

Inventories of the regeneration of gases exploited in the forest yard of SICOFOR: Case of the Forest unit of exploitation (UFE) of Gouongo (South Congo)

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Abstract—The general objective of the present survey was to undertake the practices of regeneration inventories, notably the stems of future among gases exploited by the SICOFOR society, this in order to compare their stages of development. The sampling of these forest resources took place in the D blocks and E of the Forest unit of exploitation (UFE) Gouongo in the South of Congo.

The specific objectives aimed to value the different stages of regeneration of the future stems according to their classes of diameter, and summed up to:

"the assessment of the stems of the small regeneration of whose diameters are consisted between 5 and 10 cm;

"the assessment of the big regeneration whose stems present the diameters of that are consisted between 10 and 20cm;

"finally, the assessment of regeneration acquired, that means the stems of whose diameters are consisted between 20cm and the diameters minimum of exploitabilité (DME).

To reach these objectives, the undertaken approach, was to undertake the works of layonnage and systematic numbering of the future stems according to the diameter understood between 5 - 20 cm and more.

The gotten results showed meaningful particularities depending on whether one is of an inventory block to another. For the whole surface sampled, the total number of the future stems is of 17060, either 3028 class stems of diameter understood between 5-10 cm; 2513 of class stems of diameter understood between 10 - 19,9 cm; 11519 class stems understood between 20cm and the official DME.

Among these stems, two gases predominate our zone of survey with 35,58% for the gas okoumé (*Aucoumea klaineana*) of the family of the Burseraceae and 14,94% for the Niové (*Staudtia*

kamerunensis var) of the family of the Myristicaceae. One also notes that the ninety-six species (96) inventoried are distributed in thirty families on the set of the inventory placettes.

These data permitted to put in evidence the gap between the different stages of development and showed that the class stems > 20 cm said reserve for the second passage decreases in very remarkable quantity and can drag some damages in the future.

To the look of that that precedes for the preservation of these stems in a rational and lasting way, one would consider the practice of lumbering to reduced impacts (EFIR) as well as the practice of the sylvan works during or after the operations of withdrawal of the work woods and, a scheduling of the forest roads integrated in the SIG before the forest operations.

Keywords—regeneration, stems of future, gases, diameter, middle diameter of exploitabilité (DME).

1. INTRODUCTION

The forests of the Basin of Congo constitute one of the most important " well " of forest genetic resources (PFBC, 2006). It is there about a forest massif of one only holding after the one of the Amazonie.

However, this massif is submitted to incontestable disruptions mainly of deterioration and due destruction to the conversion of the forest earths for the agricultural needs, of the industrial exploitation of work wood, as well as of the exploitation of the fire-chamber woods with a rate of deterioration of 0,09 (Wasseige and al., 2012). Compared this rate with the one of the forests of the Congo Brazzaville, it is estimated to 0,007 (CNI AF, 2005). However, in spite of these apparently weak rates, these forest massifs require a good knowledge of his/her/its animal and plant resources in order to consider the lasting management.

In Republic of Congo, the forest occupies an estimated surface to about 22471000 ha, either a

middle percentage of 65% of the national territory (FAO, 2005). According to Badevokila (2009), to the look of his/her/its geographical position, Congo is considered like an interlocutor of weight because of his/her/its production in the setting of the development of the strategies and policies common to adopt.

During their works access on the forest planning in the North part of the Country, Nkounkou (2010) and NToumi (2011) would have returned that several fragile forest gases would be victims many damages caused by the exploitation of the woods of œuvres, the wild animals, the slaughtering of the big trees for needs of agriculture on burnt land, the withdrawal of the woods of energy and construction of the artisanal houses.

In the setting of the knowledge of the physical environment and biotique of the Gouongo UFE, he/it has been considered the realization of an inventory multi resources in order to know the mobilizable woody potential on the one hand in court, middle and long term, and the development of the basis studies (ecological, socioeconomic and EFIR), on the other hand, this in order to avoid the a pity collaterals owed to the exploitation of the forest resources mainly.

These inventories permit to describe qualitatively and quantitatively the potential on foot and to make to the term of the development of the planning plan a regular follow-up in the zones of lumbering. The interventions consecutive to the follow-up of the planning plan should drive toward the setting up of the strategies of conservation of the forest biodiversity to the local level.

