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NON-DETRIMENT FINDINGS REPORT ON *PERICOPSIS ELATA* (FABACEAE) IN CAMEROON

AUTHOR:

Dr Jean Lagarde Betti

ITTO/CITES Project Africa Regional Coordinator, Ministry of Forestry and Wildlife.

INTRODUCTION

Pericopsis elata is a leguminosaea species of the Fabaceae family, known under its trade/pilot name as afrormosia or assamela. It is a tree species of the close, Guinean-Congolese forest type. Its natural range is discontinued, with several isolated sub-stands in Ghana, Côte d'Ivoire, South-eastern Cameroon, Northern Congo, the North-eastern portion of the Democratic Republic of Congo, and the South-Western portion of the Central African Republic (CAR).

Pericopsis elata is classified by the World Alliance for Nature (IUCN) as endangered species, which led to its listing in the Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). This decision had a significant impact on the revenues produced from this value timber species in the range countries.

As it is, the species is indeed endangered and has become all but locally extinct in West African countries, including Côte d'Ivoire (*Here, the species is virtually extinct* - Kouassi Amian/CITES management authority of Côte d'Ivoire, personal communication), Ghana and Nigeria, where the exploitation and international trade in this species had begun some 55 years ago. Significant stocks of the species still exist, however, in the Congo Basin, including Cameroon, Congo, and the Democratic Republic of the Congo. In CAR, afrormosia is still hardly used.

In various African countries, policies have been established to ensure the sustainable management of forests having afrormosia stands in them. However, enforcement issues and control problems do persist. The development of clear procedures to deliver Non-Detrimental Findings (NDFs) remains a priority for most producer countries (CITES 2003).

The annual quota of export volume fixed for the Cameroon government is 15,200 m³, but since 2000, the national export volume has never reached 8 000 m³ (Akagou 2008). To enhance the sustainable trade of this species, the

Cameroon government has fixed its minimum exploitable diameter at 100 cm, which is the highest in the Congo basin. According to forest companies, *P. elata* is not threatened in Cameroon, its minimum exploitable diameter should therefore be reduced as to allow them to get quality timber from that plant species.

As a response of some questions asked by the CITES, the Cameroon government through its forest administration has produced two main reports (MINEF 2002, 2004a) as to demonstrate that *P. elata* is not threatened in the country. The first report was addressed in 2002, while the second was sent in 2004. No one of these reports has led to the review of the position of the CITES decision on this plant species in Cameroon.

This work aims to gather and analyse data for dressing a Non-Detriment Findings Report on *Pericopsis elata* in Cameroon. The main objectives are to summarize the basic information on this plant species, its management, utilization and trade, and to present a comprehensive description on the procedure followed to make the non-detriment findings for *P. elata*.

The document is prepared to be presented at the International Expert Workshop on CITES Non-Detriment Findings, projected in Mexico, November 17th-22th, 2008. It is divided in two parties: Back ground information on the taxa, and the Non-detrimental Finding procedure.

I. MATERIAL AND METHOD

This section presents the milieu and the method used to draft this report.

1.1. Study area

The Congo Basin is one of the two most extensive forest continue at global level, second only to the Amazon basin; it epitomizes the dialectics of conservation and forest use for sustainable development. Because forests provide both a source of income and a life-supporting environment to many peoples, forest use and exploitation and even forest conservation pose more complex challenges.

Cameroon belongs to the Congo basin, it is located at the centre of Africa near the Equator and covers about 475,000 km². It totals about 16.5 millions ha of dense rainforests. The flora component (higher plants) has 7,000 species of which 300 are woody plants, ranking Cameroon 4th in Africa after the Democratic Republic of Congo, Tanzania, and Madagascar (MINEF 1995). From South to North, there are various types of tropical rainforests, humid savannah, forest galleries, dry forests, dry savannah, steppes and yaeres. Apart from these natural ecosystems, there are also man-made agro-ecosystems (Letouzey, 1968; 1985). Figure 1 illustrates the main phytogeographical regions found in Cameroon including: the shrubbery steppe in the Far-north province, the wooded savannah in the North province, the forest savannah in the Adamaoua and West provinces, the transition forests in the Adamoua and East provinces, the semi-deciduous forests in the East and South provinces, the mangrove and evergreen forests in the Littoral and South west provinces (MINEF 1995). Cameroon's phytogeographical map can also be classified as follow: afro-mountain region, in South west, west and north west provinces, the soudano-zambezi region in the North and Far north provinces, the Guineo-congolense region found mainly in the Centre, South, south west and East provinces, the Dja Congolense district found in the East and south provinces, and the pery-forest savannah found in the Adamaoua province (Letouzey cit. Sonké 1998).

Cameroon is often considered as Africa in miniature due to its large variety of ecosystems and climates. The various ecosystems have always been inhabited by Cameroonians who have, some how, reshaped them through the years by harvesting this rich biodiversity for food, medication, construction of houses, etc.... The rate at which they are used varies from rural areas to towns.

According to the Cameroon's minister of forestry and wildlife, "the forest sector of Cameroon contributes to some 30% of total non-oil export revenues. Presently, the timber industry ranks first in terms of exported goods deadweight and accounts for 20% of the total value of exported goods. Its contribution to GDP rose from 4.3% in 1992 to 8% in 1999 and is currently exceeding 12%. It directly and indirectly employs 90,000 persons. This development potential can only become sustainable within a participatory management plan articulated both outside and inside the country" (Ngolle Ngolle 2008).

The utilization of resources is not always rational and sustainable thus constituting a threat to biodiversity. Systems of farming such as slash – and – burn agriculture constitute the major cause of the destruction of the tropical forest, recognised as a real reservoir of biological diversity. It is also important to note that poaching which used to check animal populations has now become a real bane of wildlife. Activities of forest logging are viewed as one of the main cause of intensive poaching and commercial hunting (Betti, 2004; MINEF, 1995).

Among the ten provinces of Cameroon, six, namely the Centre (Yaoundé being the capital), East (Bertoua), Littoral (Douala), South (Ebolowa), Southwest (Buea) and West (Bafoussam) provinces, are situated in the forest zone where logging and “wild sawing” are restricted. The three Northern provinces, namely the Adamaoua (Ngaoundéré), the North (Garoua) and the Far North (Maroua) provinces, are situated in the savannah area, that is mostly concerned with sport hunting activities and, which are supplied with wood coming from Southern part of the country.

In Cameroon the distribution of *Pericopsis elata* is largely restricted to the East province.

The East province of Cameroon is largely covered by the semi-deciduous and the transition forests, and is referred as the main reserve of timber resources in the country. In fact, the province contributed for about 53.5 % of the total volume of timber produced in Cameroon (MINEFI, 2006). This province also contributes for about 3 billions of FCFA as the felling taxes per year (Mr Mbandji, the East Provincial Delegate of Forest and Wildlife in 2007, pers. Com.).

1.2. Method

Data presented in this report are based on the literature revue, discussions with different stake holders, and my own field experience.

Area of extent occurrence and area of occupancy of *Pericopsis elata* were estimated based on the important work conducted by Vivien and Faure in 1985 on African trees (Vivien et Faure 1985). The map was completed using results of the forest inventories conducted by the National Centre for Forest Development (CENADEFOR) and the Technical Tropical Forest Centre (CTFT) in the south (1983) and East (1985, 1986) provinces of Cameroon (CENADEFOR – CTFT 1983, 1985, 1986). The final confection of the map was done by taking in account, update data on Assamela logging found in different reports of the forest administration and in the documents of management plans of some forest companies. General elements regarding the management plan and production forests were obtained from the forest law, and management plans. The arête n° 0222/A/MINEFI of the 25 may 2001 fixing the procedures of the elaboration, approbation, monitoring, and control of the implementation of the management plans of production forests was largely used (MINEF 2001). The report of the ITTO/CITES training workshop on sustainable trade of *Pericopsis elata* held in Kribi, from 2 to 4 April 2008 was largely exploited (ITTO 2008).

Discussions were conducted with several resource persons in Yaoundé, Kribi, and Bertoua. The Director of forests, the Sub Director of forest management and inventories, the Chief service of managements, the CITES management authority, the Chief Service of forests database, CITES Scientific authority, the staff of the provincial delegation of Forestry and Wildlife in Bertoua, researchers from the Institute for Agricultural Research and Development (IRAD)/Kribi and the Association of Timber and Forest Industries (ATFI) of Cameroon were interviewed to get their point of view and problems related to the management of *Pericopsis elata* in Cameroon.

II. BIOLOGICAL DATA

2.1. Distribution of *Pericopsis elata* in Africa

Pericopsis elata is a leguminosaea species of the Fabaceae family, known under its trade/pilot name as Afrormosia or Assamela. It is a tree species of the close, Guinean-Congolese forest type. Its natural range is discontinued (see figure 2: distribution of *Pericopsis elata* in Africa according to Bourland 2008), with several isolated sub-stands in four different areas (Vivien et Faure 1985) including: (1) East of Côte d'Ivoire – west of Ghana, (2) the west of Nigeria and Cameroon, (3) the Sangha – Ngoko basin, and (4) central basin of the Democratic Republic of Congo (DRC).

2.2. Scientific and common names

Different vernacular names are used to design *Pericopsis elata* within the range areas where the plant occurs: Obang by the Bangantou ethnic group and Nguep by the Mvong-mvong ethnic group, in the Boumba Ngoko division in the East province, Nom eyen by the Mbulu ethnic group in the south province, and Mobay by the Baka pygmies settled in the south and south east of the country (Vivien et Faure 1985).

2.3. Distribution of *Pericopsis elata* in Cameroon

In Cameroon the distribution of *Pericopsis elata* is largely restricted to the East province of the country in the Dja, Boumba, Ngoko, and Sangha river basins (see figure 3a). This main area of distribution is approximately 4 071 857 ha (MINEF 2004a, CENADEFOR-CTFT 1983, 1985, Vivien et Faure 1985) and represents about 19% of the national forest domain. There are also some small and isolated stains in the south (Dja et Lobo, Ntem, and Ocean divisions), Centre (Ndom division) and South west (Manfé) provinces (CENADEFOR-CTFT 1983, Vivien et Faure 1985).

In the east province, *Pericopsis elata* is largely found in three divisions including, the Boumba & Ngoko, Haut-Nyong, and Kadei. This area is largely composed of three main forest types including: the semi-deciduous forests of Sterculiaceae and Ulmaceae, mix forests (sempervirent or evergreen and deciduous) with a predominance of elements of the semi-deciduous forest, and mix forest (evergreen and semi-deciduous) with predominance of the Dja forests. Aside of these tree forest types, there are also many other forest types, which are disseminated all over the area of *Pericopsis elata*. They include: the swamp forests, the mono dominant forests of *Gilbertiodendron dewevrei*, secondary forests on former logging sites and dominated by light demand plant species such as *Alstonia boonei*, *Macaranga spp*, *Musanga cecropioides*, *Terminalia superba*, forests on rocks or inselbergs dominated with *Croton mayumbensis*, *Oncoba crepiniana*, drained forests along rivers as sangha, Boumba, Lobéké inhabited with *Uapaca heudelotii* and *Guibourtia demeusei*, ripicol forest of *Irvingia smithii*, *Trichilia retusa* and *Cathormion altissimum*, and swamp forest of *Raphia laurentii* and *Phoenix reclinata* (MINEF 2004b, MINFOF 2007a).

Data collected during this work from different documents (management plans) tend to show that, the area of distribution of *Pericopsis elata* is more important than what was previously said by Vivien et Faure (1985). This area also covers an important part of the Kadey division, including the Bimba village in the north of Mbang (fig. 3b).

But we are not in position to tell if or not, the distribution area of Assamela has increased. May be, Vivien and Faure who first drew the distribution map of

Pericopsis elata in Cameroon did not cover those zones during their botanical expeditions.

2.4. Biological characteristics

2.4.1. Life history

Pericopsis elata is a semi-gregarious species with a limited but widely dispersed distribution. It is locally abundant in parts of its main range. *P. elata* is a high tree, up to 20 m that can reach 1.3 m of diameter at breast high. The trunk is tortuous and irregular. Trees with high diameter are often hollow or rotten in their heart (Vivien et Faure 1985, Bourland 2008). The bark is more characteristic (0.5-1 cm), greyish and smooth. The trunk has brown to reddish stains. The slice of the trunk is yellow to orange, with an external green ring. The sapwood is well differentiated, yellow (1-2 cm). The wood is brown yellowish. Leaves are light, on horizontal branches. Leaves are deciduous, composed of 7-11 small leaves (follicles in French). Fruits consist of linear indehiscent pods, with brown and smooth surface (Vivien et Faure 1985).

The lack of natural regeneration for this species has been widely noted by many authors. Forni (1997) and Bourland (2008) reported low recruitment and regeneration levels under closed canopy conditions in unexploited forest in East province of Cameroon. The natural regeneration depends on the light conditions. This regeneration is high in areas where forest logging and forest roads have been realized (Kabala et al. 2008). In natural regeneration experiments, it has been observed that the seedlings of *P. elata* are scarce no matter the overhead canopy is light, medium or dense. It has been suggested that, insect damage to the seeds may be the cause of the scarcity of regeneration. But it is not thought that this species is more liable to insect damage than others especially as its germination period is short. Growth is slow in early youth, but increases when overhead light is available (Dei-Amoah & Cardoso 2008). It is said that a noticeable amount of natural regeneration for *P. elata* depends on some conditions such as: sufficient number of mother trees, ripe and abundant fruits, and sufficient quantity of seed, a soil well drained, and an optimal light of more than 40% (Peters 1994 cit. Kabala et al. 2008). However, natural seedlings are remarkably rare. *P. elata* produces flowers every year or every two years at the minor rainy season (March – May). Ripe and indehiscent pods, are wind-dispersed in strong winds and are produced from January to April (Bourland 2008). Each pod contains (Vivien et Faure op cit.) between 1-4 flat seeds (with diameter 1-1.5 cm). Seedlings are reported to be drought tolerant. In early youth it is tolerant of overhead shade but would appear to be a light demander later (Dei-Amoah & Cardoso 2008).

2.4.2. Habitat type

Pericopsis elata is a light demand plant species. The species occurs in 9 different forest strata in the East and South provinces of Cameroon (see table 1). In the South province, *Pericopsis* is only found in the humid dense forests on soil. In the East province, *Pericopsis* is found in humid dense forests and other forest habitats. The moist semi-deciduous forests with annual rainfall of 1000 – 1500 mm seem to be the specific habitat type where occurs *P. elata* in Cameroon (CENADEFOR-CTFT 1983, 1985). *Pericopsis elata* is semi gregarious to gregarious tree and uses to grow on flat ground, valleys and slopes. It is found in high density along rivers (Vivien et Faure 1985). *P. elata* is a true pioneer species, stimulated to germinate by gaps in the canopy (Forni 1997, MINEF 2004a, Dei-Amoah & Cardoso 2008, Dimanche & Regner 2008, Kabala et al. 2008). This

plant species accepts soils of “Reddish-yellow latosols”, with an annual temperature of 23 – 26°C (Kabala et al. 2008).

Table 1: Distribution of *Pericopsis elata* in different forest stratum and habitat types in East and South provinces in Cameroon, data extracted from the Forest Resources National Inventory (CENADEFOR –CTFT 1983 & 1985).

