fields and fallows with 64%, 18% and 14% of the total area of wood energy production areas respectively. Plantations and forests are the least represented ecosystems with 3% and 1% of the total area of wood energy production areas respectively.

In addition to villages, the main points of consumption of wood energy are the towns, which are supplied by sites located in the divisions concerned. Only the Bafoussam town is supplied with wood from divisions other than Mifi. The Noun Division is thus the main sampling point for the two production systems, with pressure on the following seven species: Tali (*Erythrophleum suaveolens*), kouo (*Hymenocardia acida*), shea (*Vitellaria paradoxa*), yellow wood (*Combretum spp.*), Balié (*Terminalia spp.*), Azobé de savane (*Lophira lanceolata*) and acacia (*Acacia spp.*)

The charcoal that supplies the Bafoussam town comes from Nkouchanka in the Foubot Subdivision, and Sanki in the Bangangté Subdivision. Production is carried out using the following processes: traditional grinding wheel, pit and hybrid technique.

The firewood comes from the Galim, Penka Michel, Bangou, Baham, Mfessang, Batouffam Subdivision.

Charcoal and firewood all come from Nkoulén in the Foubot Subdivision.

It is important to note that the fuel wood taken from the Santchou Subdivision is marketed in the Moungo Division, Littoral Region.

3.1.1.2. Procurement by products of external origin

The wood energy sector is increasingly supplied by products from outside the region, mainly charcoal. Sporadic supplies are provided during certain major events by their organizers, or by certain elites during short stays in the region.

The constant supply comes from the SMK and Mbgatou industrial sawmills located in the Central Region, Mbam and Kim Division.

3.1.2. Sustainability of the Internal Supply Chain

The supply problem of the wood energy sector raises questions about the sustainability of characteristic agro-forestry systems, natural forests in view of the exponential and growing demand of local stakeholders and the availability of resources. Till date, the results of the studies do not suggest sustainable and efficient management, which guarantees a balance between the exploitation rate and the self-regeneration of the wood resource.

Firewood is sold in faggots or bundles. Faggots are sometimes produced by using parts other than the stem of trees (branches, roots, etc.).

Charcoal is sold in the following states: pieces, broken and biochar in different containers (bags, bowls, plates...).

The following table summarizes the daily consumption of some economic stakeholders in the West Region of Bafoussam Town.

Table 8: Daily wood energy consumption of SMEs in Bafoussam Town

	Firewood	Charcoal
Doughnuts	15	
Bakery	241	
Poultry farmers	181	205
Potters		43
Eatery	13	5

	Firewood	Charcoal
Restaurant	64	8
Vegetable Rotisserie		6
Animal Rotisserie	23	4

Source: Ngoungoure (2012)

From the analysis of the data in the above table, it appears that bakeries and doughnut producers do not use charcoal. Potters and "vegetable rotisserie" do not use wood from wood fires.

The high consumption of energy wood is observed among poultry farmers, who are increasingly adopting charcoal, followed by the booming bakeries in Mifi. Stakeholders mostly use this source of energy because of the difficulty in connecting farms to the electrical grid, and the energy supply that does not meet the requirements of the electrical equipment needed to operate bakeries.

3.1.3. Institutional Framework and Related Taxation

At the institutional level, wood energy management is regulated by MINFOF. The Forest Law sees sustainable forest management as a priority. This Forestry law does not seem to take into account the issues related to wood energy treated in the forestry policy.

As proof, the forestry administration does not pay attention to carbonization. However, in forest legislation, green charcoal is classified as a special product¹. Its exploitation is subject to a permit issued by MINFOF the authorisation of the Inter-ministerial Committee for Allocation of Titles. The fact that the legislator limits authorisations to green wood does not give the possibility of giving added value to senile trees in a coal production project. There is no decree regulating the production of firewood.

Taxation in the wood energy sector varies according to the type of product.

For charcoal, the selling price is increased and the regeneration tax is supposed to be paid for non-timber forest products, special and medicinal products at XAF 10/Kg².