This present work that intends like general objective, to value the stems of future in the forest concession of the Gouongo UFE in the South Congo, aim three specific objectives that are:

"the assessment of the small regeneration of whose diameter is consisted between 5 and 10 cm;

"the assessment of regeneration with a diameter understood between 10 and 20cm;

"finally, the assessment of regeneration whose stems have a diameter understood between 20cm and the official DME of each of the species inventoried, in order to compare our results with arrangements of the article 91 of the decree n°2002-437 of the forest code 2002 fixing the conditions of management and use of the forests.

In perspective this survey should permit to make advance in an ecological and lasting manner the maintenance of the production forests.

2. MATERIAL AND METHODS

2.1. MATERIAL OF OFFICE

(01) laptop of 4 Gbs of memory;

the cards of collection of the data (layonnage and numbering);

software of treatment of the cartographic data (ArcGis 10.0);

(01) GPS of mark Garmin 60Cx;

of the numeric supports (topographic Funds and pictures satellites);

various tools of office (rule, reporter, etc.)

2.2. MATERIAL OF LAND

(01) GPS of mark Garmin 60cx for the topographic summaries and the registration of the different forest strata met;

(01) compass da marks Suunto used for the materialization of the azimuth

(01) clisimètre of Suunto mark for the correction of the slopes;

two double decametres for the measures of the distances;

four machetes for the clearing of vegetation on the trails to open including the obstacles on on the floor during the walk;

two files to sharpen the machetes so that they are always cutting;

of the cards of summaries of all data collected on the land;

card of topographic funds used to mark itself/themselves in relation to the orientations of office;

thematic card (plan of poll) that describes the data of the survey zone, notably the trails of inventory; the chalk industrial illustration of the useful reference marks for the team (previously counted trees and recorded);

two limp of painting whitewashed on the trunks in a height given on trees identified for the numbering;

2.2.2. material of the numbering works

(01) GPS of mark Garmin 62cx for the summaries of the geographical coordinates of each of the sampling units inventoried;

thematic card (plan of poll) that describes the units of sampling;

two machetes for the identification of gas (sap, fiber of the tree trunk, etc.);

(01) rope of 12,50 meters for the measures of the distances of the retained units of sampling;

(01) small board for the measure of the diameter to a certain height;

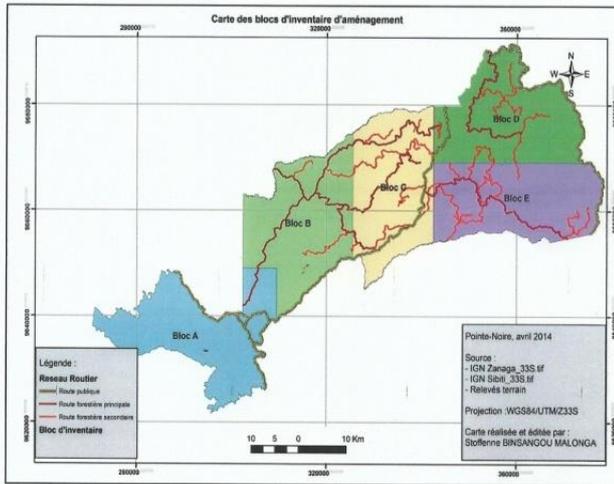
two (02) ribbons of measurement for the measures of the diameters of the trees;

of the cards of summaries on the features physics and biotique of the middle.

2.2. METHODS

2.2.1. Methods of layonnage

The thematic card (plan of poll) gotten after the summaries topographic of the land for the evaluation of the wealth of the forest resources of the Gouongo UFE gives a surface estimated to 244632 ha in the D blocks and E (Face. 1).



Face 1: Card of cutoff of the blocks of the Gouongo UFE of the D blocks and E in the south Congo (P. MBETE, 2014)

The choice of these two blocks is justified by the presence of the forest on firm soil according to the classification (AETFAT, 1957), and also by the presence of the big woody.

Sensible that the sampling was about a systematic inventory, it has been kept a device of inventory to 1° with adjoining strips the some to the other. The unit of sampling is of oblong shape of 200m x 25m, either 0,5ha. The systematic stitch adopted during the works of cartography (plan of poll) is of 2000m.