PROVINCE	STRATUM	SPECIFIC HABITAT TYPE	DIAMETER 20 – 40 CM (stem ha ⁻¹)	DIAMETER SUP. 40 CM (stem ha ⁻¹)	OBSERVATION threatened if density < 0.05stems/ha according to API project
SOUTH	The Dja forests	Humid dense forest on soil	0.00	0.01	threatened
	Mix forests with the Dja and semi-deciduous forests	Humid dense forest on soil	0.00	0.01	threatened
	Power Atlantic forest	Humid dense forest on soil	0.00	0.01	threatened
	Mix forest with dominant semi-deciduous species	Humid dense forest on soil	0.00	0.01	threatened
	Typical Caesalpiaceae forest (Cristal mount)	Humid dense forest on soil	0.00	0.01	threatened
EAST	Evergreen forest of Irvingiaceae	Humid dense forest on soil and other forest habitats	0.02	0.23	not threatened
	Evergreen forest of <i>Gilbertiodendron dewevrei</i>	Humid dense forest on soil	0.00	0.01	threatened
	Transition forest	Humid dense forest on soil and other forest habitats	0.03	0.18	
	Semi-deciduous forest	Humid dense forest on soil and other forest habitats	0.06	0.61	

2.4.3. Role of the species in its ecosystem

2.5. Population

2.5.1. Global population size

According to Pilot Integrated Management project (API project) which have been working in the East province of Cameroon for a long time, a plant species is said to be threatened if its medium density is less than 0.05 stem/ha (Forni 1997). This argument has been used by the forest administration to claim that *Pericopsis elata* is not threatened in Cameroon (MINEF 2002, 2004). If we consider this assumption, we can said that *Pericopsis elata* is threatened in the South province of Cameroon, where it occurs with densities less than 0.02 stem/ha in all forests stratum and habitat types, and for diameter classes > 20 cm (CENADEFOR-CTFT 1983). This is not the case for the East province (CENADEFOR-CTFT 1985). In fact, except for the Evergreen forest of *Gilbertiodendron dewevrei* where the density is less than 0.02 stem/ha, *P. elata* is well represented in the East province of Cameroon, particularly in the semi-deciduous forests where it occurs with densities of 0.66 stem/ha for diameter classes > 20 cm. For this reason, permits for exploitation of *Pericopsis elata* have never been attributed for the south province.

Figure 4 illustrates the population size map of *Pericopsis elata* in its main distribution area (Fauvet 2008). The map was drawn, based on the national resources inventory conducted in South Cameroon in 1983 and 1985 (CENADEFOR – CTFT 1983, 1985). For stems of diameter > 40 cm, the density of Assamela ranges from 0.22 to 4.35 stems/ha. The high density being observed at the Yokadouma region, in the Boumba & Ngoko division.

The recent national forest resources assessment conducted by FAO from 2003 to 2004 gives the density of 0.03 stem/ha for *Pericopsis elata* in the whole country, which tends to show that this plant species is vulnerable in Cameroon (MINEF - FAO 2005). This low density may be due to the fact that, the 2003 inventory covered many ecological zones of Cameroon, including those where *P. elata* does not occur. Also, this density includes trees with diameter less than 20 cm.

2.5.2. Current global population trends

In the following sections, we focus the analysis on the East province of Cameroon, considered as the main reserve of *Pericopsis elata* timber in the country.

During the second phase of the Forest Resources National Inventory (CENADEFOR – CTFT 1985, 1986), the National Centre for Forestry Development (CENADEFOR) delimited the East province in 6 forest blocs, with numbers from 6 to 11. The delimitation was not only based on ecological or floristic conditions, but also on physic and other considerations. A total of 23 Forest Management Units (FMU) are currently logged by timber companies in the main reserve of Assamela in the East province of Cameroon. Those FMU are distributed as follow in different blocs delimited by CENADEFOR: bloc 7 (2 FMU), bloc 8 (7), bloc 9 (1), bloc 10 (8), bloc 11 (5), and bloc 6 (0). Table 2 shows estimated densities of *Pericopsis elata* trees with diameter high than 40 cm in the six forest blocs. The following Forest Management Units 10 026 (ALPICAM), 10 038 (CAMBOIS), 10 039 (PALLISCO), 10 054 (SFID) and 10 056 (SFID), which also contain important stocks of *Pericopsis elata* in the East province of Cameroon, are not included in this analysis. These FMU were covered with the fourth phase of the national inventory. They are found in the Kadei division. The analysis does not also include Assamela found in the sales of standing volume (Ventes de coupe in French) n° 10 01 153, 10 03 115, and 10 01 116.

Table 2. Distribution of Assamela density in different blocs in the East province of Cameroon

BLOC N°	DENOMINATION	SURFACE AREA (ha)	UFA	CENADEFOR-CTFT (1985) (stem ha ⁻¹)	MINEF (2004) (stem ha ⁻¹)	OBSERVATIONS
6	Haut-Nyong South	528 750.00	-	0.00	-	
7	Haut-Nyong Centre	431 250.00	10 02 9, 10 037	0.045	0.14	Nki national park
8	Boumba–Ngoko and Haut-Nyong	731 250.00	10 01 8, 10 02 0, 10 02 1, 10 02 2, 10 02 3, 10 030, 10 031	0.45	0.58	
9	Boumba–Ngoko South-West	675 000.00	10 015	0.36	0.37	Boumba bek (321 076 ha) & Nki national parcs
10	Boumba–Ngoko North-East	601 250.00	10 00 1, 10 00 2, 10 00 3, 10 00 4, 10 00 5, 10 00 7, 10 00 8, 10 009	0.22	0.51	
11	Boumba – Ngoko South-East	857 500.00	10 01 0, 10 01 1, 10 01 2, 10 06 3, 10 064	0.55	0.42	Lobéké national park (217 854 ha)
TOTAL				0.27	0.40	

Figure 5 illustrates those densities per bloc. This figure is not proposed to compare the two year of inventories, since the methods used were different and for specific purposes. For example, CENADEFOR report does not give detail information on densities in different classes of diameter. This would be appreciated if we got the raw data. These data may exist in CIRAD at Mont Pellier, France. However whatever be the year, the figure tends to show that *Pericopsis* occurs in high densities in the Boumba-Ngoko division. Haut-Nyong-South area is on the limit between the East and the South provinces, which explains the low density of *Pericopsis elata* in this zone.

Except for the bloc Boumba-Ngoko-North East, the density of *Pericopsis* tends to increase within the two years. If it is the case, it would be interesting to link it

with the logging activities undertaken in this area since many years. But once again as we said above, these data may be considered with prudence. The 1985 inventory's for example data does not represent the environment of the whole bloc, to authorize statistical analyses (CENADEFOR-CTFT 1985). Detail inventory data obtained from the CENADEFOR's work as far as the national inventory conducted with the help of FAO in 2006 should be used and analysed, to get an idea on the current global population trends.

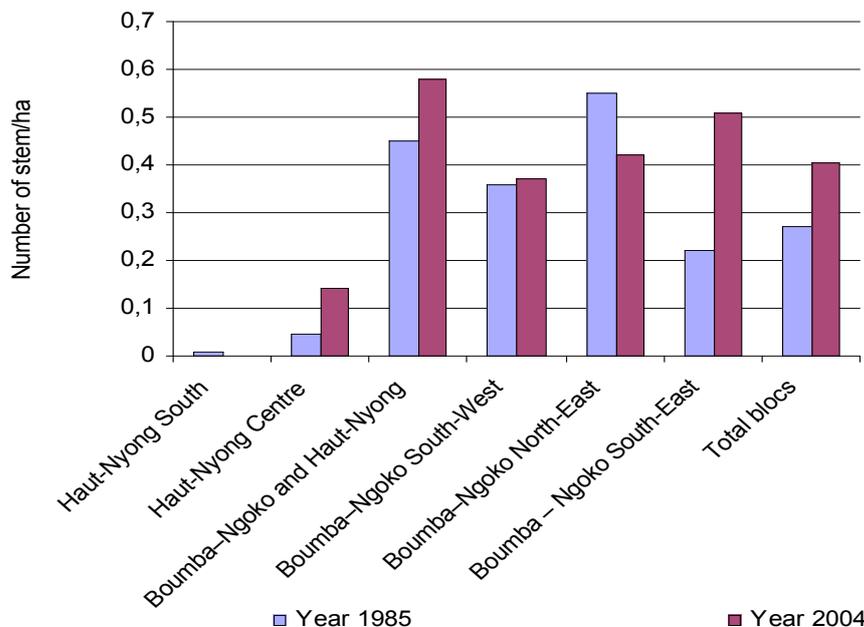


Figure 5: Distribution of *Pericopsis* densities in different blocs in the East province of Cameroon.

2.6. Conservation status

2.6.1. Global conservation status

Pericopsis elata is classified by the World Alliance for Nature (IUCN) as endangered species (EN).

2.6.2. National conservation status for Cameroon

Pericopsis elata's is listed as 'exceptionelle' species with its minimum exploitable diameter (MED) set at 100 cm.

2.6.3. Main threats within the case study country

Two main threats can be observed for *Pericopsis elata* in Cameroon: habitat loss/degradation (human induced) and illegal logging.

Habitat loss through agricultural activities is considered as one of the main threat on forest biodiversity in Cameroon. Large-scale agriculture and other human activities in the area are leading to the degradation of primary forests (UICN, 1989; Betti, 2002), thus causing "vulnerability" of the wild plants. According to IUCN (1989), the rate of deforestation in Cameroon is the most high in the Congo basin, with an annual rate of 0.5%.

Illegal logging, composed mainly of “wild sawing” is considered as one of the main threat on the forests of the Eastern province of Cameroon (Betti & Bobo 2007).

III. MANAGEMENT MEASURES

3.1. Management history

Cameroon is considered as the most advanced in terms of forest sector policy in the Congo basin (Carret 2000, Karsenty 2006). This means that Cameroon is the first country to have produced and implemented a good and coherent forest code in the sub-region, after the summit of the world (Rio de Janeiro in 1992).

Cameroon government through its forest administration acted in different logical steps to ensure the conservation of forest resources: the knowledge of the resource, the zoning of the country and affectation of different land uses, the enhancement of the forest and wildlife control, monitoring and revenues.

More than 25 years ago, Cameroon Government decided with the help of the international Community, to tackle the general problematic of sustainable forest development. The Government therefore first focused its efforts on the knowledge of the timber resource of the meridional or forest zone of the country. A national forest inventory has therefore been established, comprising 7 phases (figure 6). Four out of these phases have yet been finalised by the years 80, for a total forest bloc of 14 000 000 hectares, with the north limit situated at about 4th parallel. In fact, the basis work undertaken within the national inventory conducted during the years 1980 (CENADEFOR – CTFT 1983, 1985) led to the elaboration of principal norms and technical tools for the management of the forest domain. These tools include: (1) the zoning plan of the meridional area (phases 1-4 of national inventory) which led to division of the forest zone in two main domain types, namely the permanent domain and the non-permanent domain, and (2) all norms related to the interventions in the forest milieu (production forests to be précised).

The non-permanent domain comprises the community forests, sales of standing volume (small forest concessions of not more than 2,500 ha), and mining zones. It is also composed of lands affected for agricultural and other agroforestry activities (République du Cameroun 1994, 1995).

The permanent domain (République du Cameroun 1994, 1995) is divided into the domanial or state forests which belong to the State, and communal forests which belong to the private domain of the council. The states forests are themselves divided into production forests, protected areas, and forest reserves. Production forests are the most important in terms of surface area, 64% of the permanent domain, and 40% of the meridional zone. They are the type of forest affectation which interests us in this text. Production forests are mainly composed of big forest concessions. Each forest concession is composed of one or many forest of more than 5,000 ha, called the forest management units (FMU). The process of establishment (classification) of a FMU includes three main steps: (1) data collection and local consultations, (2) confection of the file and signature of the decree of establishment (décret de classement in french), and (3) boundary stone (bornage).

The forest logging is conducted in the country through the logging convention (convention d'exploitation in french) for what concerns the permanent domain, and through the management convention (convention de gestion) for what is done in the non-permanent domain. The attribution of these different conventions is subordinated by the validation of the management plan (forest concessions) or the simple management plans (community forests) by an Inter ministerial Committee presided by the forest administration.

Forest Management Units (FMU) are assigned to the sustainable production of the wood and other resources (non timber forest resources for example) in respect to the conditions that allow the preservation of ecological functions of the forest. More than 83 forest management units have been attributed for a total area of 1,835,367 ha. Nine FMU are allocated for the conservation of biodiversity, in the East province. All those conservation units are located within the phytogeographical area of Assamela.

When allocating the FMU to a given company, a preliminary three years convention is signed between the Forest administration and the forest company. The terms of this preliminary convention precise that the forest company has to produce within the three-years of the convention and before the definitive convention has been signed, three types of documents in respect to the norms and rules indicated in the forest law, and including: a management plan for the whole concession (FMU), a five-years management plan (for the forest logging unit), and the operation plan of the first year of activity. At the end of the preliminary convention, a definitive convention is then signed between the forest Company and the Cameroon government for a renewable period of 15 years. At any step of the elaboration of the management plan, the forest administration verifies what has been realised in the previous step before giving his *quitus* (ok) for the next step.

More than 20 forest companies have produced their management plans, many of which are in the process of validation by the Inter ministerial Committee, established to this end. The implementation of the management plan implies two main constraints for the company: the respect of specific part of the forest that has to be exploited (block of exploitation for 5 years, also called the forest logging units) and the respect of the minimum exploitable diameter (MED).

The forest law seeks to promote a sustainable exploitation of the timber (by the increase of the harvesting volume per hectare) and the non timber forest products, and also diversify and ensure high processing of forest resources. This does not only imply the settlement of appropriated and perform processing units (sawmills), but also requires the adequacy between the capacities of sawmills and the availability of the resources.

The measures undertook within the application of the new forest law have had a significant impact in the development of the forest sector. These measures and rules included: the ban of the exportation of logs for many plant species, the instauration of additional tax for the exportation of logs of the remaining plant species, the obligation for forest companies to settle a fair sawmill. Following these measures, the number of forest industries increased in the country, but the harvest volume per hectare did not increase more.

To ensure the contribution of the forest sector in the national economy, Cameroon government took two important measures: the allocation of FMU through a competitive bidding process namely adjudication, and the creation of the Forest Revenues Enhancement Program (FREP). The competitive allocation of FMU ensures high revenues, while the creation of the FREP in 1999 aimed to secure those revenues and to combat taxes frauds. Such measures are known as main conditions, required to improve forest or environment taxes (Scholl 2005).

According to the forest administration (MINEF 2002, 2004a) the distribution area of *Pericopsis elata* in East Cameroon is covered by protected areas and forest management units. The four protected areas are: the national park of Boumba-Bek (321,078 ha), national park of Nki (238,853 ha), national park of Lobeké (217,200 ha) and the integral ecological reserve of Messomesso (51,797 ha).

These represent 22 percent of the distribution area of assamela. In addition there are 30 FMU in this area, nine of which, with an area of 895,494 ha, are covered by a biodiversity conservation project. In total therefore, 46 percent of the area of distribution of *Pericopsis elata* in Cameroon is protected (MINEF, 2002, 2004a).

These data do not reflect the real potential of the country in *Pericopsis elata*. The distribution map of Assamela often used by the forest administration and many authors is the one published by Vivien et Faure (1985). This map limits the area of distribution of Assamela in the south of the Mbang subdivision (Kadei division). Data gathered during this work from different documents (management plans) tend to show that, the area of distribution of *Pericopsis elata* also covers an important part of the Kadey division, including the Bimba village in the north of Mbang. FMU 10 054 (67,942 ha) and 10 056 (72,391 ha) belonging to the Doumé Industrial Forest Society (SFID) and covering a total area of 140,333 ha in the Mbang region are not often included in the analysis.

Of the 21 FMU assigned for timber production, twelve have finalised their management plans and have signed definitive management conventions with the forest administration (see table 3).

Table 3: list of concessions (FMU) with a definitive management convention in 2007 and with *Pericopsis elata* (MINFOF 2008).

COMPAGNY	CONCESSION	FMU	AREA (ha)	VOLUME OF ASSAMELA LOGGED IN 2007 (m ³)	OBSERVATION
SIBAF/STBK	1003	10 018	81 397	1958	
SFCS	1007	10 023	57 996	316	
SFDB		10 029	46 922	117	
SEFAC	1052	10012		528	Certified by ICILIA (CITES Scientific, pers. Com.)
GREEN VALEY		10 021	66 183	561	Certified by FSC (Delegate of Haut-Nyong forest, pers. com.)
ALPICAM	1040	10 026	67 217	459	
CAMBOIS	1043	10 038	44 651	1047	In the certification process (Delegate of Haut-Nyong forest, pers. com.)
SEBAC	1022	10 009	88 796	229	
CFC	1025	10001, 10 002, 10 003, 10 004	193 105	1439	Certified by FSC (MINFOF 2008)
Total		12 FMU		13 123	

Some of these FMU have already been certified by ICILIA (SEFAC company) and FSC (CFC). Others are in the process of certification.

It is only to those concessions which have signed their definitive management convention, that the forest administration attributes quotas for Assamela's timber.

3.2. Purpose of the management plan in place

The management plan of a FMU aims to exploit the timber resource in a sustainable manner. For Assamela, the management plan aims to ensure that the international trade in that plant species is non detrimental to its conservation in Cameroon.