For the exploitation of firewood, the agreement, the felling tax, the regeneration tax and the payment tax must be integrated for the exploitation of firewood, the payment of which is as follows: - wooden stere: 65 francs; - stere in charge: 650 francs³.

Actually, there is an administrative tolerance for non-payment of taxes provided for by the Finance Law. However, there is a parafiscal charge, which is not the least. The latter increases production costs in the wood energy sector. These are the payment of tree felling rights to traditional rights holders, the payment of right-of-way to law enforcement agencies and municipal barriers.

3.2. Domestic Timber Market

3.2.1. Towards a New DTM Framework

The Cameroonian Government is committed to promoting and marketing legal timber and forest products within and outside the country. This commitment was made following shortcomings, the main ones being: complaints from certain exploiters in the wood sector who are unable to sell their products easily, lack of

¹ Decision No. 2032/D/MINFOR of 22 August 2012 establishing the list of special forest products of particular interest to Cameroon

² Article 247a - (1)

³ SECTION V OTHER DUTIES AND TAXES Article 246 - (2)

information on the supply and demand for wood and wood products, little-known or unknown species that are subject to low exploitation, lack of structure in the marketing of legal wood at the national level, lack of control over the pricing system for processed products on the market, etc.

To resolve these shortcomings, the forestry and trade administrations jointly signed Order No. 0878/MINFOR/MINCOMMERCE of 26 April 2010 on the organisation and functioning of the Domestic Timber Market (DTM) in Cameroon. According to this text, the DTM is, on the one hand, a system for collecting and sharing information on supply and demand and, on the other hand, a set of physical sites where commercial transactions in timber products and their by-products take place between stakeholders in the sector, in compliance with the laws in force in Cameroon.

The Domestic Timber Market (DTM) consists of a virtual and a physical platform. The virtual market is a system (software platform) for collecting and sharing information on wood supply and demand that may lead to a commercial transaction in accordance with regulations in force. The physical market is defined as a geographical area of the national territory on which commercial transactions of wood products take place between stakeholders in the sector, in compliance with the laws in force.

Like any other market, DTM is a meeting point between sellers (having the resources in storage sites) and buyers (who solicit it). Between these two stakeholders, there are intermediaries who are mainly processors and transporters.

In decision No. 0618/D/MINFOR/SG/DPT/SDPB/PFmib⁴ of 02 November 2016, MINFOR formalised the rules and process to be applied and carried out to make the DTM effective in Cameroon. Thus, to be recognized as a DTM stakeholder, any operator must first declare the site on which he operates to the territorially competent DTM branch manager. The file to be submitted must contain the following elements: a registration form for physical sites; a vow in which the person concerned undertakes to comply with all of DTM requirements and sell only products of legal origin; possible sources of supply; the site's location plan; the statutes of the institution, etc.

3.2.2. Domestic Timber Market in West Cameroon

The timber market in the West Region is structured around two means of supply: external and internal supply, and dissemination in the region from Bafoussam and transport to the Moundou from Santchou.

3.2.2.1. External procurement

Products from outside the region have two origins: the North-western zone and the dense humid forest zone for service wood.

The wood products from the Northwest are products from eucalyptus silviculture. Kumbo is the main supply area. The interest for the products of this origin are their dendrometric characteristics (straight, and large diameters, etc.). A central warehouse is located at the Africa Construction site in Bafoussam town. Slats, stakes, dead branches, backs, poles, etc are the main products.

Given the limited supply in quantity and quality of the local wood market, supplies are increasingly coming from products from humid forest areas. Planks, battens, joists, etc are the main products marketed. They come from sawmill waste, community forests, illegally exploited products...

⁴ Decision No. 0618/D/MINFOR/SDPB/PFmib of 02 November 2016 Making enforceable the procedures for making abandoned waste/wood and residual stems available to artisanal processors in Permanent and Non-Permanent Forest Domains in two main regions (East and South)

Three axes are used to supply the region: the East, South-East and South axes.

- The eastern axis provides supplies to Bafoussam town from the Centre Region, mainly woods from the Fouban-Magba and Foubot - Malantouen subaxes;
- The South-East axis allows the region to be supplied with wood from the Eastern and Centre Regions;
- The Southern axis which allows the region to be supplied with wood taken from the coast (Nkondjock) and which passes through Bafang. Supplies from the Littoral are only provided during the dry season, because of the poor road conditions in this area.