According to (ATIBT.; 2007) the forest inventories contain to its breast two big operations of which: the works of layonnage and the Numbering. In our case, the works of layonnage consisted in opening the approach paths or tracks in the forest on a width of 1,5 m in order to position the units of sampling.

Of this operation, several parameters are kept and done on the land It is about of:

- ✓ the determination of the angles on the land in order to get some polygons to estimate the surfaces of the blocks, and the right lines at the time of the construction of the trails;
- ✓ the calculation of the magnetic declension in order to take account of the angle formed between the geographical North and the magnetic North;
- ✓ the géo-référencement of the starting points of the trails;
- ✓ the clearing (débroussaillage) of the trail to the machete while trying as much that possible to cut all undergrowths, except the stems whose diameter is

superior or equal to 5 cm) to have the widths required of the trails;

- ✓ the chaining (piquetage all 25m, in order to delimit the units of sampling) and the accumulated distances;
- ✓ the correction of the slopes;
- ✓ the registration on GPS of the collected information (geographical coordinates " latitude and longitude " all 200m);
- ✓ the description of the physical environment;
- ✓ the replenishment of the cards of collection of the data conceived to this effect.

The information raised during the works of layonnage essentially concern:

- the type of plant formations;
- the topography (slopes and their corrections);
- the hydrographic network;
- the tracks of lumbering;
- the impacts bound to the lumbering and the activities anthropiques;
- the chablis; etc.

Every team of layonnage is composed as well as he follows:

- (01) Chief of teams;
- (01) Boussolier;
- (01) peak Machetteur;
- (01) Jalonneur;
- (01) Chaineur;
- three (03) Dégageurs.

2.2.3. Method of numbering of the regeneration of the young stems of future exploited in SICOFOR

The methodological approach of collection of the data concerning the stems says regeneration is identical to the one of the sampling of the big woody in the tactical inventories.

The meter botanist in the execution of the tasks elaborated on distribution that wants to say depending on whether gas within the unit of sampling of 0,5ha is is isolated or is grouped, as well as on the indication of gas presence, notably abundance (light or dense abundance).

The identification of every taxon is the one to recognize gas by the characterization of his/her/its leaves, the shape of the trunk, the color, the latex, and the odor. During these works, three stages of development were taken in account, it is about of :

- S2 stage for the stems of whose height is consisted between 30 cm and 1,5 meter and the diameter between 5 and 10 cm;

- S3 stage for the stems whose height is superior to 1,5 meter and diameter understood between 10 and 20 cm;

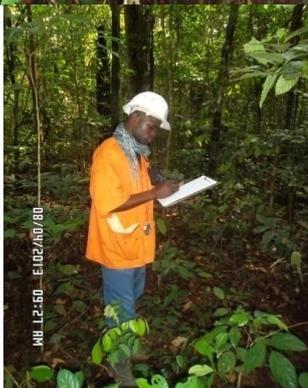
- S4 stage for the stems whose height is superior to 2m and the diameter is equal or superior to 20 cm.

The numbering to the level of regeneration only concerns the young stems marketed by the society. He/it takes place on the trails in the placette of 0,5ha. All feet whose gas has a commercial value and whose diameter is understood above between the three stages of development quoted were taken in account.

The team was constituted of three people of which a meter botanist, a chaîneur for the hold of the distances and the angles and a drawer for the hold of the data.

To the discovery of a stem, he/it had been noted: the name of gas, the diameter, the angle, and a commentary (type of foot, slope and quality). The angles have been taken to calculate the total height and the height of the stock (White., 2004), from a device named clinomètre put to a distance of 50m of the trunk and positioned to the height of the observer's ceil in a DBH of 1,5m.

The aim consisted in measuring the angle (p) formed between the canopée and the trunk in order to value the height of the houppier and the stock on foot. For it, some trigonometric formulas have been used to calculate the total height of all the tree and the height of the stock or the summit. The photos 1; 2 and 3 illustrate the stages of summary floristiques in the units of sampling.



Face 2 : Photos illustrating the method of identification and the measure of the diameters (P. Mbeté, 2014).

The set of the data collected during these works have been recorded in cards of numbering, then recorded to the computer for the purpose of compilation and treatment.

3. RESULTS

After the works of land, the data have been compiled under Excel calculator, then treated.