3.3. General elements of the management plan

Elements of the management plan are précised in the arête *n° 0222/A/MINEFI/ 25 may 2001*. This Arête sets the procedures of the elaboration and approbation of management plans, and the procedures for monitoring and control of the implementation of the management plans for the production forests, in the permanent domain.

The article 5 of the arête stipules that, the management plan is a document which aims to fix the forest logging activity in the permanent forests, through a fair planning of harvests in space and time, and by enhancing silvicultural interventions, as to ensure a sustainable and equilibrium logging activity. This document is composed of five main sections including: (1) description of the natural milieu of the forest concession, (2) mapping, (3) management inventory, (4) affectation of soils and use rights, (5) Calculation of the forest possibility (stock).

The above sections contain following information.

- 1) Description of the natural milieu of the forest concession: it describes the biophysical characteristics of the forest, the socio-economic environment, and the history of the forest, based on appropriated studies.
- 2) Mapping:
 - a. stratification of the forest territory at the 1/50 000 scale
 - b. the produced map may contain following information: the final stratification realized beyond the management inventory, affectation of soils or delimitation in series, and the delimitation of five-year blocs (logging management units) in annual logging units.
- 3) Management forest inventory
 - a. the list of tree species to assess obligatory are contained in the technical files (sheets) published by the forest administration. For those timber species, the inventory counts, measures and identifies all stems with diameter at Breast High of over 20 cm. Stems are classed in 10 cm diameter classes (20-30, 30-40, 40-50, ...).
 - b. Data analysis is done with a special computer package, validated by the forest administration. The package currently used by the Cameroonian forest administration is the TIAMA package (Computer treatment applied to forest management).
 - c. The sample rate for the management inventory should not be less than 1% for a forest concession less than 50,000 ha, and not less than 0.5% for a concession more than 50,000 ha (not less than 50,000 ha).
- 4) Affectation of soils and use rights: this consists of identifying and mapping the soil uses within the forest concession.
- 5) Calculation of the forest possibility: this item will be discussed in section 3.4.2.

3.4. Restoration and alleviation measures.

3.4.1. General provisions

A few general provisions for the management of Assamela have been taken by the forest administration. They include the minimum girth limit: 100 cm in Cameroon instead of 80 in other countries of the Central African sub-region, the marking of seed-trees (with a record of GPS coordinates for each one of them), adequate spatial distribution and artificial regeneration work undertaken in some management units.

Annual production forecasts in the managed forests are over 45,000 m³ raw timber (round timber).

3.4.2. Elements of the arête n° 0222/A/MINEFI/ 25 may 2001

The basis of restoration and alleviation measures is outlined in the arête n° 0222/A/MINEFI of 25th may 2001, article 6 (element 5: calculation of the forest possibility) to article 10 as follow.

The possibility is the quantity of wood that can be harvested per hectare after each cutting cycle. The calculation of the annual cutting (logging) possibility is an iterative process of optimization, aiming to well determine the rotation (periodicity of cutting) and the minimum exploitable (or harvesting) diameters for managed trees (this is call the managed minimum exploitable diameter = MED/AME or the minimum managed diameter = MMD).

The management inventory (census) divides the tree species inventoried in five groups which are: (1) the managed tree species which will be used for the calculation of the forest possibility, (2) the complementary principal tree species, (3) the promotion tree species, (4) the special tree species which are subjected to particular silvicultural regime, and (5) the remaining (other) tree species.

For analysis, all principal timber species are arbitrary classified in group 2. The forest manager may include in group 1 (managed tree species), a minimum of 20 tree species for which the exploitable volume is not less than 75% of the initial exploitable volume of the principal tree species. Group 3 is composed of the promotion tree species, and group 4 contains tree species subjected to special silvicultural regime.

The parameters used in the calculation of the forest possibility and the determination of the MED/AME include: the choice of the managed trees, the rotation, the growth rate in diameter of trees, the cubage tariff (tariff de cubage in french), the damage rate and the mortality rate.

Rotation is the delay between two successive harvests. It is the time spent between two successive logging years in the same space. In Cameroon, it is fixed at 30 years. However, this can increase in case of some specific constraints revealed by the analysis of the inventory data.

The growth rates in diameter used are published in the technical files (sheets) by the forest administration. For *Pericopsis elata*, the growth rate is 0.4 cm/year.

The minimum exploitable diameter of managed trees MED/AME proposed by the manager (forest company), may not be less than the one (MED/ADM) fixed by the forest administration. The administrative minimum exploitable diameter (MED/ADM) fixed for *Pericopsis elata* in Cameroon is 100 cm, which is the highest in the Congo basin.

For the managed species, stems with diameter high than MED/ADM + 40 cm, are retrieved from the initial population table which serves to simulate the forest possibility. These stems are called the "bonus".

However, all trees of this group "bonus" are subjected to technologic inventory, aiming to appreciate the quality of the wood, and to allow the selection of mother trees (useful for seedlings production) which will be banned (forbidden) for any exploitation in the concession.

The rate of reconstitution (or the reconstitution rate) of species to manage, the managed minimum exploitable diameter (MED/AME), and the rotation time, interact one another towards the determination of the possibility.

The percentage of reconstitution (or reconstitution rate) is calculated using the following formula.

$$\%RE = (No (1-\Delta) (1-\alpha)^T)/Np$$

Where:

No: number of stems of diameter classes < MED, which are used for the reconstitution (reestablishment) of the ligneous resource;

α : natural mortality (1%) per year;

Δ : mortality caused by logging damage;

T : rotation (30 years);

Np: total exploitable stems (MED + 3) to be reconstituted;

%Re: percentage of reconstitution (reestablishment).

The reconstitution (reestablishment) is good when %Re is more than 50%. The principle of the simulation consists of increasing progressively the administrative minimum exploitable diameter (MED/ADM) as to get a %Re 50%. The new minimum exploitable diameter which provides the best simulation (%Re 50%.) is called the managed minimum exploitable diameter (MED/AME).

The managed trees cannot be exploited under the MED fixed during the calculation of the forest possibility (MED/AME). All other tree species can be exploited in respect of the MED fixed by the forest administration (MED/ADM).

The forest delimitation is done on a map at 1/50 000 based on the results of the management inventory. It is realised in two steps:

Step 1. Firstly, the forest concession is divided into five-years blocs as to obtain a difference of less than 5% of the exploitable volume for the principal tree species (managed and complementary);

Step 2. Secondly, the five-year blocs are then divided as to allow a continuous progression of logging activity in the space and time. Each five-year bloc is divided in 5 logging units (assiette de coupe in French), contiguous and with equitable surfaces.

Sylvicultural treatments, rather than cutting in respect with the MED, must be conducted as to ensure the forest reconstitution (reestablishment) at the end of each rotation.

The nature, objectives, intensity, and the planning of sylvicultural operations are described in the documents of the management plan, and of the five-year

management plan. The annual operation plans precise the areas managed, the forest strata logged, and the planning of future interventions.

Research activities useful to complete the based data, which are necessary to ensure sustainable management are précised in the management plan.

As it was said in section 2.1.1., the approbation of the management plan implies two main constraints to exportation: the respect plots (five-year blocs) and the respect of MED.

The area constraint is determined by the respect of annual plots in space and time. Many plots can be opened to forest logging simultaneously, but they must be contiguous. A five-year management unit is definitively closed to forest logging, 6 years after its opening by the forest administration.

3.4.3. Example of management measures in the Forest Management Unit N° 10 039.

To illustrate the calculation of the forest possibility, let us take the example of ETs ASSENE NKOU, a forest logging company working in the East province.

3.4.3.1. General presentation of the Forest Management Unit.

The FMU 10 039 belongs to ASSENE NKOU forest company (ETS ASSENE NKOU 2003). It covers a total area of 47 585 ha, in the East province, Haut Nyong Division, Lomié Subdivision, Dja district.

3.4.3.2. Synthesis of results of the management inventory

A management inventory was realized in 2002.

The characteristics of such an inventory are presented in table 4

Table 4. characteristics of the inventory

Characteristics	Data obtained
Surface area of the FMU	47 585 ha
Sample rate	1.29%
Assessed surface area	613.84 ha
Compilation unit	1
Dimension of a given plot	250 m x 20 m = 0.5 ha
Number of complete plots	1223
Total length of the assessed transects	306.92 km
Number of transects	48
Distance between transects	1,500 m
Sample rate of stems 20 cm of diameter	1.29%
Sample rate of stems < 20 cm diameter	0.02%

Data obtained from the forest inventory are analysed with the TIAMA package. This package provides following elements:

- table of content (areas of forest strata with number of plots);
- the list of tree species inventoried (per group of species);
- the distribution of stems per strata and group of species;
- the curve of stems distribution per diameter class;
- the population table;
- the table of stock (volume for principal tree species);

- the sample rate (obtained from the number of plots of forest strata and the total area of the FMU).

Some of these results are presented for illustration as follow.

a) Density

A total of 424 plant species was inventoried in the FMU. They are distributed in 5 groups as follow:

- Group 1: managed species, 28 species;
- Group 2: complementary species TOP 50, 25.
- Group 3: promotion species, 23;
- Group 4: special species, 13;
- Group 5: other species, 335.

A total number of 6309 stems of Assamela was inventoried, with 485 exploitable stems. The density of Assamela is 0.14 stems/ha.

b) Volume

The cubage tariff is a formula which calculates quickly for a given parameter, the volume of the log. The cubage tariff established for Assamela during the second phase of the national forest inventory (CENADEFOR – CTFT 1986b) was used. This is $V = -0.609 + 9.668D^2$.

D = diameter of the log. For example, for a log with D = 25 cm, the volume of Assamela will be: $V = -0.609 + 9.668 \cdot (25)^2 = 6041.89 \text{ m}^3$

Raw volume

The raw volumes of Assamela is of 33 246 m³ in that forest management unit. The exploitable volume is 6,757 m³.

Commercial or trade volume

Commercial volume (Vc) is calculated based on the trade coefficient (CC) and the raw volume (Vr).

$$V_c = V_r \times CC.$$

The trade rates are published by the forest administration, for all tree species in the technical files (sheets). Those trade rates were proposed by the Pilot Integrated Management project (API) and also by the phase II of the national forest inventory. For Assamela, CC = 0.50; this gives the trade volume of Vc of 3,378.5 m³.

3.4.3.3. Productivity of the forest

a) Growth rate

Growth rates currently used in Cameroon derive from studies conducted in the Central African Republic (CAR), Ghana, and Côte d'Ivoire. Studies on growth rings have been realised by the Pilot Integrated Management project (API) and have only concerned 10 tree species (API 1994, API Dimako 1995). The annual growth rate used by ETS ASSENE NKOU in the FMU 10 039 is the one arbitrary proposed by the Cameroon forest administration. The annual growth rate for Assamela is 0.4 cm/year.

b) Mortality

The mortality rate used here is 1% for all diameter classes. It is the official mortality rate fixed by the forest administration.

c) Logging damages

Forest logging implies destruction of some remaining (residual) tree species. Those damages vary according to different types of activities. The main activities causing damages on residual tree species are the settlement of the road network, the settlement of the logs parks, the extraction of stems or logs, the cutting of trees, the opening of transects, and many others. The forest administration had fixed the damage rate at 7% of the residual stock of the forest.

3.4.3.4. Proposed management

a) Management objectives

The FMU 10 039 is a forest of the permanent domain. So, the main objective is to ensure a sustainable and long term timber production. This main objective is also that of these management activities. Another objective pursued by ASSENE NKOU activities in the area is to valorise Non Timber Forest Products (NTFP).

b) Soils affectation and usage rights.

b.1. Soils affectation

The forest stratification led to the identification of 9 strata which can be distinguished in two different series of forest: protection forests and production forests.

The production forests are the most important (80% of the total surface area of the FMU). It covers a total area of 44,623 ha, and will be retained for logging activities.

The protection forest is composed of swamp forests: temporary drained swamp forest of bamboos, and permanent drained swamp forest boarding the rivers. These two strata will be affected to total protection, due to their vulnerable ecology. The remaining 7 strata will be affected to timber logging, although there exist one strata with temporary drained swamp forest.

b.2. Usages rights

According to the proposed management decree that was submitted to the signature of the Cameroon Prime minister (Head of Government) and related to the delimitation of the FMU 10 039, local people are authorized to collect fire wood, construction wood, other non timber forest products (wild fruits, medicinal plants) under respected limits. Only the traditional hunting will be allowed but with some regulations.

c) Management of the production forests.

c.1. List of the managed tree species

All principal tree species assessed in the forest are considered as management species; these are the species on which the management decisions will be taken. A total of 53 tree species was listed for that. Fourteen tree species are less represented. Their density is < 0.01 stem/ha, which is too small for ETS ASSENE

NKOU. That is why the company decided to delete the 14 tree species from his list.

Then, the list of the 20 most abundant tree species was fixed (table 6). These species totalise 2 605 069 m³ and represent 92.27% of the total exploitable volume of all principal tree species. This list was previously retained for the simulation of the net (trade) production.

Table 6. Tree species previously retained for the simulation of the net production

Species	Stem /ha	Exploitable stems (D MED)	Volume/ha	Exploitable volume (D MED)	%Volume
emien	1.93	71174	11.46	504843	17.88
alep	3.74	65216	9.37	356899	12.64
tali	1.21	47351	7.64	340081	12.05
fraké	1.6	49765	7.23	29445	10.43
okan	0.87	18637	4.66	194094	6.87
dabéma	0.97	19642	4.09	161930	5.74
sapelli	0.62	8055	3.74	107413	3.8
ayous	0.23	10391	2.43	100194	3.55
illomba	1.33	13894	2.75	88608	3.14
Padouk	1.62	16545	2.95	85245	3.02
rouge					
kosipo	0.24	4173	1.41	55527	1.97
bongo H (olon)	1.05	9697	1.81	51650	1.83
abam vrai	0.81	7980	1.37	44885	1.59
fromager	0.14	5090	0.95	41693	1.48
moabi	0.2	2376	1.04	40507	1.43
sipo	0.08	1497	0.79	33274	1.18
kotibé	0.36	6846	0.81	28869	1.02
niové	0.67	6273	0.93	27006	0.96
longhi	0.14	3917	0.64	26612	0.94
mambodé	0.08	2515	0.48	21274	0.75
Total	17.89	371034	66.55	2605069	92.27

In the second phase, ASSENE NKOU discussed with his trade partner, the PALLISCO forest industrial company. As a result of discussions, it was decided to move from the above list, 4 tree species including Moabi, Sapelli, Kossipo, Ilomba. Many reasons guided ASSENE NKOU in this decision including: the form of their specific curves and economic reasons. Moabi, Sapelli, and Kossipo get an irregular distribution in different diameter classes. It is not easy to obtain for these species, a sufficient reconstitution (reestablishment) rate, without

increasing too much the MED. Enhancing the reconstitution (reestablishment) of those tree species through the increasing of their MED, will not profit to the company. Sylvicultural operations will be implemented for those species. Trade in Ilomba timber is not attractive for the moment. This tree species does not currently represent any economic interest for ASSENE NKOU Company.

Assamela and other tree species were considered as complementary tree species (group 2) and added to the selected 20 tree species.

Finally, a total of 28 plant species was retained as managed species for the calculation of the forest possibility.

c.2. Rotation

The rotation has been fixed at a minimum period of 30 years according to the arête n° 0222.

c.3. Simulation of the net production

The simulation of the net production concerned all exploitable managed tree species, with diameter between MED/ADM and MED/ADM + 3 classes, or + 30 cm. These were considered as stems exploitable within the first rotation (EEI).

All trees with diameter MED + 4 classes, which were considered to be too old (cannot rather grow) were retrieved from the simulation. Those stems are available for the logging, but will not be used for the calculation of the reconstitution (reestablishment). They will constitute the “Bonus” of the first rotation.

To obtain the reconstitution (reestablishment) rate, ASSENE NKOU proceeded in two steps.

Step1. In the first step, logging damages in terms of stems, were deduced on trees with diameter class < MED/ADM.

Step 2. In the second step, the growth and mortality rates, were deduced to the new number of stems obtained from step1. This calculation led to the determination of the number of stems which will be logged in the next rotation (EER). Only stems with diameter class MED/ADM, and for which the simulation has produced a good reconstitution (reestablishment) of the forest (Re 50), were retained for logging.