Marketing is focused on the hardwood species found in the Nylon wood depot. These species are as follows: ayous (*Tryplochyton scleroxylon*), bête (*Mansonia altissima*), sapelli (*Entandrophragma cylindricum*), iroko (*Milicia excelsa*), pachylopba (*Azelia pachyloba*), fraké (*Terminalia superba*).

3.2.2.2. Supply from the inside

The domestic market consists of fuelwood products and service wood brought into the region. The supplies of the Divisional headquarters and towns' capitals are similar to those of wood energy.

3.3. Wood processing

Wood processing in the West Region is mainly carried out on a small scale. Indeed, compared to regions that have processing tools of various categories, the dendrometric and physical properties of trees in wet mountain areas, coupled with their standing wood potential, do not stop the installation of industrial units. Wood from other regions is a product of primary processing.

Originally, the marketing of poles made from exotic species was the main objective sought by foresters; circumstantial felling operations of a few feet allowed local residents to have local timber. The by-products of these operations, i. e. the branches, the doses were consumed locally.

Nowadays, wood processing has new determinants. Indeed, we are witnessing, more and more, the felling of a significant number of standing trees and the systematic marketing of by-products. New by-products are found in wood deposits in urban centres, such as sawdust, which is highly prized by developers of agricultural farms and ridges (washers).

In addition to exotic species, there is a growing presence in wood deposits of species that come from the fields. The latter are mainly ridged with a chainsaw or cut using machetes for the production of bundles. These are mainly ripe citrus fruits.

Sawmill operations are carried out by amateur sawyers, also known as village sawyers. They are involved when they are called upon to fell, cut down or separate a tree in a field or forest plantation. The material yield obtained after processing is low, given the quality of the material used by sawyers. However, all by-products are recovered.

It was noted that some edgers were present in the Bafoussam. These edgers are used to divide the joists that come from the dense forest area into battens.

4. WILDLIFE MANAGEMENT IN THE WEST REGION

The bushmeat trade in the West Region is practically illegal.

Legal trade is governed by rules issued by the forest administration that set out the conditions for harvesting and marketing. The main titles and authorizations that can be issued by the regional forest and

wildlife service are: small hunting permits and collection permits. The taxes collected are: weapon taxes, collection tax and public auction sales of seized meat carcasses.

In some divisions, there is income from carcass collection, although no hunting permits are issued. It seems appropriate for the wildlife services to issue collection permits based on hunting permits.

The scarcity of hunting permits seems to be due to the constraints and length of the administrative procedures for their issuance. The weapons of most active hunters are not registered with the wildlife authorities. This inadequacy/failure seems to be at the root of the predominance of illegality in the sector. Indeed, 46.5% of the revenues recorded come from the auction of seized illegal products.

Commercial hunting, which is actually poaching, is carried out by real professionals who are often foreigners in some cases and indigenous in others. Two points through which 95% of bushmeat passes have been identified as trade hubs in the West. It is Foubot which is supplied by meat from Massangam, Mankari, Fouban, Ngambe Tikar and Ndeuck in the Mbam. The second point in Bantoum is supplied by meat from the Mbam via Ntonga.

The remaining 5% comes from the Littoral and slightly from the Southwest. Meat from the Littoral supplies Bafang and Bazou. Santchou is supplied by small quantities from the southwest, mainly from Bakembo.

Poachers use cable for traps and sometimes modern means such as firearms. The interviews revealed an increase in the use of firearms and steel cables to kill animals. The meat from this hunt, which passes through Foubot, is buffered and taken to urban centres for sale. The meat that passes through Bantoum in most cases is fresh.

There is also a presence of trophies from the carcasses of large mammals in several traditional chiefdoms. In Bamiléké societies, large mammals confer power and notoriety. Bamiléké leaders are generally referred to as *Nomtema* (lion). Because of the great respect they have for them. The "fo" chief is normally the one for whom large game (buffaloes, warthogs, felines...), feline skins, large statues, multi-purpose stools or set with silver coins, elephant tusks, rhinoceros and lion teeth, etc.