3.1. The trails of numbering of the D blocks and E.

The pictures 1 and 2 shows the results of layonnage of the D blocks and E of the Forest unit of exploitation (UFE) Gouongo conceded to the society of exploitation of SICOFOR.

Picture 1: Results of layonnage in the Block D

Name of layons	Angle (degree)	Length Estimable (m)	Length Achieved (m)	Gap (m)	Rate of realization n (%)	Obstacles
L1	274°	25412	25254	158	99,38	Lémogni river
L2A	274°	15354	15347	7	99,95	
L2B	94°	10970	10950	20	99,81	
L3A	274°	7438	7606	-168	102	
L3B	94°	16950	16950	0	100	
L4A	274°	5303	5303	0	100	
L4B	94°	19473	19300	173	99,11	Lémogni river
L5A	274°	4000	4000	0	100	
L5B	274°	12360	12360	0	100	
L5C	274°	7280	7160	120	8,35	Lémogni river
L6	274°	22616	22412	204	99,10	Lémogni river
L7	274°	18740	18557	183	99,02	Lémogni river
L8	274°	8662	8550	12	98,71	
L9	274°	6173	6175	2	100	
TOTAL		180731	179924	807	99,55	

$$\text{Rate of realization of it \%} = \text{LR} \times 100/\text{LP}$$

With LR = achieved length and LP = foreseeable length.

The picture 1 indicates the number of the trails opened in the D block and watch that on an estimable length of 180731m gotten under SIG and cartographiée as regards to poll, it has been achieved to the total 179924m representative 99,55% of the set of the open trails, either a gap of 807m equivalent to two units of sampling.

This gap is essentially owed to the obstacles of the crossing on the Lémogni river, that was in rise in the water level at the time of the works of land. The picture 2 when to him, present the trails opened in the E. block

Picture 2: Results of layonnage in the Block E

Name of layons	Angle (degree)	Length Estimable (m)	Length Achieved (m)	Gap (m)	Rate of realization (%)	Obstacles
L1A	94°	2675	2675	0	100	
L1B	274°	13767	13075	692	94,97	Léboulou river
L2A	94°	2925	2925	0	100	
L2B	274°	12306	12475	-169	101	
L3A	274°	12818	12850	-32	100	
L3B	94°	600	600	0	100	
L4A	94°	1000	1000	0	100	
L4B	274°	9333	9333	0	100	
L5	274°	13356	13356	0	100	
L6A	274°	15450	15450	0	100	
L6B	94°	1902	1902	0	100	
L7	274°	11777	12000	-223	101	Incoherence to the level of the theoretical length
L8	274°	10438	10375	63	99,40	
L9A	274°	4331	4370	-39	101	
L9B	94°	3000	3000	0	100	
L9C	94°	1000	1000	0	100	
L10A	274°	4440	4440	0	100	
L10B	94°	2914	2800	114	96,09	Léboulou river
L11A	274°	3700	3700	0	100	
L11B	94°	1683	1775	-92	105	
TOTAL		129415	129101	314	99,76	

The exam of the picture 2 shows that the Léboulou river only crosses two trails, notably the L10B trails and the L1B. One also notes that the theoretical length of the L7 trail revealed to the plan of poll doesn't correspond to the reality land, what is certainly due to the numeric supports used during the preparation of the poll plan, notably the topographic funds and the pictures satellites.

Indeed, because of a cloudy cover sometimes permanent in this zone, he/it arrives that the géo-référencement of some trails is not returned with accurateness; from where the gap notes 223m representative a parcel of sampling.

Thus, all as to the previous picture, on an estimable length of 129415m, 129101m have been achieved only, with a gap of 314m, representing a percentage of realization of 99,76%.

3.2. The works of numbering of regeneration of the D blocks and E.

The works of numbering of the regeneration of the two blocks showed that, the total number of the future stems for gases exploited by SICOFOR is of 17060 stems, with 3028 stems for the class of diameter 5-10 cm; 2513 for the class stems of diameter 10-19,9 cm; 11519 for the stems of whose diameter is consisted between 19,9 - 20 cm and 5164 for the stems of more than 20 cm of diameter.