All those calculations were conducted on the 28 managed species. Table 7 shows an example of such a result, for ten tree species.

Table 7. Retained simulation

EEI: possibility for the first rotation; EER: possibility for the second rotation

Species	Possibility =current possibility = EEI (number of stems)	Bonus (number of stems)	EER = next possibility (number of stems)	Reconstitution (Re)	MED (cm)
assamela	498	0	597	119.88	100
emien	13509	28687	18268	135.23	80

alep	9909	15714	10541	106.38	80
tali	11300	20123	6248	55.29	80
fraké	17872	5553	18893	105.72	80
ayous	3275	2239	1884	57.53	90
padouk rouge	4033	957	5137	127.39	80
bongo H (olon)	8468	559	7200	85.03	60
niové	5706	583	2981	52.25	50
mambodé	89	1634	279	312.1	80
Total	135377	102458	103813		

c.4. Forest possibility (total volume and volume/ha)

The possibility in terms of stems defined in the precedent simulation corresponds to a possibility of 1,005,980 m³ and a bonus of 1,201,509 m³ (table 8). This gives a total possibility of 2,207,489 m³ on an exploitable surface area (production forest) of 45,461 ha. This volume will be harvested during the 30 years, which corresponds to an average annual volume of 73,583 m³, 48.6 m³/ha/an.

Table 8. Possibility in term of volume (example)

VEI: possibility for the first rotation; VER: possibility for the second rotation

Species	Possibility (m ³ /ha)	Possibility (m ³)	Bonus (m ³ /ha)	Bonus (m ³)	VER (m ³ /ha)	VER (m ³)	MED (cm)
assamela	0.15	6929	0	0	0.2	7781	100
emien	1.87	85042	7.05	320334	3.3	149756	90
alep	1.37	62376	3.43	155744	1.5	69551	80
tali	1.56	71136	4.54	206220	0.9	41379	80
fraké	2.71	123070	1.4	63438	3.1	141794	80
ayous	0.88	40037	1.13	51317	0.5	23056	90
Total	22.13	1005980	26.43	1201509	16	709039	

c.5. Determination of MED/AME

The Minimum exploitable diameters for management have been determined for all tree species of group 1.

The percentage of reconstitution rate was established using the formula proposed by the forest administration (see section 2.1.4.b).

$$\%RE = \frac{(No - (1 -))}{Np}$$

The evolution of the reconstitution (reestablishment) rate for each species in relation with the increase of the minimum exploitable diameter (MED) is presented in table 9. Only 10 tree species are represented. The forest reconstitution is good when %Re > 50%.

Table 9. MED/ADM and MED/AME for the managed tree species.

SPECIES	MED/ADM	MED/AME	%Re
assamela	100	100	120%
emien	50	80	135%
alep	50	80	106%

SPECIES	MED/ADM	MED/AME	%Re
tali	50	80	55%
fraké	60	80	105%
ayous	80	90	57%
bossé	80	80	62%
clair			
bilinga	80	80	102%
dabéma	60	80	58%
doussié	80	80	190%
R			

Some tree species have seen their MED increased, in order to obtain an enough reconstitution (reestablishment) percentage. Other species such as Assamela, Bossé clair, Bilinga, and Doussier R get enough reconstitution (reestablishment) percentage (%Re 50%) at MED/ADM, so their MED do not need to be increased.

c.6. Sylviculture

c.6.1. Distribution of stems per diameter classes.

The distribution of stems per diameter classes for a tree species is important and fundamental for its management. It allows to visualise the structure of the present population, and to identify different anomalies and deficiencies related to the regeneration and the state of the population. It is on this basis that the adapted silvicultural interventions will be proposed.

Table 10 shows an example of the distribution of those stems per diameter classes for four tree species: Assamela, Ayous, Emien, Fraké.

Table 10. Distribution of number of stems per class of diameter (centres of the classes are represented in cm)

SPECIES	MED	25	35	45	55	65	75	85	95	105	115	125	135	145	155	MED	Total
Assamela	100	850	313	317	487	769	1650	709	729	263	222	0	0	0	0	485	6309
Ayous	80	662	636	395	317	653	965	1326	796	1363	1070	1033	261	170	745	6764	10391
Emien	50	5616	4974	5682	7762	9455	11635	13549	8041	11131	4844	3117	839	93	708	71174	87447
Fraké	60	4252	4029	6678	8002	11428	15026	11995	5790	3938	1062	349	0	0	178	49765	72726

Figure 7 illustrates the correspondent specific curves. The diameter classes are as follow: class 1 = 25 cm, class 2 = 35 cm,...class 6 = 75 cm,...,class 9 = 105 cm, ..., class 14 = 155 cm.

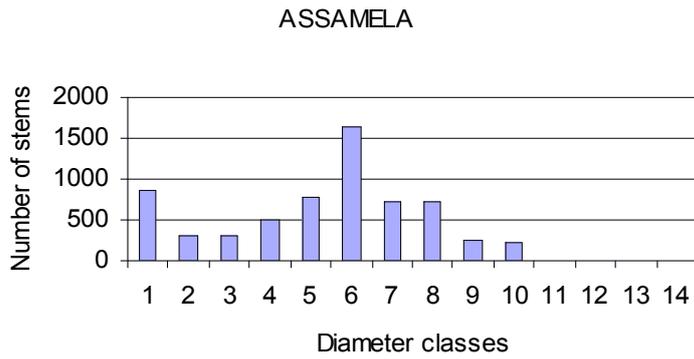


Figure 7.a. Assamela (*Pericopsis elata*)

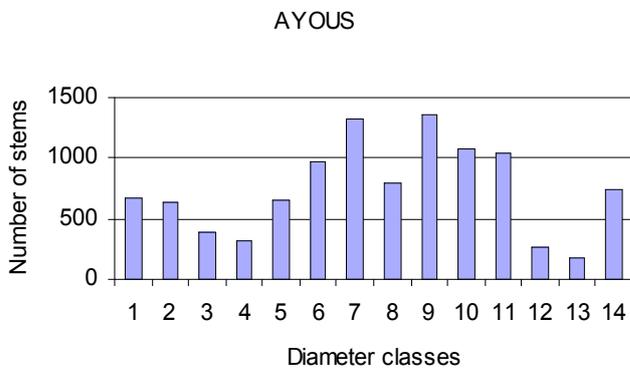


Figure 7.b. Ayous (*Triplochyton scleroxylon*)

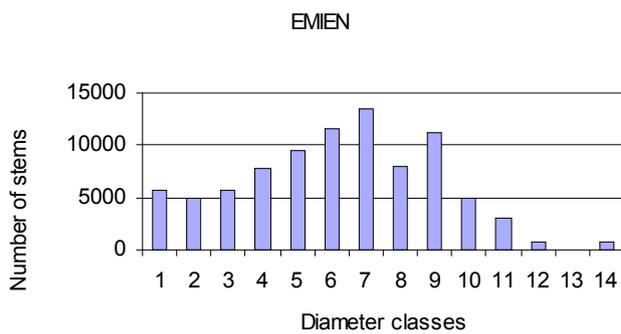


Figure 7.c. Emien (*Alstonia boonei*)

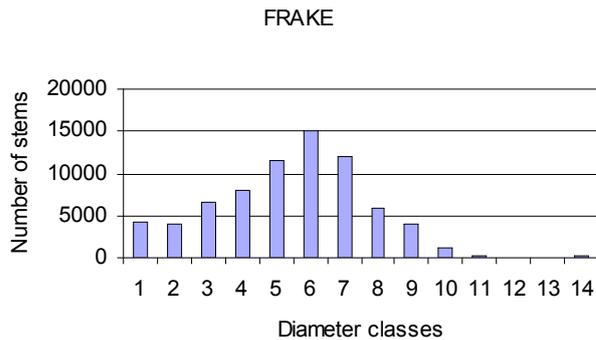


Figure 7.d. Fraké (*Terminalia superba*)

These are exclusively light-demand tree species. Stems with small diameter are less represented, compared to median classes. This characterises species with low regeneration. Except for Assamela, the summit of the curve of those plant species is often located in the right side of the MED/ADM, which characterises an insufficient rate of reconstitution (reestablishment). For example, the summit of the curve of Fraké (*Terminalia superba*) is at 75 cm (class 6), which is in the right side of the minimum exploitable diameter (MED/ADM), fixed by the forest administration at 60 cm. To ensure a sufficient reconstitution (reestablishment) of those species, the manager has to increase the MED/ADM. By adding two more diameter classes to this administrative MED, the reconstitution (reestablishment) rate will be 50%. The new MED obtained is MED/AME, which is: $MED/AME = MED/ADM + 2 \times 10 \text{ cm} = 60 \text{ cm} + 20 \text{ cm} = 80 \text{ cm}$.

For most of those species and due to their regular fructification (except for Ayous), there will be not necessary to develop specific silvicultural interventions; they will profit of the opening of the forest canopy by the logging activities to enhance their regeneration and increase their populations.

c.6.2. Specific case of Assamela

Assamela is the only tree species of this group (light demand plants) for which the manager does not need to increase the MED/ADM. This MED is too high according to most of the forest concessionaires. The individuals of Assamela at diameter 100 cm are wilting, and stems of many of them are rotten. This is confirmed by many authors (Vivien et Faure 1985, Bourland 2008) and the Association of Timber and Forest Industries in Cameroon (Ouguia pers. Com.). Those individuals are therefore often abandoned in the forest, which lead to an economic loss for both the forest company and the Cameroon government (ETS ASSENE NKOU 2003, Bourland 2008). These problems were largely outlined by the Association of Timber and Forest Industries (ATFI) of Cameroon during the ITTO/CITES regional workshop held in April 2008 at Kribi, Cameroon, on the sustainable logging and trade of Assamela (ITTO 2008). As we can see, the summit of the curve for Assamela is at 75 cm of diameter, while the MED/ADM is at 100 cm. This means that, Assamela is logged in Cameroon when it is not rather alive. Almost dead individuals of this plant species are logged, which is not correct.

In the other side, it has been reported that management through controlled exploitation benefits the natural regeneration and population dynamics of *Pericopsis elata* primarily by creating forest gaps (ATIBT, 2001). *Pericopsis elata* can be easily propagated from seed and from rooted stem cuttings (CITES 2003).

Sylvicultural trials were realised in many forest species in Cameroon, including *Baillonella toxisperma* (Moabi), *Entandrophragma sp* (Sapelli, Sipo, Kossipo, ...), *Milicia excelsa* (Iroko), *P. elata*, *Triplochyton scleroxylon*, etc. *P. elata* was planted in two forest reserves: the Ndeng Ndeng forest reserve in East province, and the Kienké sud forest reserve, in the South province.

Different sylvicultural methods were developed and tested with some interesting results. Assamela was largely tested with the enrichment method (Table 11). The problem is that those plantations have been abandoned following the economic crisis which attacked the country in the late 1990 and the economical structural adjustment (MINEF 2004c).

Table 11. General physiognomy of *Pericopsis elata* plantations in Cameroon (MINEF 2004).

PLANTATION	YEAR	SPECIES	PLANTED	METHOD	SEEDLINGS AND ORIGIN	ACTUAL SURFACE	STATE OF THE PLANTATION
BIDOU	1979	Assamela	2	Enrichment planting (recrû in French?)	Seeds from local mother trees	2	Average density: 340 individuals/ha; Øm = 17 cm, Hm = 18.5 m. Trunks are extremely branched and crooked so that satisfactory intermediate yields cannot be provided. This result cannot militate to use this plantation as a demonstrative plot.
Dend-Deng	1996 - 1997	Assamela Framiré Moabi Bibolo	8	Enrichment planting		5.5	Lack of cleanings and multiple damages caused by the passage of herds of cows. Only Moabi and Cedrella have resisted.
Dend-Deng	1998 - 1999	Assamela Bibolo	5	Enrichment planting		3.5	Assamela seems to grow well and has Øm = 7 cm, Hm = 6 m. layons need to be cleaned.

PLANTATION	YEAR	SPECIES	PLANTED	METHOD	SEEDLINGS AND ORIGIN	ACTUAL SURFACE	STATE OF THE PLANTATION
Deng-Deng	1999 - 2000	Assamela Cedrella	16	Enrichment planting		11	Assamela grows well, but needs cleaning operations.
Total			31			22	29% of the surface area lost.

Data are not available to capitalise those results. For example, nothing is said concerning the nature and origin of the seedlings used in the Deng-Deng forest reserve. Also, most of those plantations are currently exposed to different forms of pressures including the extension of agricultural areas, the illegal logging and sawing, the bush fires, ... These activities are not compatible with the research targets assigned to the plantations.

Germination trials conducted by ETS ASSENE NKOU showed that, Assamela can easily be educated in nurseries. Germination takes place in five days, without particular sylvicultural treatments. Assamela has a regular fructification (fruits production) regime, and seeds are easily collected. In plantation, Assamela grows well in high light, and can therefore be easily reintroduced. This confirms the idea that *Pericopsis elata* can be easily propagated from seed and from rooted stem cuttings. In Ghana, trials conducted showed that germination takes place in 8 days but seedlings are scarce (Dei-Amoah & Cardoso 2008). Plantation trials in Côte d'Ivoire have shown growth to around 20 cm in diameter after 20 years (Kouame cit. CITES 2003). In Bidou, the growth is about 17 cm in 20 years.

In the Democratic republic of Congo, sylvicultural trials were conducted during years 1940 – 1950, mainly on the enrichment planting method and the monitoring of the natural regeneration. Some interesting results were obtained (Kabala Tshikala et al. 2008): (1) Afrormosia is a typical light-demand plant species during its early age (young individuals), the natural seedlings need a relative light of about 40-50% after 2 – 3 weeks of germination; (2) the regeneration rate (germinative power) decreases with the intensity of the clearings and the natural forest was considered as the suitable milieu for the germination; (3) in forest management, cleanings and clearings (éclaircies in french) are necessary during the first year to obtain quickly the massif that will combat the overhead shade. The Afrormosia trees introduced in those plots are exploitable in DRC where the minimum exploitable diameter is 60 cm. The average annual growth observed was 0.45 m/year between 1949 and 1974. This result is less than what is observed in Bidou, and which 18.5 m high of trunks is for the same number of years (24 years). Growth trials undertaken in Nigeria have shown that the rate of growth was medium but sapling growth was extremely branched and crooked so that satisfactory intermediate yields were not provided. Furthermore the coloured resistant heartwood is valuable rather than the pale sapwood. These factors militate against the use of the species in timber plantations because the economics of plantation forestry depend considerably on sale of material early in the rotation (Lowe, in litt. 2003cit. CITES 2003).

Densities and reconstitution (reestablishment) rate of Assamela are presented in table 12 for 10 forest management units.

Table 12. Distribution of density and the reconstitution (reestablishment) rate (%Re) of Assamela for 10 forest management units, in the East province of Cameroon.

FMU	DENSITY	%Re
10039	0.14	120%
10063	0.58	74%
10026	0.69	163%
10022	0.3	506%
10023	0.65	75%
10020		228%
10037	0.12	243%
10009	0.17	72%
10038	1.82	282%
10018	0.29	91%
MEAN	0.53	185%

Data presented in this table tend to show that Assamela is not threatened in the East province of Cameroon, at least in those 10 forest management units. Although the differences observed in the process of census, mainly link to the use of different sample rates by timber companies, it is clear that the density of 0.53 stem/ha is quite high compared to what was suggested for threatened plant species (< 0.05 stem/ha) by the API project (API 1995, 1994, Forni 1997). The value of the percentage of reconstitution (reestablishment) is too high (average 185%) compared to the limit required by the forest administration for sustainable management, and which is 50%. This high level of %Re is due to the high value of the minimum exploitable diameter which is 100 cm.

For ETs ASSENE NKOU and many other managers, it would be interesting to reduce the minimum harvesting diameter of Assamela to 70 or 80 cm in regard with current availability of the resource and the characteristics of its wood. Because of its economic importance, the silvicultural interventions to be conducted by ETS ASSENE NKOU will aim to facilitate its regeneration and to improve the development of future stems (tiges d'avenir in French). Harvesting is said to be the main silvicultural intervention used by the forest managers (ATIBT 2002). ETs ASSENE NKOU will therefore limit the resulting damage caused to the residual stand by logging activities, by putting in place methods and techniques of reduced impact, and prohibiting re-passage in already cut stands so as to facilitate regeneration of the stand.