Several trophies of class A⁵ animals are in the Bamiléké chiefdoms. The recognition and sacredness of animals is justified by the spate of art exhibition museums, which include a large number of trophies of fully protected animals. In addition, some rites are performed with these trophies during major cultural events.

The number of trophies of fully protected animals present in chiefdoms is increasing significantly. Indeed, the 2017 MINFOF staff census noted that this number has increased from 97 in 2016 to 217 in 2017. This increase suggests a new form of poaching specific to West Cameroon, or a trade in trophies from other regions. He also mentioned the possession of trophies by individuals who have acquired notable titles in chiefdoms. The majority of holders declare that they inherited them from their ancestors. No trophy holder has the required authorizations. They are the certificate of origin, and a certificate of trophy ownership. The holders by ricochet did not pay the related taxes as provided for in the Finance Law.

⁵ Law 94/01 of 20 January 1994 on Cameroon's forestry, wildlife and fisheries regime, and in particular Article 101(1) thereof, which stipulates that: "Any person found, at any time and in any place, in possession of all or part of a protected animal of Class A or B, as defined in Article 78 of this Law, alive or dead, shall be deemed to have captured or killed it".

In the western highlands, there is a strong trade in Gambian pouched rats. Branches are identified in Bangou, Fongo Ndeng and Fotetsa; they feed a network of restaurants, highly frequented on weekends by inhabitants of the region. MINFOF officials practice administrative tolerance on the development of this sector. This acceptance would be due to the fact that the majority of rats are not hunted in forest areas, but rather in areas meant for human beings (fields, agroforestry areas, groves, fallows, etc.)

Table 9: SWOT Analysis for the Forestry and Wildlife Sector in the West Region

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> - Rich biodiversity of fauna and flora - Ecotouristic landscapes (Dschang cliff, escarpments in the Haut Nkam, Bamboutos and Ndé...) - Strong silvicultural cultivation by the people - Strong presence of sacred forests - Presence of Hippos in the Noun Plain - Valuation of marginal land for silviculture - Soil and climate conditions favourable to silviculture of fast-growing species) - control of technical silvicultural routes by farmers 	<ul style="list-style-type: none"> - Uncontrolled/anarchical cutting of trees and low resource renewal - High anthropogenic pressure that does not guarantee natural regeneration - Insufficient technical personnel for forest and wildlife control - High appetite for game consumption (households and ceremonies) for local populations - low prioritization of conservation - Weak collaboration between local foresters and technical services for better supervision - Funds allocated to communes for reforestation, without monitoring mechanisms (communal forestry) - Lack of state support for private foresters - Low reforestation rate - The protected areas of West Cameroon are not part of the scope of action of the Technical and Financial Partners, and the priorities of the State) - Restricting access to resources without studying opportunity costs and without compensating populations - Weak collaboration between stakeholders from different categories of sectors for the effective implementation of agroforestry - Difficult social integration for fauna and flora conservation areas - Low adoption of non-conventional livestock farming - Disappearance of ancestral vegetation conservation habits (family groves, invasion of sacred forests, etc.)
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Presence of a plant for processing eucalyptus trees into electrical poles - Existence of training organisations for stakeholders - Stakeholders subsidising legal groups - Supporting municipalities, NGOs and traditional chiefdoms for reforestation 	<ul style="list-style-type: none"> - Deforestation and accelerated degradation of natural forests, reforestation areas and forest reserves - Human/wildlife conflicts - Bushfires - Weak collaboration between the population and the forest administration - Non-respect of silvicultural techniques by silviculturalists

<ul style="list-style-type: none">- Promoting non-conventional breeding (Aulacodes, Guinea pig, Rats, etc.)- Establishing the Domestic Timber Market	<ul style="list-style-type: none">- Increased poaching on all animal species- Pollution and nuisance- Permanent conflicts between farmers/breeders- Demographic pressure/anarchic urbanisation- Invasiveness of ecologically fragile areas (low ground, sloppy basins, steep slopes, etc.) by populations
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