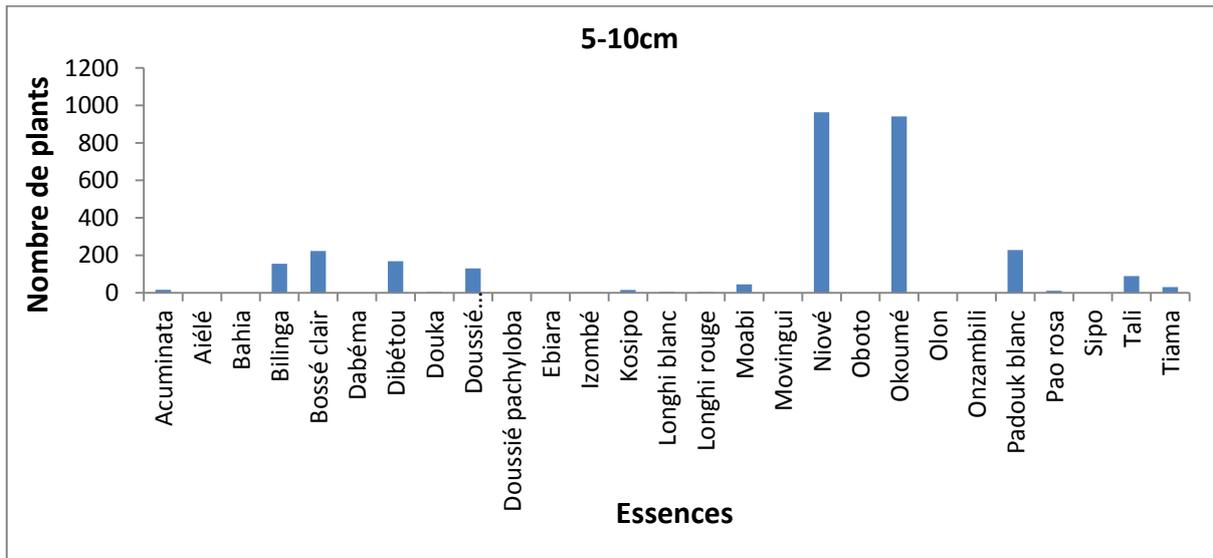
The commercial names of gases, the scientific names and families of the future stems sampled to the level of the two blocks of inventory are presented in the picture 3.

Picture 3: Commercial, scientific names and of families of the essences of the stems of future of the Gouongo UFE

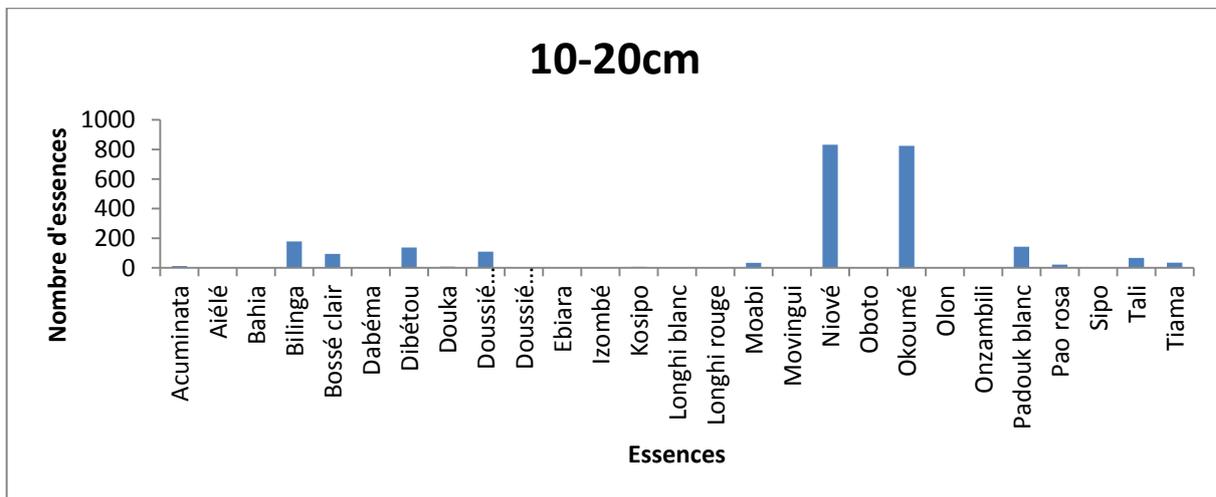
Gases (commercial Names)	Scientific names	Families
Okoumé	Aucoumea klaineana	Burseraceae
Niové	Staudtia kamerunensis var gaboninsis	Myristicaceae
Doussié bipendensis	Afzelia bipendensis	Caesalpinioideae
Bilinga	Nauclea diderrichii	Rubiaceae
Bossé clair	Guarea cedrata	Meliaceae
Padouk blanc	Pterocarpus mildbraedii	Fabaceae-Faboideae
Dibétou	Lovoa trichiloides	Meliaceae
Moabi	Baillonella toxisperma	Sapotaceae
Tali	Erythrophleum ivorensis	Fabaceae-Caesalpinioideae
Izombé	Testulea gabonensis	Ochnaceae
Kossipo	Entandrophragma candollei	Meliaceae
Pao rosa	Swartzia fistuloides	Caesalpinioideae
Longhi blanc	Gambeya africana	Sapotaceae
Douka	Trieghemella africana	Sapotaceae
Movingui	Distermonanthus benthamianus	Fabaceae-Caesalpinioideae
Tiama	Entandrophragma angolensis	Meliaceae
Acuminata	Entandrophragma congoensis	Meliaceae
Longhi rouge	Gambeya lacourtiana	Sapotaceae
Sipo	Entandrophragma utile	Meliaceae
Aiélé	Canarium schweinfurthii	Burseraceae
Bahia	Hallea stipulosa	Rubiaceae
Dabéma	Piptadenistrum africanum	Fabaceae-Mimosoideae
Olon	Zanthoxylum heitzii	Rutaceae
Ebiara	Berlinia bracteosa	Fabaceae-
Onzambili	Antrocaryon klaineanaum	Anacardiaceae
Doussié pachyloba	Afzelia pachyloba	Fabaceae-
Oboto	Mammea africana	Clusiaceae