3.5. Synthesis on the management measures.

As it can be observed, the management measures undertaken by the Cameroonian forest administration in the forest sector take in account the main principles of the sustainable forest management as outlined by the international tropical timber organization (ITTO 1992). Those measures follow the framework developed by the international technical tropical timber association (ATIBT 2002).

According to the results obtained by compiling the rate of reconstitution of *Pericopsis elata* in different forest management units, it would be interesting to reduce the administrative minimum exploitable diameter (MED/ADM) of this plant species to 70-80 cm as to maximise its exploitation and trade.

UTILIZATION AND TRADE

4.1. Type of use

Pericopsis elata is in Appendix II of CITES with annotation number 5 since June 1992. Logs, sawn wood, and veneer sheets of *Pericopsis elata* are subject to CITES controls. A ban on log exports was introduced in 1999 for all species except *Triplochiton scleroxylon*. This has led to an increase in secondary processing of *Pericopsis elata* within the country mainly in sawn wood, but increasingly into solid flooring boards. All national production of Assamela comes from wild trees.

4.2. Harvest

According to the CITES Management authority, the national annual production previsions (possibilities) of Assamela are more than 45 000 m³ (Akagou 2008). Data obtained from Eastern Delegation of Forestry and Wildlife in 2007 revealed a processing rate of about 43% for Assamela timber for a total of 23 permits (MINFOF 2008).

A total of 43 forest companies exported products from Assamela timber between 2004 and 2006. Table 13 shows for each company, the annual production and possibilities obtained for three years: 2004, 2005, 2006.

Table 13. Produced volume and possibility (available volume) of Assamela in different permits between 2004 and 2006.

PERMIT NUMBER	YEAR 2004		YEAR 2005		YEAR 2006		TOTAL		MEAN	
	PRODUCT VOLUME	POSSIBILITY								
10003	879	2480	1744	6601	2604	4185	5227	13266	1742.3	4422.0
10005	890	8856	577	5430	2148	2579	3615	16865	1205.0	5621.7
10007	93	1017	356	1188	192	531	641	2736	213.7	912.0
10008	0	0	0	0	0	389	0	389	0.0	129.7
10009	884	1008	647	1316	59	151	1590	2475	530.0	825.0
10010	50	228	249	556	227	1184	526	1968	175.3	656.0
10011	203	548	0	935	0	202	203	1685	67.7	561.7
10012	436	625	1568	3168	680	1376	2684	5169	894.7	1723.0
10013	722	1921	0	0	0	0	722	1921	240.7	640.3
10015	280	497	229	3250	388	3340	897	7087	299.0	2362.3
10018	50	1885	4635	5464	1428	4812	6113	12161	2037.7	4053.7
10020	0	360	11	22	0	0	11	382	3.7	127.3
10021	765	1921	1653	2486	1000	2634	3418	7041	1139.3	2347.0
10022	436	812	126	176	0	24	562	1012	187.3	337.3
10023	582	2494	1718	2309	1216	2880	3516	7683	1172.0	2561.0
10026	343	1247	798	2611	1053	1373	2194	5231	731.3	1743.7
10029	750	2120	178	1259	71	963	999	4342	333.0	1447.3
10030	82	299	449	697	416	914	947	1910	315.7	636.7
10031	863	1568	688	1219	580	0	2131	2787	710.3	929.0
10037	0	0	0	1327	0	0	0	1327	0.0	442.3
10038	1050	1449	1147	1683	1103	1758	3300	4890	1100.0	1630.0

PERMIT NUMBER	YEAR 2004		YEAR 2005		YEAR 2006		TOTAL		MEAN	
	PRODUCT VOLUME	POSSIBILITY	PRODUCT VOLUME	POSSIBILITY						
10039	120	244	12	223	29	578	161	1045	53.7	348.3
10045	0	19	0	0	0	0	0	19	0.0	6.3
10054	67	132	13	11	0	84	80	227	26.7	75.7
10063	650	1098	758	2449	14	83	1422	3630	474.0	1210.0
10062	0	0	4	0	0	0	4	0	1.3	0.0
10064	1841	1716	48	323	1837	2648	3726	4687	1242.0	1562.3
VC100111 6	0	0	0	0	3119	0	3119	0	1039.7	0.0
VC100115 3	0	0	0	0	0	5114	0	5114	0.0	1704.7
9006	29	0	0	0	9	4539	38	4539	12.7	1513.0
1475	0	175	0	0	292	101	292	276	97.3	92.0
1478	0	0	0	0	0	498	0	498	0.0	166.0
1002147	0	0	0	0	7	22	7	22	2.3	7.3
807103	0	0	0	0	0	3600	0	3600	0.0	1200.0
VC 1001117	722	0	0	0	0	22	722	22	240.7	7.3
VC 1001119	519	1689	0	0	0	0	519	1689	173.0	563.0
VC 1001140	0	1250	0	0	0	0	0	1250	0.0	416.7
VC 1001155	0	2108	0	0	0	0	0	2108	0.0	702.7
VC 1003143	0	254	0	0	0	0	0	254	0.0	84.7
VC 1004125	0	213	0	213	0	0	0	426	0.0	142.0
VC 104128	0	153	0	153	0	0	0	306	0.0	102.0
AR100500 1	0	272	0	272	0	0	0	544	0.0	181.3
AR000000 4	0	0	6	100	0	0	6	100	2.0	33.3
	13306	40658	17614	45441	18472	46584	49392	132683	16464.0	44227.7

To obtain the 15,200 m³ as the annual quota (Q), the Forest administration considered a processing rate (R) of 33.77% for the annual production (P) of 45,000 m³.

$$Q = P \times R$$

$$Q = 45\,000 \times 33.77\% = 15,200 \text{ m}^3.$$

The above processing rate is less than the 43% obtained in the East province. This confirms the preoccupation of the Cameroonian CITES Management authority who has the problem of lack of exact processing rate, that may guide the attribution of quotas to different companies (Akagou 2008).

Table 14 shows the sawn wood volume of *Pericopsis elata* exported from Cameroon between 1992 and 2006 (UNEP-WCMC CITES Trade Database). The 2007 data were provided by the Cameroonian CITES management authority (Akagou 2008).

Table 14. Exports volume of *Pericopsis elata* from Cameroon (1992 – 2006)

YEAR	EXPORTS (m ³)
1992	4419
1993	13009
1994	21101
1995	17673
1996	26147
1997	27657
1998	19074
1999	21379
2000	7641
2001	2720
2002	6501
2003	7285
2004	7358
2005	7626
2006	6415
2007	7785

Cameroon exported its main important volume of *Pericopsis elata* in 1997 and 1996, with 27,657 m³ and 26,147 m³ respectively (figure 8). In 1995, the new forest law was published, announcing eminent ban of log exports. But any special decision, banning the log exports was not taken. Timber companies therefore profited of this situation to increase their log exports in 1996 and 1997. In 1999, the ban on log exports was introduced, which led to a decrease on Assamela exports. Since 2000, production levels have been under 8,000 m³ of lumber, although its annual exportation quota is 15,200 m³ (CITES 2003, Akagou 2008).

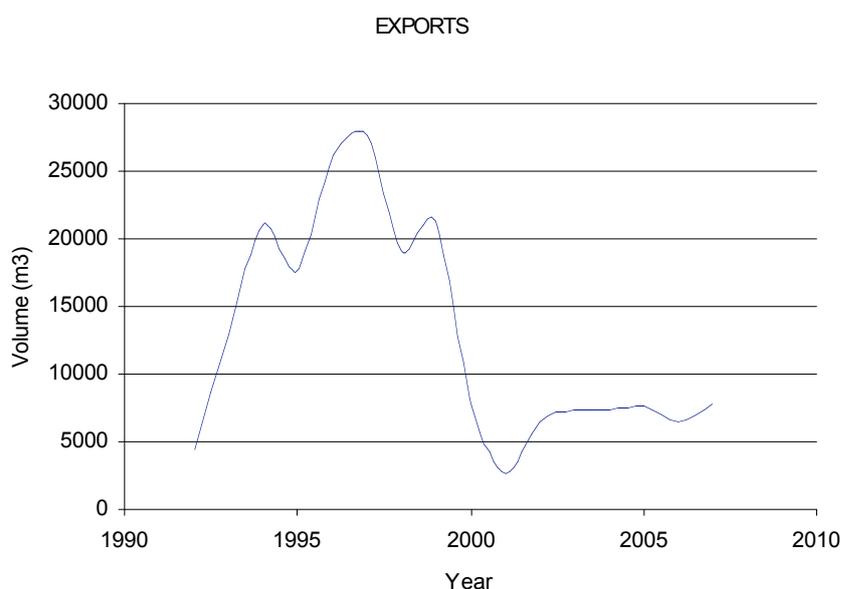


Figure 8. Exports volume of *Pericopsis elata* from Cameroon between 1992 and 2006.

Table 15 presents the exports volume per country for the two last years (2006 and 2007). We can note that at total of 18 countries imported Assamela products from Cameroon, for a total volume of 14,303.5 m³, which is less than the 15,200 m³ authorized per year by the CITES.

Table 15. Export volumes per country (Akagou 2008).

COUNTRY	YEAR 2006	YEAR 2007	TOTAL
AFRIQUE DU SUD	94.3	178.5	272.9
Belgique	4673.8	5270.6	9944.5
CANADA	65.1	0.0	65.1
CHINE	19.8	125.8	145.6
Espagne	56.7	63.0	119.7
France	109.7	52.7	162.4
GRECE	91.4	82.7	174.1
Italie	961.2	1397.0	2358.2
TUNISIE	78.0	0.0	78.0
UAE	16.8	0.0	16.8
USA	351.4	382.7	734.1
DANEMARK		31.4	31.4
EMIRATS A		90.9	90.9
MAROC		24.7	24.7
ROUMANIE		25.7	25.7
TAIWAN		59.4	59.4
TOTAL	6518.2	7785.3	14303.5

We can note in figure 9 that, what ever be the year, Belgium (9944.5 m³), Italy (2353.2 m³), and USA (734.1 m³) are in this order the three main importing countries of Afrormosia of Cameroon for the two years 2006 and 2007.

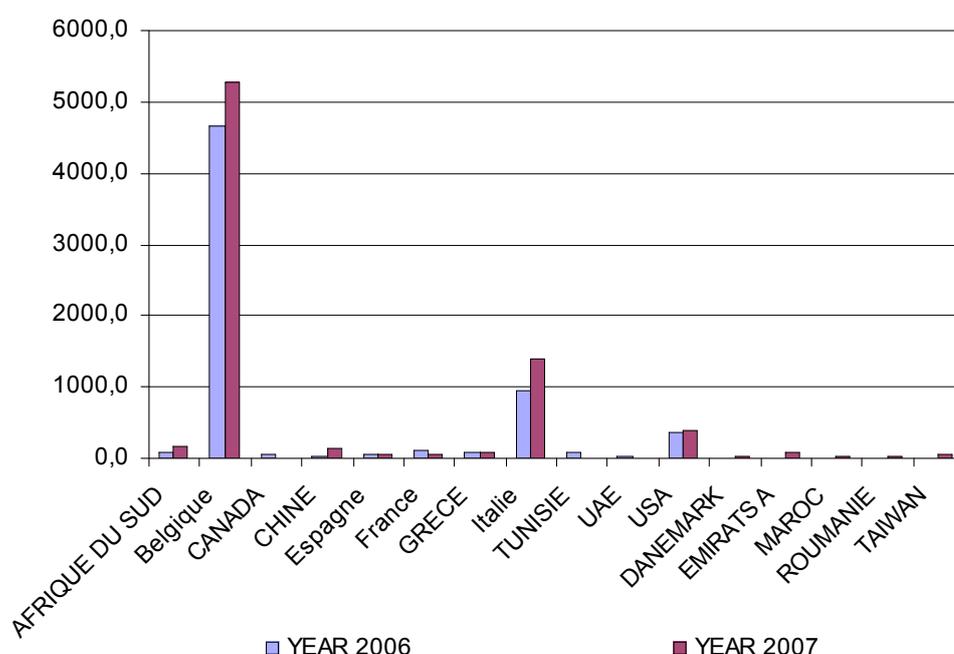


Figure 9: Distribution of exports in different importing countries

IV. MONITORING

Control of timber exploitation, trade and exportation is the main responsibility of the Ministry of Forestry and Wildlife (MINFOF). Other services are concerned, such as the Ministry of Finance through the Forest Revenue Enhancement Program (FREP) and the General Division of Customs (GDC).

5.1. General elements of control as outlined in the arête n° 0222/A/MINEF/25 may 2001.

Before talking about the control and monitoring of Assamela in Cameroon, it is important to first understand the general elements required by the forest administration. The basic elements of the monitoring or control system are précised in the arête 222, articles 25 - 49. The monitoring starts in the central administration by the attribution of the forest management unit, the approbation of the document of the management plan, till the external services (provincial delegations) of the forest administration.

The process of approbation of the management plan of the FMU comprises eight main steps: (1) attribution of the FMU on a competitive basis (adjudication), (2) signature of the preliminary convention (3) sampling design or protocol, to be approved by the forest administration, (4) the management inventory to be approved by the forest administration, (5) the document of the management plan, (6) sub-commission for analysis of the document of the management plan, in charge to examine and issue a technical avis on the contain of the document of the management plan (7), the inter-ministerial commission for approbation of the management plan assisted by one independent observer; (8) the definitive convention which aims to implement the management plan.

The sub-commission in charge to examine and issue a technical avis on the contain of the document of the management plan is mainly composed of researchers from different domain (foresters, biologists, socio-economists, jurists, etc.), the National Agency for the Forest development (ANAFOR), universities, and the Institute for Agricultural Research and Development (IRAD).

The inter-ministerial commission in charge with the approbation of the document of the management plan is composed of: the Director of forests representing the Ministry of forestry and wildlife (MINFOF): president – one representative of the Ministry of territorial administration: member – one representative of the Ministry of planning and territorial management: member – one representative of the Ministry of scientific and technical research: member – the Director of wildlife and protected areas (MINFOF): member – the Director of timber promotion and processing (MINFOF): member – the Director of sustainable development of the Ministry of environment and nature protection: member – the provincial Delegate of environment and forestry (MINFOF) of the province where the forest concession is located.

The Committee meets at least twice a year. The evaluations of the implementation of the management plan are realized at the end of each logging unit (5 years), at the end of the convention (15 years), and also at the end of the rotation (30 years). Those evaluations can even be conducted if necessary at any moment of the year, by the competent forest services.

The management plan can be revised after every 5 years. Any modification of the management plan can imply the realization of new or complementary inventories.

The development, and implementation of the management plan is a fund demand and many companies have problem to get their forests. By the year 2003, some companies used to develop their management plan, using services of the consulting offices (consortium), and many of those companies did not get the technical know – how, necessary to implement their management plans. One of the innovation made in the forest sector there after, was the creation in each forest company, a management unit. This unit is directed by a forest engineer who is in charge of the development, the implementation, and the revision of the management plan. The existence of this unit as far as the qualification of the person in charged to work on it are some criteria also appreciated by the Government for the approbation of the management plan.

Since 2 – 3 years ago, the International Technical Tropical Timber Association (ATIBT) trains forest managers of timber companies on different tool for the development, revision, and implementation of the management plans for tropical forests. Hence, more than 30 forest managers have been trained in the Congo basin.

During the preliminary convention, the beginning of activities in a new annual logging plot requires the obtention (detention) of an annual logging certificate. The maximal area to attribute within the year is fixed in conformity with the current legislation. Each annual plot cannot be attributed twice.

During the definitive convention, the beginning of logging activities in a new annual plot, or the renewable of a given annual plot requires the obtention (detention) of the annual operation permit. This permit also cannot be attributed twice.

All felled trees obtained during forest logging activities are noted in a logging book. Sheets of this book also called the “DF10 sheets”, are filled every day by the forest company.

The logging book or the “DF10 sheets” are printed by the forest administration, and sold to regular possessors (holders) of annual permits. The cods (numbers) of sheets allocated to a given company, and for a specific title (annual permit) are registered in the forest data base, settled in the Ministry of Forestry and Wildlife/forest department (SIGIF). Each concessionaire is responsible of the “DF10 sheets” perceived. These sheets can only be used for a specific permit and a specific year for which they have been edited. The cods of sheets that have been destroyed (spoiled) or loss, must be declared by the company to the forest administration, so they can be deleted from the forest data base (SIGIF). The control (monitoring) of “DF 10 sheets” that are in movement in the country, is permanently realized by the forest administration officers, who punish any irregular utilization.