One notes that on the twenty-seven (27) gases recorded two families are extensively predominant. It is about the meliaceae and the Fabaceae-Caesalpinioideae

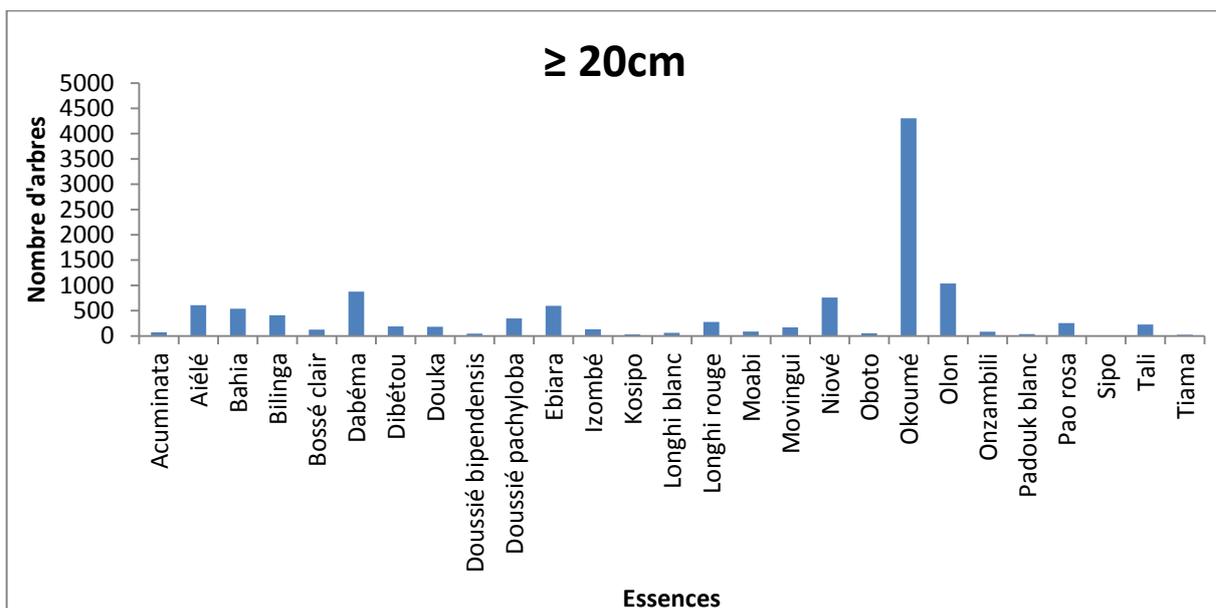
The The faces 3, 4 and 5 show the development of the future stems in generation in relation to the species and to the classes of diameter.



Face 3: Stage of development of gases in regeneration of the diameter class understood between 5 and 10 cm



Face 4: Stage of development of gases in regeneration of the diameter class understood between 10 and 20 cm



Face 5: Stage of development of gases in regeneration of the class of diameter superior to 20 cm.

The exam of the faces 3, 4 and 5 show that two gases that abound the two blocks exist submitted to the inventory.

One would think about a " forest in Okoumé" (Moutsamboté, 2005). The other gases exploited by the society are present but, with a very weak representativeness rate.

One also notes that in relation to the diameters, the class essences of diameter >20 cm, lend to take over in the future exploitation become more and more weak with the progression of the growth of gases.

The picture 4 indicates the pilot or commercial names, the total number of the stems by gas and their abundance.

Picture 4: Pilot names of gases with the total of the recorded stems and their abundance in percentage

Number of Gases	Total of gases	Abundance of it (%)
Acuminata	98	0,57
Aiélé	608	3,56
Bahia	538	3,15
Bilinga	742	4,35
Bossé clair	443	2,60
Dabéma	876	5,13
Dibétou	494	2,90
Douka	193	1,13
Doussié	286	1,68
Doussié	346	2,03
Ebiara	596	3,49
Izombé	135	0,79
Kosipo	50	0,29
Longhi blanc	71	0,42
Longhi rouge	281	1,65
Moabi	166	0,97
Movingui	170	1,00
Niové	2553	14,96
Oboto	52	0,30
Okoumé	6070	35,58
Olon	1037	6,08
Onzambili	85	0,50
Padouk blanc	406	2,38
Pao rosa	286	1,68
Sipo	8	0,05
Tali	381	2,23
Tiama	89	0,52
GENERAL TOTAL	17060	100

The picture 4 shows that on a total of the stems of future of 17130 of different classes of diameters, the regeneration of the future stems for the Okoumé is 35,58% against 14, 96% stems of Niové, followed of the stems of Olon that represent 6,08%.The picture 5

shows the different families and species exploited in the UFE.

Picture 5: Distribution of the different families of gases in exploited regeneration

N°	Families	Number of species
1	Achariaceae	1
2	Anacardiaceae	3
3	Annonaceae	3
4	Apocynaceae	2
5	Burseraceae	5
6	Cannabaceae	2
7	Clusiaceae	3
8	Euphorbiaceae	5
9	Fabaceae-Caesalpinioideae	14
10	Fabaceae-Faboideae	2
11	Fabaceae-Mimosoideae	7
12	Hymenocardiaceae	1
13	Irvingiaceae	3
14	Lecythidaceae	1
15	Loganiaceae	1
16	Malvaceae-Bombacoideae	1
17	Malvaceae-Sterculioideae	2
18	Meliaceae	9
19	Moraceae	3
20	Myristacaceae	4
21	Ochnaceae	1
22	Olacaceae	2
23	Passifloraceae	1
24	Phyllanthaceae	4
25	Putranjivaceae	1
26	Rubiaceae	5
27	Rutaceae	2
28	Salicaceae	1
29	Sapotaceae	6
30	Urticaceae	1
General total		96

The exam of the picture 5 shows that the number of the species and families of the most elevated stems of the zone are the one of Fabaceae-caesalpinioideae, followed from Meliaceae, of the Fabaceae-mimosoideae, the Sapotaceae, the Rubiaceae and the Euphorbiaceae.

4. DISCUSSION

Of the survey of the distribution of the future stems according to the stages of development of their diameters, watch that in the two E blocks and D numbers it of the trails varies.

The Lémogni river crosses five times the different trails of the D block whereas the Lé Boulou river only crosses two times the L10B trails and L1B with an obstacle of in the L7 trail of the E. block This block

contains 20 trails on the floor whereas the other account only 14. During the works of opening of the trails, one noted that the distance to browse was smaller 129415 m against 180731m foreseen in the D. block

The three levels of development stage show that the stems of third generation whose diameter is superior or equal to 20 cm that should represent the commercial future close to the population of the survey zone, decrease in insufficient quantity and would put a real problem of production very weak grumière to the second passage of the exploitation.