Any “DF 10 sheet” must contain the logs coming from the same permit (annual logging plot). Every week, the forest logger must put together, sheets belonging to the same group “month of logging – permit” and transmit them to the provincial delegation of forestry and wildlife.

Each regrouping sheets constitutes a weekly portion. And a weekly control sheet DF 11, must be annexed to each portion.

The portions are consecutively numbered (codified) per year and per permit. A portion can only contain “DF10 sheets” belonging to the same month of logging. In the section “provenance of timber”, the forest logger must precise

the councils names. If the permit covers more than one council, the forest logger will have to indicate the percentage of the area of each council. The forest logger must deposit (transmit) the "DF 10 sheets" not later than 10 days after the end of the logging month, to the Provincial delegation of forestry and wildlife. The Provincial Delegate has thereafter to deliver the DF10 attestation of deposit to the logger. The compilation of those sheets is done in the provincial delegation of forest/Service of forest database (external SIGIF), before being transmitted to the central forest database in Yaoundé (SIGIF central).

The annual plot is closed to forest logging at the 30th of June of the year. And the company must deposit the annual report of forest interventions (RAIF) not later than the 31th of July of the same year.

5.2. Participative implementation of the management plan

The implementation of the management plan focuses on three different stakeholders: forest administration, forest company, local population. The management plan must specify how the notion of participative management is applied at the level of the forest concession. It must also describe the mechanisms that should be developed to resolve conflicts.

In the annex of the document of the management plan, there exists an agreement convention linking the forest company and the local communities. This agreement states the obligation of the two parties (logger and the population). Local populations are authorized to harvest some products in the forest concessions, mainly composed of non timber forest products such as wild fruits, vegetables, and medicinal plants. They are also allowed to undertake fishing and small scale traditional hunting of small mammals which are authorized by the forest law. Sometimes, local communities are also authorized to conduct small scale agricultural activities, with low impact on timber production. They are committed to work together with the timber company to combat poaching and illegal or "wild" sawing.

The forest logger has to pay regularly his forest taxes, and to contribute to development projects for the benefit of the community. In fact, the social and cultural dimension is one of the important innovations outlined in the Cameroon forest legislation. This dimension states that, the local people may participate to the management of forest resources and may gain some profits of the exploitation of those resources. The concrete measures undertaken by the Cameroon government in this regard are for e.g., the obligation of forest companies to realise certain number of social activities (duties) such as the creation of schools, health centres, etc... for the benefit of local communities, the payment of the annual forest tax ("*Redevance forestière annuelle*" in French) by the exploiter. The annual forest tax is a specific tax that is settled on the surface area of the forest under exploitation. Revenues coming from this tax are shared between the public treasury or the forest administration (50%), the local council (40%), and the local communities (10%). When the permit is a sale of standing volume, local communities perceived additional informal tax of 1,000 FCFA/M³.

The parts of the forest tax allocated to the council and communities are destined to realise some small development projects at the local level. A specific arrêté was published by the forest administration to specify the modalities of using those funds. Number of dispositions have been put in place to ensure that the money is effectively used for such a projects. The activity reports of councils are

regularly sent to the forest administration to monitor the management of the forest revenues.

The forest administration works to ensure the conservation and development of permanent forests all over the country. His job does not only consist of controlling and monitoring the forest logging activities; but also to protect the loggers against illegal sawing done by some villagers in the forest concessions. The forest administration is also committed to plant trees in zones where forests have been destroyed or degraded. All these tasks require a lot of money. To enhance the contribution of the forest revenues in the conservation of forests, the Government of Cameroon created the Special Funds for Forests Development (FSDF). The main objective of this fund is to re-inject some parts of the forest revenues in the sustainable management of those forests. The decree n° 96-237-PM of 10 April 1996 fixing the modalities of functioning of this fund states that, the FSDF is a special fund of the public treasury destined to finance the management, conservation, and sustainable development operations of the forest resources. The revenues of the FSDF come from different sources including: (i) the quote-part of revenues produced by the annual forest tax (RFA), the felling tax, the tax of transfer of a forest concession, the exit tax (at the port), the progressive surtax paid for the exportation of unprocessed or raw products, the price from selling the forest products, penalties, transactions, damages-interests, other selling forms such as selling the seized products, (2) the recuperation including authorization of gathering logs within the agricultural activities, roads construction, or abandoned logs in the forest, (iii) Revenues affected by the law, (iv) selling of files by the forest concessionaires including forest agreements, permits, (v) selling of administrative documents including the DF10 sheets, the factory entrance book, the way bills book (for logs and for sawn wood), (vi) subventions, contributions, and dons, and others.

Revenues gained from the seized products are shared as follows: 35% go to feed the public treasury and 65% go to the FSDF. The 65% of the FSDF are furthermore shared as follows: 40% for buying different forest material and equipment (Global positioning systems, maps, tents, etc.), capacity building, or as the Government contribution in the financing of some forest projects (The forest administration has like this contributed to the financing of the recent National forest inventory together with the FAO), 25% are paid to the forest officers who have participated to the control mission that led to the payment of those revenues. Before, the money generated by the selling of seized products was collected by the forest officers and reversed in total to the General Directorate of Taxes (GDT), with the repartitions showed above. The problem is that, the GDT did not use to send back the quote parts of the forest administration. That is why, since the month of March 2006, the forest administration has decided to retain the part belonging to its services. And since there, things seem to work well.

The expenditures supported by the FSDF include (i) management of forest reserves, (ii) regeneration of forests, (iii) forest inventory, (iv) materialization of limits of forest concessions and creation of infrastructures, (v) equipments for forest inventories, (vi) technical control and monitoring of forest management in concessions, (vii) dissemination of results of research on forest management, (viii) research in forestry, (ix) functioning of different committee (for agreements, permits, management plans, etc.), (x) counterpart funds in the forest projects, (xi) contribution of the Government to international Institutions, (xii) motivation of the forest agents and officers.

5.3. Specific CITES provisions

5.3.1. CITES regulations

Cameroon signed the Convention on the International Trade of Endangered Species in June 1981 and ratified it in September of the same year. To guarantee the effective implementation of this Convention, and in pursuance of the relevant provisions of its Articles 8 and 9, Cameroon adopted a number of legislations, composed of three major measures:

- Decree n° 2005/2869/PM of 29 July 2005 setting forth the enactment provisions of a number of provisions of the Convention on the International Trade in Endangered Species (CITES);
- Ministerial Order N° 067/PM of 27 June 2006 providing the organisational set-up and operational procedure of the Inter-ministerial Coordination and Monitoring Committee for the implementation of the Convention on the International Trade in Endangered Species (CITES);
- Decision N° 0104/D/MINFOF/SG/DF/SDAFF/SN of 02 March 2006 providing the designation and definition of role of the CITES Scientific Authority in Cameroon.

The adoption of these regulations bears witness, if need be, of the ownership process of the CITES Convention by Cameroon at national level.

Cameroon government has appointed two CITES organs: the management and scientific authorities.

During the recent ITTO/CITES training workshop on the *Pericopsis elata*, held in Kribi, Cameroon from 2 to 4 April 2008, the Minister of Forestry and Wildlife, Prof. Dr. Elvis Ngolle Ngolle, focussed his address on those efforts done by Cameroon to own and implement CITES regulations.

5.3.2. CITES management authority

This role belongs to the Ministry of Forestry and Wildlife, Forest department, Sub-directorate of agreements and permits, service of intervention norms in the forest sector. This service is in charge of allocating annual quotas of Assamela to logging companies, issuance of the CITES permits for export. The service is also concerned with the elaboration, diffusion, and monitoring the respect of qualitative norms of logging, and norms related to the forest certification.

The Cameroon's CITES management authority faces many problems including the lack of scientific data on biology, ecology, phenology, processing, ...to ensure a sustainable trade of *Pericopsis elata*. During the ITTO/CITES training workshop on Assamela, the CITES management authority declared that it faces the problem of attributing quotas to different timber companies. Due to the lack of information on the relation between the raw volume (logs) and the processed volume (sawn wood), it is difficult for the management authority to allocate suitable logging volumes to forest companies. Effort should be made to target to address this problem.

5.3.3. CITES Scientific authority

The National Forest Development Agency (ANAFOR)'s main mission consists of assisting the public sector, privates and local communities in developing plantation forests in all over the country. It also assists forest concessions in the implementation of their management plans.

ANAFOR was appointed by the Forest administration to play the role of the CITES scientific authority for plants issues in Cameroon. Hence, its mission

consists of giving advices to the CITES management authority on scientific questions.

During the ITTO/CITES training workshop held in Kribi, the ANAFOR representative outlined the problem of lack of capacities. Considering the role of the CITES Scientific Authority for plants in the chain of decision for the trade of CITES-listed species, it would be interesting to build its capacities in order for it to be better able to fulfil its mandate. The CITES Scientific Authority for Plants being a rather young body, it suffers from a shortage of technical, financial and material capacities. This situation does not enable this Authority to formulate any Non-Detrimental Findings on the Assamala exports from Cameroon in the present circumstances. It is essentially in view of this situation that the Scientific Authority have submitted to ITTO a project to build the capacities of its executives (Mbarga 2008).

5.4. Other provisions

Cameroon has also taken ad hoc measures to ensure healthy trade practices and to meet the challenge (1) the allocation of logging titles by an inter-ministerial commission assisted by one independent observer, (2) the support of one independent monitoring organization (Global Forest Watch) to monitor the status of plant cover, (3) the publication of a national strategy document for forest and wildlife controls in Cameroon which is validated by all stakeholders, (4) the strengthening (securisation) of forest logging documents, (5), the enhancement of the forest revenues through the forest administration and the finances administration, (6) the reinstatement of the visa to certify the legal origin of timber, (7) the suspension or rescission of concession agreements where applicable tax have not been paid or where the details of the forest management plan have not been validated, (8) the requirement to have an environmental impact study implemented before the start of any forest management work for all concessions exceeding 50 ha.

The Government of Cameroon is firmly committed to improving the national forest governance but is also committed to raise the level of confidence that already exists between the Cameroonian forest sector and its external partners who have been providing their long-standing support.

5.5. Control of logging

According to the forest law, two main documents are required before undertaking any forest logging activity in Cameroon: the forest logging agreement and the permit. The agreement gives access to the forest logging profession, while the permit gives access to the forest resource (timber in this case). One must have these two documents before extracting any log from the forest, and mainly from the permanent domain (Republic of Cameroon 1994, 1995).

In the control of logging, one can distinguish two types of controls: the technical control and the administrative control. Technical control consists of control measures at the point of felling and along transport routes.

In 2000, a Central Unit for Control/Unité Centrale de Contrôle (UCC) was set up by the forest administration to coordinate forestry controls nationally and to support provincial Brigades de Contrôle. Since 2004, that unit (UCC) became the National Brigade for Control (Brigade Nationale de Contrôle in French). To reinforce transparency in control measures the forest administration has appointed an independent observer, Global Witness (MINEF, 2002). Global

Witness is currently working together with the National Brigade for Control to ensure the sustainable forest logging in Cameroon.

In the forest, the technical control consists of verifying the delimitation and the respect of the annual logging area, respect of MED/ADM, the logging inventory, the respect of the silvicultural prescriptions, the verification of the cubage in the parks, the felling techniques. This is mainly done by the National Brigade for Control assisted by the independent Observer, but also by the provincial Brigade, the provincial chief of forest service, the divisional chief of forest service (chef de section forêts in french), the local chief of forest and wildlife post.

The administrative control consists mainly to the verification of different documents including management plans, DF10 sheets, and activity reports transmitted by the forest company to the forest administration.

5.6. Control of timber products along transport routes and in the points of export: circuit of timber from forest to abroad.

This section aims to present the regular circuit of timber, since the felling site, till the points of export by a legal forest company as outlined in the forest law (République du Cameroun 1994, 1995). Let us take the example of a given concessionaire who wants to convey his products to Douala, the economical capital of Cameroon.

Once a log has been confectioned in the logs park, the local chief of forest and wildlife post must deliver, after further verification, two documents to the exploiter: the certificate of origin and the way bill for logs transport. This log is then conducted in the saw mill for processing (here we suppose that the saw mill is not located in the same place of the felling site or wood park). At the processing operation (the entrance of the saw mill), there exists a check point of control. This is, an external service of the Forest Revenue Enhancement Program (FREP). This service aims to verify and to compile, the volume of timber at the entrance and at the exit of the manufactory. When the timber has been processed, the local chief of forest and wildlife post must deliver two other documents which shall convey the sawn wood to the points of export including the certificate of origin and the way bill for sawn wood. Along the road, there are many control forest posts and check points. In each post, the forest agent has to control the existence and the authenticity of the required documents for log or sawn wood transportation including: the forest agreement, the annual permit with volumes indicated, the certificate of origin, cubage, the way bill. He also has to verify the conformity of these documents with the real volume of timber transported, before putting his stamp on the way bill. Thereafter, the controller must record all the data in a register book, provided by the forest administration to this end. The summation of the sawn wood volume recorded at the end of the season should be done for further verifications.

Once in Douala, the company has two alternatives: selling the wood in the domestic market, or exporting this wood. Most of the wood produced by the timber companies in Cameroon is usually destined to export. The local market is furnished by the illegal or "wild sawn wood" (Betti 2007b). In the Douala port, the exporter has to deal with two main administrations: the forest administration and the customs administration. The forest administration is mainly composed of three main services: the chief of forest and wildlife post n° 1, the chief of forest and wildlife post n°2, and the Trade wood database (COMCAM).

The exporter has first to present himself with his product to the Chief of forest and wildlife post n°1, settled at the entrance of the port, known as "port 1".

There, he has to present many documents including: the agreement, the annual permit, the certificate of origin of sawn wood, the way bill for sawn wood, the certificate for export, and the CITES certificate for what concerns the CITES products (*Pericopsis* and *Prunus*). The certificate for export is delivered by the Ministry of Forestry and Wildlife/Division of promotion and processing/Sub-direction of processing. This certificate is issued, after having verifying that the company has paid all taxes related to the volume and quality of the wood subjected to export (felling tax and saw mill entrance tax). The certificate for export provides information on the origin of the wood, the volume, the products (sawn wood, veneer, or flooring board,...), the country of destination, the address of the buyer in the importing country. The company may therefore present the payment receipts issued by the FREP. The CITES certificate is issued by the Ministry of Forestry and Wildlife/Division of forests/Sub-direction of forest management/service of intervention norms in forests. This service is also the one which plays the role of the CITES management authority. The CITES certificate is issued after having verifying that, the company has respect the requirements prescribed for the exportation of CITES products, including mainly the respect of the quotas allocated. Once the Chief of forest and wildlife post n°1 has verified the existence and the authenticity of all those documents in conformity with the product subject to exportation, he then delivers the specific bulletin. The specific bulletin records data on the origin of the product (FMU), agreement, permit, volume, products, destination (importing country). This bulletin is produced in many copies; some of which are given to the exporter and some to the trade wood database (COMCAM).

With his specific bulletin, the exporter has thereafter to present himself with his product to the Chief of forest and wildlife post n°2, settled in the port 2, together with the customs officers. These controllers (forest and custom officers) have to check the conformity of the declared products with what is mentioned in the specific bulletins. After these verifications (checking), the exporter has to pay the exit taxes (fees) (*droits de sortie* in French), before putting the product in the container for export.

5.7. Problems observed in the field of control

5.7.1. During logging activities

During the logging control, forest officers are often faced to problems. The most important being the lack of financial and logistical resources to appropriately conduct forest monitoring and achieve the several tiers of objectives ascribed to SFM. Many chiefs of forest and wildlife post do not get any bike, so they use to be transported in the forest by the forest concessionaire himself. In this condition, they are often sensitive to any "tentation" (corruption) coming from the forest company. Some of the forest officers who refused to make some arrangements with the concessionaire have been abandoned in the forest.

Another problem often observed in the control of timber logging in the forest, is that of the lack of coordination between different services of the forest administration. This problem which has already been outlined for non timber forest products (Betti 2007) is also observed in the timber sector.

Illegal logging constitutes together with poaching, the two serious problems of the forest sector in Cameroon (MINEF, 1995; MINEFI, 2006). Illegal logging is the harvesting of timber in contravention of a country's laws. Together with the associated international trade in illegally-harvested wood products, it causes environmental damage, costs governments billions of dollars in lost revenue, and is closely associated with corruption and organised crime. It also undermines

the competitiveness of legitimate forest operations in both exporting and importing countries.

Different forms of illegal logging exist, including: exceeding allowed cutting boundaries, the non respect of the minimum exploitable diameter, the non respect of the volume of timber allocated, illegal felling, false declarations (Betti, 2004). Illegal felling and false declarations are said to be the two major types of illegal practices found in the forest sector in Cameroon (http://www.idrc.ca/en/ev-28727-201-1-DO_TOPIC.html). The importance of illegal logging has increased with the implementation of the new forest code. In fact, the more the forest activities are regulated, the more the number of infractions increases (Karsenty, 2006).

Although neglected by forest industries, the national need of wood covers by the informal sector represents some 300 000 m³/year of timber (Koffi Yeboa, 2005). This sector is growing more and more and its economic impact is crucial at all levels including production, processing, distribution and employment (MINEFI, 1998; 2004). The evolution of the production and exportations of sawn wood in Cameroon (all exploited timbers) from 1995 to 1997 for both formal and informal sectors is illustrated in table 16.

Table 16. Evolution of the production and exportations of sawn wood in Cameroon from 1995 to 1997 (x 1000 m³) (MINEFI, 2004).

Products	1995/1996	1996/1997
Production of the formal sector	436	460
Production of the informal sector	245	260
Total production	681	720
Local or domestic consumption	420	445
Exportations	261	275

The informal sector contributed for 505,000m³, which represents 35.6% of the national production of sawn wood for the two exercises (1995/1996 and 1996/1997). The formal sector contributed for 64.5% with 896,000 m³. Knowing that the logging companies prefer to produce their wood for the foreign market (536,000 m³ for the exportation of the two periods), it is clear that the remaining 360,000 m³ is not enough to satisfy the domestic demand which is about 865,000 m³.

Different reasons explain the proliferations of illegal logging or sawing sector in Cameroon. The main reasons include: the lack of motivations among the logging companies, the lack of clearance in the management of funds that have to be given to local communities, the complexity of the conditions required for allocating small permits and the economic crisis.

Timber companies export products according to the buyer’s requirements.

5.7.2. Along transport routes

Along the transport routes, technical control consists of verifying relevant documents and their conformity with the product transported. The problems observed here include the lack of sufficient and qualified personal, the lack of material of control, the lack of motivation for the forest agents, the competence conflicts with other administration. Following the structural economic adjustment undertaken in the late 1990, the Cameroon government has stopped the recruitment of forest officers in the forest administration. This had a negative impact in the forest control and monitoring activities. In many forest posts and check points settled along the road, there are one, two or three forest

agents who are currently doing control. This number is not enough to ensure the control of log trucks all days and nights (24 hours/24). Also, many of the agents affected in those posts are too old now and do not get sufficient material for staying awake and resisting to cold all night long. Due to the lack of motivation, following the reduction of the salary, most of the forest agents are sensitive to any corruption activities. Many of them do not record data from checking in their register book, as required by the forest administration. So many of these register books cannot be used, for further verifications. One cannot try to retrace the timber volume trade transported to Douala, through data recorded in those books (Betti 2007).

Another problem largely observed along the roads is that of conflict of competency with other administrations such as police forces. These persons use to stop cars for checking forest products (Betti 2007).

5.7.3. At the points of export

The Cameroon wood is exported from the ports of Douala, Kribi, Limbé, Tiko. The first and main problem observed here is the lack of synergy between the custom officers and the forest officers. Often, the custom officers, who are posted at the end of the exportation chain, refuse to consider the specific bulletins dressed by the forest officers. Also, they used to refuse that the forest officers check the final container and consigns the transport document "connaissancement in french". In this condition, some products are exported without the visa of the forest officers.

The second problem in export is at the level of the chief of post N°1. Normally, the chief of forest and wildlife post n°1 must transmitted all specific bulletins to the Trade Wood database. This is not always the case, since some specific bulletins do not exist or disappear. Such behaviour which is certainly link to corruption is detrimental to the monitoring, and checking of statistical data on the trade wood.

The third problem is that of the non existence of COMCAM in other ports. Only COMCAM Doula has work correctly till date. COMCAM Limbé, Kribi, Tiko have not been functioning in fair manner. COMCAM Kribi has just started working.

The fourth problem observed in the control of timber products is that of the proliferation of the "criques". "Criques" are informal points of export, found in many localities settled along the frontier Cameroon – Nigeria, in the south province of Cameroon. These are unsafe sites, where forest officers cannot undertake any control mission (Betti 2007).

The fifth problem is that of lack of connection between the two forest database systems belonging to the Ministry of Forestry and Wildlife. As we can see, specific CITES requirements for *Pericopsis elata* are the responsibility of MINFOF which is the Cameroonian Management Authority for CITES. MINFOF records information on trade in timber through two database systems for the collection of revenue and to support law enforcement: SIGIF at Yaoundé and COMCAM at Douala. The problem is that, there is no connection between the two database systems. In Yaoundé, SIGIF records data on a log by log basis, while in Doula, COMCAM records data on sawn wood by sawn wood basis. Such a system cannot allow to monitor the circulation of timber in the whole country, and to make a linkage between the logs volume and the processed volume.

The sixth problem is that of lack of such a system for monitoring domestic trade in wood products. Till date, the forest administration has never developed a fair

system for controlling and monitoring domestic trade, which cannot help to get a global trade volume of wood in the country.

In 2001, the Scientific Review Group (SRG) convened under EU legislation, on which member States' Scientific Authorities are represented, formed a negative opinion on the conservation effects of imports of *Pericopsis elata* from Cameroon, resulting in an effective suspension of imports. The grounds for this decision, which was based on a proposal from Belgium, were doubts as to the legal provenance of much of the timber being exported. This decision was reversed following consultation with Cameroon. The SRG was sufficiently reassured to allow imports to resume, pending the outcome of the Significant Trade process. During 2002, various fines and withdrawal of permission to export have been imposed for activities relating to trade in *Pericopsis elata* in contravention with the provisions of CITES (CITES 2003, MINEF, 2002).

5.8. Perspectives

Although the control and monitoring system put in place in Cameroon faces many problems, there are some perspectives which need to be outlined here. The most important include the implementation of the Forest and Environment Sectorial Program (PSFE), and the progressive certification of production forests.

5.8.1. The Forest and Environment Sectorial Program (PSFE)

The Forest and Environment Sectorial Program (PSFE) is a national program for sectorial development, elaborated by the Cameroon Government and opened to the funding of all donors, including international or bilateral aids, the civil society, and NGOs. It aims to develop a coherent framework for all interventions which contribute to the realisation of the objectives of the forest and wildlife policy of the country.

Through the PSFE, the Cameroon Government wants to get a guide that will allow him to ensure a fair monitoring and an efficient control of the forest and environmental activities by strengthening a global dynamic to the isolated efforts made by projects. The PSFE aims to ensure that those projects be coherent with the objectives of sustainable development of the country.

The PSFE was developed in 2003 (MINEF 2003) for a period of 10 years, distributed in two 5 years phases. The first 5 years phase was estimated at 66,148 millions of FCFA (1 FCFA = 650 euros).

The implementation of the PSFE is done on a participative basis, with the forest administration being the main interlocutor. The architecture of the program distinguishes three main levels: (1) the national level of the global management, (2) the national level of component management, (3) and the provincial level of implementation. At any level, a program Committee defines the orientations, the programmes, and the Annual work plans (AWP).

The Forest and Environment Sectorial Program is made of 5 components including: (1) environmental management of forest activities, (2) management of production forests and valorisation of the forest products, (3) biodiversity conservation and valorisation of faunal or wildlife resources, (4) community management of forest and wildlife resources, (5) institutional building, training, and research.

The Component 2, dealing with the management of production forests and valorisation of the forest products is the one that largely interests us in this document. This component is composed of five sub-components including: (1) zoning the remaining national territory (mainly the northern part of the

country), (2) management of production forest, (3) valorisation and processing of the timber resources, (4) valorisation and processing of the Non timber forest products (NTFP), and (5) forest control, monitoring and forest tax enhancement.

The function of forest control and monitoring is the main and legal role of the forest administration, however and according to what precedes, this function does not work well, which impacts negatively the sustainable development of the forest sector. A national strategy for control of forest and wildlife products was elaborated in 1999, but with mitigate results in a context where almost all the forest agents make control (or research of the infractions). The new view of the strategy of control as outlined in the fifth sub-component of Component 2 of PSFE suggests to:

- (1) re-centre or clarify the role of each service according to its position. It is not interesting to multiply the control actors. Most important is to facilitate the responsibility and the monitoring of each actor on a specific task. In this basis, the role of each service should be clarified as follow: (i) orient the forest control posts on the monitoring and the struggle against the illegal logging, since they are suitable to ensure a permanent monitoring of the national territory, (ii) withdraw the "check points" mission from the forest posts, and develop a specific network, like the one already put in place by the Forest Revenues Enhancement Program (PSRF), to ensure safety in strategic points using the new control technologies, (iii) confirm the Provincial Delegate as the main coordinator of the control, (iv) enhance the services of the forest department on control and monitoring tools.
- (2) move towards a planning control system, which is based on a database system. If the actual system of control is not working correctly, it is because many complementary functions (services) to the above services are not working. This leads to the isolated control activities, with a weak efficiency and lack of transparency. To solve these problems, it is important to build a control chain which will permit to activate the process of leading, treatment, monitoring, and classification of files and trials (process verbal in French). This system should be built on: (i) a database system which will allow to follow all necessary steps, from the trials till the contentious, (ii) an inter-action with the Forest Revenues Enhancement Program (PSRF) Forest Revenues Enhancement Program (PSRF) in terms of transmission of fines or penalties, (iii) development at the provincial level of simple mechanisms for planning and monitoring-evaluation/coordination, (iv) an improvement of the forest logging database (SIGIF) in terms of integrating data on sawn wood, (v) an interaction between the two forest databases: SIGIF (logging) and COMCAM (trade database), (vi) institutionalisation and the dissemination of the two databases at the provincial levels.

5.8.2. Certification

5.8.2.1. Certified forests or companies

Under the pressure of the ecologist movements, the external market becomes more and more reluctant on products coming from natural forests, and mostly non managed forests. By 2010, it is obviously possible that only products harvested in managed forest will enter the international market.

Although the Principles, Criterion, and indicators (PCI) for the sustainable management of forest are not yet approved by all parties in Cameroon, the

efforts made by the Government in the forest sector can be useful for the forest certification. In fact, the Cameroon forest law together with the measures undertook to enhance the sustainable management of forest resources as underlined in this document, are a suitable framework to reach the forest certification target. The challenge here is that of implementing strictly those measures in the field.

Six out of the forests concessions which are exploiting the *Pericopsis elata* timber species in Cameroon have already been certified yet by ICILIA or FSC (see table 3).

5.8.2.2. The Forest Law Enforcement, Governance and Trade (FLEGT) process

The IITO/CITES training workshop held at Kribi also provided the Cameroonian Minister of forestry and wildlife, the opportunity to introduce the Cameroonian forest sector in its assets in terms of achievements, challenges and perspectives. For information, Cameroon is currently engaged in negotiations with the European Union to reach a Voluntary Partnership Agreement (APV/FLEGT) to improve the governance and transparency of the timber trade between the two partners.

The Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan was adopted by the European Commission in May 2003 as part of the EU's response to the call for action at the World Summit on Sustainable Development. The Action Plan sets out a new and innovative approach to tackling illegal logging, linking good governance in developing countries with the legal trade instruments and leverage offered by the EU's internal market.

At the core of the Action Plan are Voluntary Partnership Agreements with timber-producing countries that wish to eliminate illegal timber from their trade with the EU. These agreements will involve establishment of a licensing scheme to ensure that only legal timber from producing countries ("Partner Countries") is allowed into the EU. Unlicensed consignments from Partner Countries would be denied access to the European market under the scheme.

The agreements are voluntary. This means that Partner Countries can decide whether or not to sign up, although once they do so the licensing scheme is obligatory.

Each Voluntary Partnership Agreement will require a definition of "legally-produced timber" and the means to verify that wood products destined for the EU have been produced in line with the requirements of this definition. Both the definition of legality and the verification system should be appropriate to circumstances in the Partner Country. Details of these will be negotiated between each Partner Country and the EU. Where needed, EU development assistance will be provided to help establish licensing schemes.

Several meetings have been organized between representatives of the two parties (Cameroon and European Commission). The main area of discussions include: the nature of products that will be concerned by the FLEGT, the origin of those products, the chain of custody, the system of licences issuance, audit, the institutional framework, the forest governance.

a) Extend of the FLEGT system:

For the beginning, the FLEGT process will concern some products, there after, the process will be enlarged to other products, and mainly finished products for which the definition is not clear yet. The FLEGT will concern timber of all origins, including timber of legal companies and seized products that have been sold legally by the forest administration.

b) Funding of the system:

The FLEGT monitoring system will start in the forest, from the raw product till the exit port. Two exit ports have been retained including the Douala and the Kribi ports. The monitoring system will be based on the codes bares system. Cameroon Government has prepared himself for the financing of the monitoring system. The materials and other equipments will be supported by the public treasury, while the capacity building of the monitors and studies will be financed by the FSDF. The European Commission has declared to help the Cameroon Government in the development of such a system for a total amount of 3.5 billions of FCFA. The development of the monitoring system is a long process including the selection of an expert for the development of the system, buying of materials and equipment, and the training of local forest agents in charged of using materials devoted of such a system.

c) System of issuance of FLEGT certificates

There will be two types of certificates: the "legality certificate" that will be delivered at the central forest administration (Forest Department), and the "exit authorization or "authorization of export" that will be delivered at the exit points by the local forest Delegates. The certificates concerns the societies (companies) while the authorizations concerns the products. The problem that has to be arranged here (exit points) is that of collaboration between the forest and the custom agents.

d) The audit system:

The EC would like to finance and validate the audit of the FLEGT system. The Cameroon party thinks that this specific task belongs to the Government of Cameroon. For the Cameroon representatives, the audit will not only concerned the monitoring of forest logging and trade, but also the impact of such a system in the whole forest revenues of the country. Does the system of FLEGT profit to the Cameroon Government or not? So there are two types of questions: policy and visibility.

e) The institutional framework:

The European Commission thinks that, the FLEGT process must be implemented within a specific project, that they will support. For Cameroon party, this is not necessary. To avoid weaknesses often observed with projects, the system should be integrated within the current monitoring and control system of the forest administration. This is to warrant the efficiency and the long term of the system. The institutional framework is structured as follow: (1) at the central level, there will be two departments including the forest department and the processing and promotion department; (2) at the external levels there will be: the local forest post, the check points and forest posts along the road, the check points at the entrance of the factories (saw mills), the exit forest posts (at the exit points: Douala & Kribi), the provincial Delegate, and the customs. It is the provincial Delegate who will deliver the exit authorizations.

The new monitoring system is supposed to be more efficient. In fact, contrary to what was done before, the results of logging inventories (annual inventories in logging plots) will be largely used and mapped. The central forest

administration will be able to know and monitored almost all the trees which will be logged during the year in a given plot. These logs will be integrated in the forest control. The details of such a monitoring system will be précised in the appendix 5 of the FLEGT agreement.

The FLEGT agreement is supposed to be signed by the two parties by December 2008.

CONCLUSIONS AND RECOMMANDATIONS

Pericopsis elata is classified by the World Alliance for Nature (IUCN) as endangered species, which led to its listing in the Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). The annual quota of export volume for Cameroon is 15,200 m³ while the girth limit or the administrative exploitable diameter was fixed by the Government at 100 cm.

In Cameroon the distribution of *Pericopsis elata* is largely restricted to the East province of the country, the moist semi-deciduous forest with annual rainfall of 1 000 – 1 500 mm being its specific habitat.

The basis of restoration and alleviation measures or Non-Detriment Findings (NDF) is outlined in element 5, article 6 of the arête n° 0222/A/MINEF of 25 May 2001: calculation of the forest possibility and determination of the managed minimum exploitable diameter.