According to the recommendations of the O.I.B.T. (1990), the feasible yearly possibility must be the subject of a prudent evaluation if one doesn't have any reliable data on regeneration and the dynamics of growth of gases, notably with regard to the growth in diameter and the answer of the trees and soil to the effects of the exploitation.

The problem of forest reconstitution remains a report in the yards of forest production. Kouba (2010) and Kokolo (2012) underline that in the forest yards of production, the young stems of future of the exploitable gases had considerable damages for the second passage in relation to the weak strengths, it is why, to reconstitute a stock of wood being sufficient for a second passage would pose problems of gain of the enterprise in the more part of the forest societies.

By the way, the works of Lessebe (2013) show that on 100 young stems in regeneration to the hectare, only 5-10 young stems arrive at the age of maturity. The essences of the second group destinies potentially for the sawing and the provision of the local markets are more present in the already exploited parcels than the essences of the first group.

In relation to the distribution of gases in regeneration, Aubreville (1959) and Mensbrugge (1966) show that, the source of the spatial distribution of the species according to the diameter noted in forest, depends in particular on the fashion of dissemination of the seeds, the nature and the composition of fauna and flora that is often interdependent. To this subject, one mentions volontier the example of the forest elephant (*Loxodonta cyclotis*) that brings a major contribution to the dissemination of the big fruits.

To reduce the damages of the future stems in the forest is not the only criteria to determine the intensity of the exploitation. The distribution of the diameters of the highly commercial gases would also play an important role so that the withdrawal adapts to the resource (Whitmore, 1990).

This type of inventory practiced in our case is very important because, it permits to value the state of the forest resource and his/her/its availability to short and middle term in order to assure the everlastingness of the lumbering.

It is why, the Ministry in charge of the forests by the slant of the forest brigades of planning, must observe a particular attention on the dynamics of the regeneration of the most sought-after gases on the international market.

The regeneration of the future stems in the Congolese forests, especially in the massif of the Chaillu where one meets a number important of the species héliophiles, is permanent, because after slaughtering of a tree or a chablis, one notes a dynamics of regeneration auspicious to the evolution of the species being located to the level of the lower stratum.

However, the forest reconstitution in the forest yards with regard to the most sought-after gases on the international market is stationary in the exploited parcels.

The system of the Pilot Units of planning of Reforestation and agroforestry (UPARA) can contribute again a lot to attenuate the defaults noted in the renewal of gases the more valued; from where the necessity to put an unit of this type in place at the time of the follow-up of the plan of planning of the Gouongo UFE.

5. CONCLUSION

The Gouongo ufe situated to the South of Republic possesses an important biologic diversity and require a particular attention for a good management in view of a socioeconomic and environmental development of the survey zone.

To reach these results, we opened the trails in the two blocks submitted to the inventories before passing to the operations of regeneration numbering according to their stage of development.

The inventories carrying on the regeneration of gases exploited by the SICOFOR society in the goal to get the biggest possible information on the withdrawals to come during the second and third rotation showed that the young stems of diameter understood between 5-10cm, and those included between 10-20 cm present enormous potentiality.

On the other hand the stems having a diameter? 20cm, lend to take over in the exploitation future decrease as his/her/its diameter believes.

The results gotten, reveal that the Okoumé gas and Niovés are the most abundant whereas the other gases have weak enough strengths.

The family of the Fabaceae-Caesalpinioideae is more abundant in the UFE consistent Gouongo of the family of the Meliaceae.

To the look of that that precedes, the introduction of the lumbering methods to reduced impact (EFIR) could bring the viable solutions in order to preserve these young stems of future that die because of the damages due to the slaughtering of the big trees, to

the passage of the animals for the brood of the young stems after the exploitation.

These results show that the years futures, the society will only count with three main gases notably the Okoumé, the Niové and the Olon, one thinks about the pilot units of planning, reforestation and agroforestry (UPARA) by the intervention of the sylvan works, since the essences of diameter superior or equal to 20 cm would not support the costs bound at the lumbering because of the insufficient number of the stems to the scale surfacique therefore

This work can be used like a tool of lasting management of the forests, and would encourage the forest operators to stow itself/themselves with the requirements of the moment in order to arrive to the certification of the forest products of the basin of Congo on the world markets.

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