Control of timber exploitation, trade and exportation is the main responsibility of the Ministry of Forestry and Wildlife. The problem resides on the application of control and monitoring system. This still faces many weaknesses. The lack of financial and logistical resources to appropriately conduct forest monitoring and achieve the several tiers of objectives ascribed to sustainable forest management constitutes one of the main problem. However, Cameroon is currently engaged in negotiations with the European Union to reach a Voluntary Partnership Agreement (APV/FLEGT) to improve the governance and transparency of the timber trade between the two partners. This will contribute to mitigate monitoring limits and combat the illegal logging.

The restoration and alleviation measures adopted by the Cameroon government for the development and implementation of management plans, are relevant to ensure a fair sustainable logging on *Pericopsis elata*. The method used to calculate the forest possibility and the managed minimum exploitable diameter can be advised for a Non-Detriment Findings protocol for CITES plant species for a specific country or specific production forest. Analyses made in this document do not authorize to consider *Pericopsis elata* found in Cameroon as a threatened plant species, in accordance with the actual availability and the level of exploitation. But this must be considered with some reserves, due to the lack of scientific updated census and data.

This report was dressed, based mainly on available information found in the forest administration at Yaoundé. The elaboration of a complete NDF report is a time and funds demand. Due to the lack of sufficient means (funds, car, and other logistics), I was not able to go to all zones where this plant species occurs. It was not easy to get some reports, mainly the management plans.

For a complete Non-detriment Findings report on *Pericopsis elata*, I recommend (1) to limit the elaboration of NDF reports on production forests, (2) to gather

and analyse management and logging inventories data of all production forests where *Pericopsis* is logged (more than 30 management plans), and determine the suitable MED/ADM, (3) conducting target inventories in forest concessions to confirm or reject results of inventories made by the forest concessionaires, (4) conducting target inventories including individuals with diameter less than 20 cm in production forests, community forests, communal forests, and protected areas and update the real density and the map of *Pericopsis* in Cameroon, (5) gathering relevant data on processing in different sawmills to define a suitable and adaptive processing rate of *Pericopsis*: this information will help the CITES management authority to allocate suitable quotas for *Pericopsis* to different companies, (6) gathering relevant data on illegal logging and domestic trade, (7) undertaking phonological studies and define the production and the MED of Assamela trees, (8) conducting complementary studies on the silviculture in both forest management units and plantation forests and establish a seed bank (9) developing and implementing the management plans of *Pericopsis*'s plantations, (10) build capacity of the CITES scientific officers .

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PHYTOGEOGRAPHIC MAP OF CAMEROON

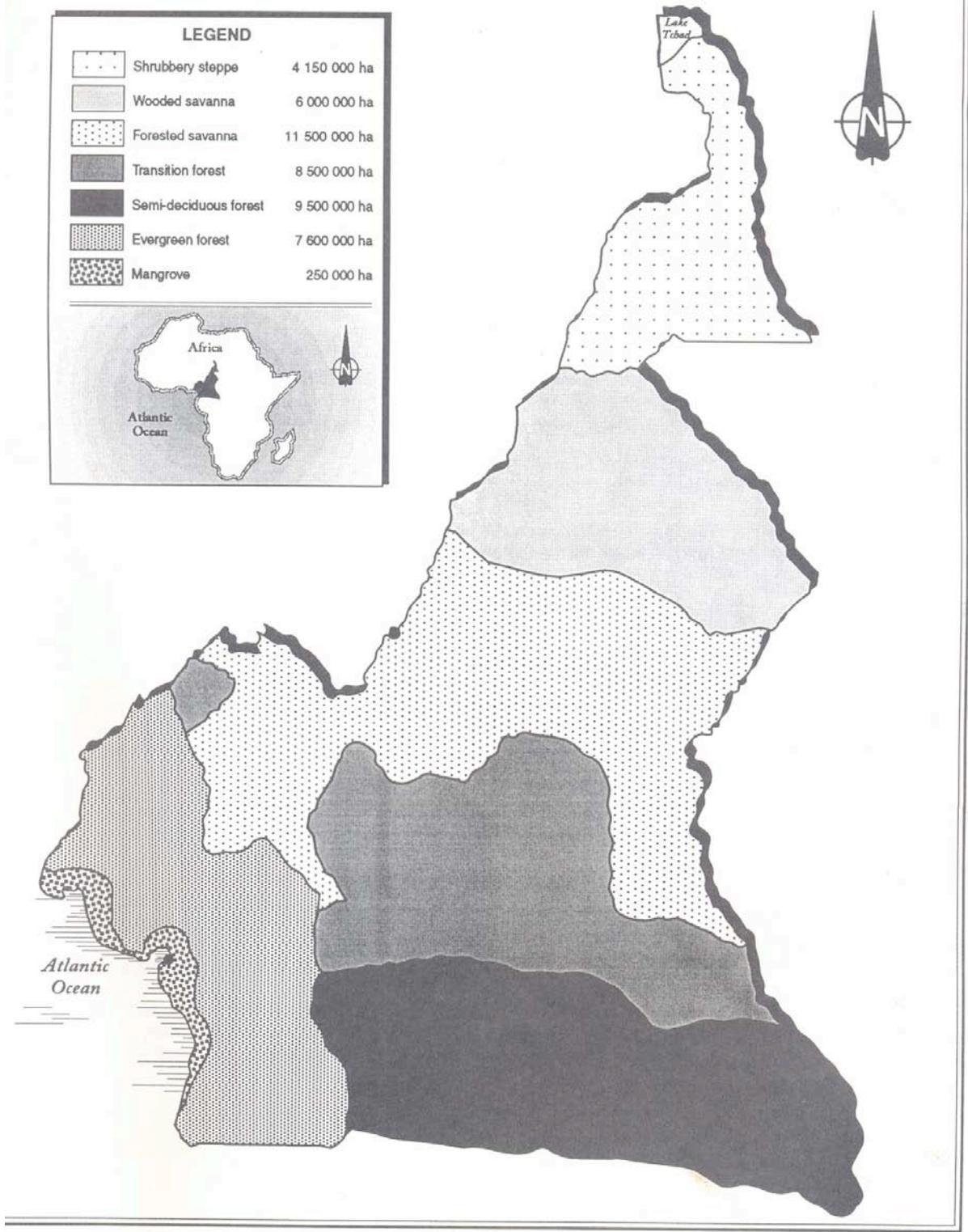


Figure 1 : Phytogeographic map

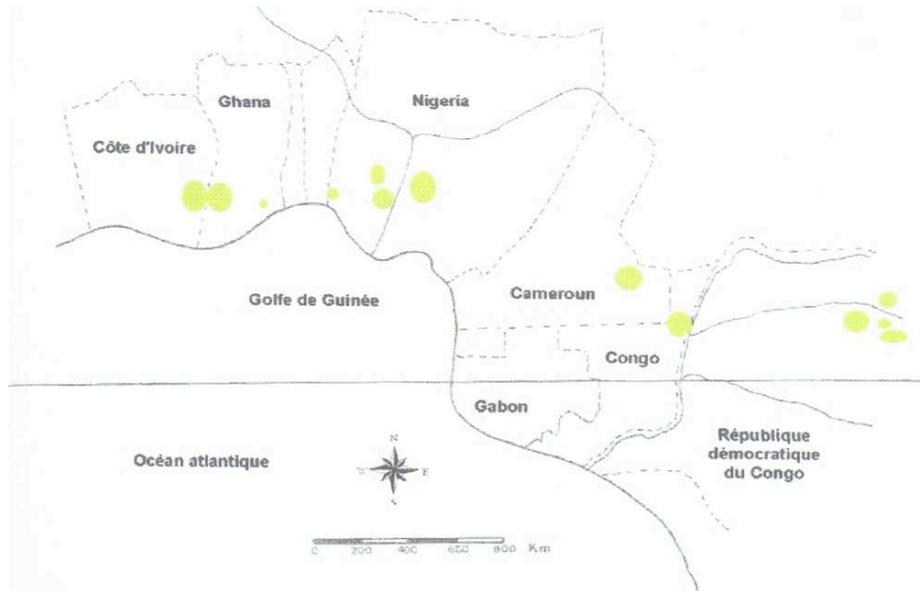


Figure 2 : *Pericopsis eleata* in Africa

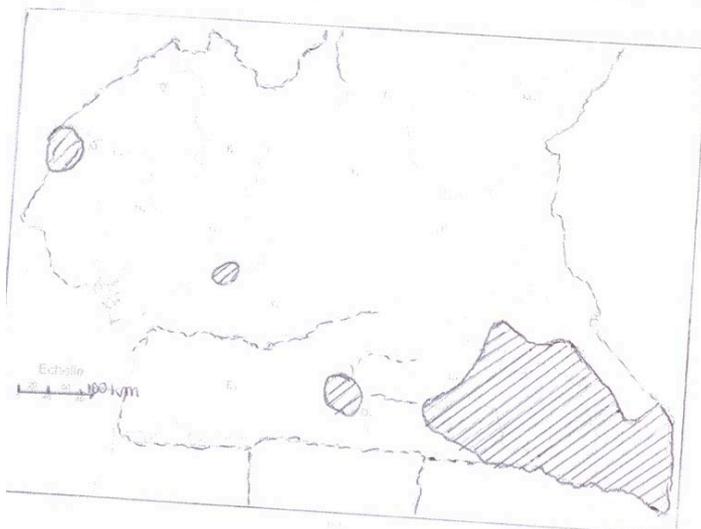


Figure 3a : *Pericopsis eleata* distribution map (Vivien J. & Faure, 1985)

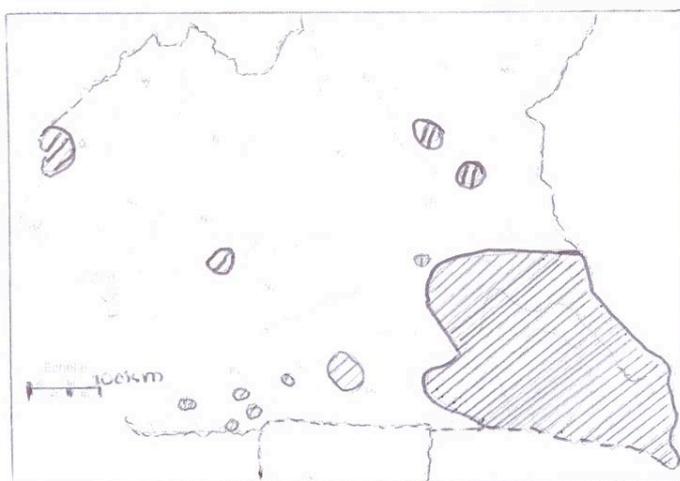


Figure 3b: *Pericopsis eleata* distribution map current data

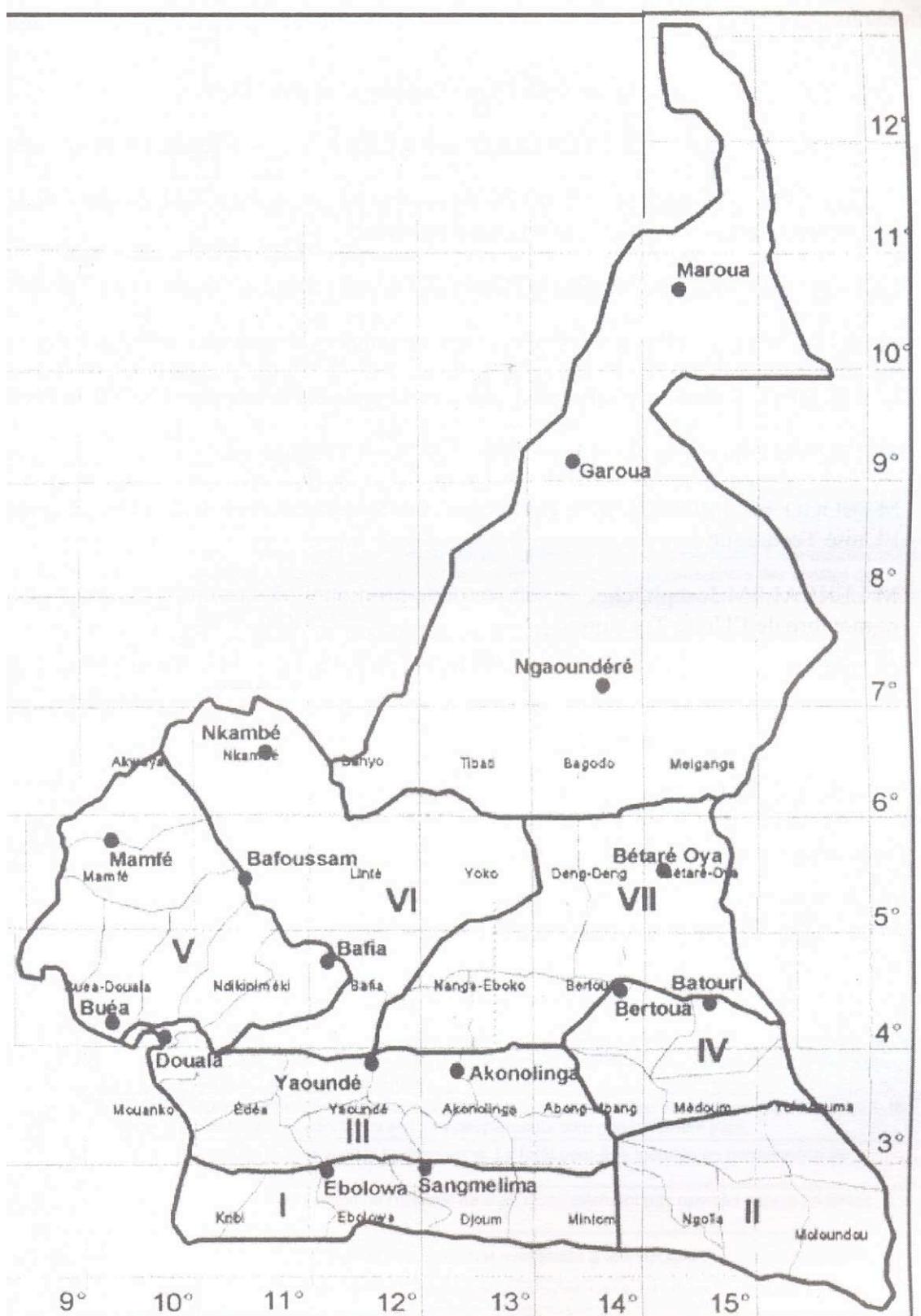


Figure 5: National Inventory phases

ANNEX 1

ABBREVIATIONS

ANAFOR:	National Agency for Support to Forest Development
API:	Pilot Integrated Management Project
ATIBT:	Association Technique des Bois Tropicaux (International Technical Tropical Timber Association)
ATFI:	Association of Timber and Forest Industries of Cameroon
CENADEFOR:	National Centre for Forestry Development
CIRAD:	Centre International des recherches agricoles pour le Développement
CITES:	Convention on the International Trade in Endangered Plants and Animal Species
CTFT:	Tropical Forests Technical Centre
COMCAM:	Database on trade wood
EEI:	Number of stems which will be logged (exploited) during the first rotation
EER:	Number of stems which will be logged (exploited) during the second rotation
EC:	European Commission
EU:	European Union
FAO:	International organisation for Food and agriculture
FLEGT:	Forest Law Enforcement, Governance and Trade
FSDF:	Special Fund for Forest Development
FMU:	Forest Management Unit
FSC:	Forest Steward Council
GDC:	General Division for Customs
IRAD:	Institute for Agricultural Research and Development
ITTO:	International Tropical Timber Organization
IUCN:	World Alliance for Nature/International Union for Nature Conservation
MED:	Minimum Exploitable Diameter
MED/ADM:	Minimum Exploitable Diameter fixed by the forest administration
MED/AME:	Minimum Exploitable Diameter proposed by the manager (forest company)

MINEF:	Ministry of Environment and Forest
MINEFI:	Ministry of Economy and Finance
MINFOF:	Ministry of Forestry and Wildlife
MMD:	Minimum Managed Diameter
NTFP:	Non Timber Forest Products
NDF:	Non-Detriment Findings
PCI:	Principles, Criterion, and Indicators
PSFE:	Forest and Environment Sectorial Program
PSRF:	Forest Revenue Enhancement Program
Re:	Reconstitution rate
SIGIF:	Database on timber logging
TIAMA:	Computer treatment applied to forest management
UCC:	Central Unit for Control
VER:	Volume of stems which will be logged during the next (second) rotation