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Wasted Logs in Uncontrolled Chainsaw Milling in Mambasa Forest, Democratic Republic of Congo

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Abstract: ***Uncontrolled chainsaw milling generates enormous quantity of logging residues on logging's sites. This study focused on the top log or the part of the trunk before the first big branch. It estimates an average of 4.3 m^3 for wasted top log by felled tree. The main species logged in the region concern Entandrophrama spp, Milicia excelsa and Khaya Anthotheca. The diameter in middle of wasted log is inferior to the diameter of stump but there are not different in length of wasted log and the sawed log part. The loggers need to practice improvement techniques of quality of the trunk or put activities for recoverable and usable artisanal logging residues in community. This case of study applies to all actors of forest management in The Congo Basin Forest and suggests a rational valorisation of woody materials for a sustainable forest management.***

Keywords: Logging residues, Artisanal logging, Selective logging, Ituri tropical forest

1. Introduction

There are sustainability rules for forest logging in order to remove wood resource materials. However, there are still illegal practices observed especially in artisanal sector of forest logging in DR Congo [6]. Moreover, formal or industrial logging is not very developed in DR Congo. Currently, according to [4] the artisanal saw timber production estimate to 3.4 million m^3 is very superior to all wood products from industrial sector in DR Congo.

The deforestation and forest degradation are caused by an assembly of multiple factors [8]. And, while the essentials of reforms and discussions on the forest management politics focused on industrial sector. The importance of local's practices, often informal is generally reduced [4]. The direct and indirect impact of artisanal logging is generally disparaged, but not very documented.

The current practices in Mambasa forest is influenced by the market demand [4]. But also, the low coefficients of transformation for obtaining the saw timber, that cause a low utilization of raw materials. Until now, this hypothesis is not confirmed by none serious study in Ituri [5]. In Africa, forest researchers are not interesting with the study on logging residues. In Western Africa's country, logging residues may represent 50% to 100% of the annual log production [12]. The logs with size inferior to that required are always abandoned while they could help to produce other many small saw wood [1]. Contrary to industrial forest logging, at Mambasa, in the artisanal, the sawing is more often realized in situ by chainsaw.

The forest logging is one of particular tools for forest management in forest production. His direct or indirect impact on forest ecosystem must be evaluated, quantified and controlled [9]. [10] was founded a relationship between the low yield, the diameter and the height of the logs. This study estimates the volume, the diameter and length of wasted logs compare to the sawed log part.

2. Materials and Methods

2.1. Study Site description

The study was conducted on post logging sites in the Mambasa forest. Mambasa is the biggest territory of Ituri Province in the Northern of DR Congo, including in a large Ituri forest, extend near the Okapi Faunal Reserve. It covers 36.783 km^2 and extends between 1°21'31.8" and 1°22'1" N latitude and between 29°1'33.7" and 29°2'33" E longitude.

Mean annual rainfall is 1639 mm. Logging activities in the Ituri region are concentrated in the relatively drier-deciduous forests near the transition between closed canopy forest and eastern savanna woodlands. The forest at the savanna margin are also riche in high-value timber trees such *Khaya anthotheca*, *Entandrophragma* spp and *Milicia excelsa* (Welw.) C. Berg [11].

We have inspected 44 post logging sites included in Alimasi, Akawa, Tobola, Lokutau and Mambau villages located at Nduye and RN4 (4th National Road) Axis. (Fig.1).

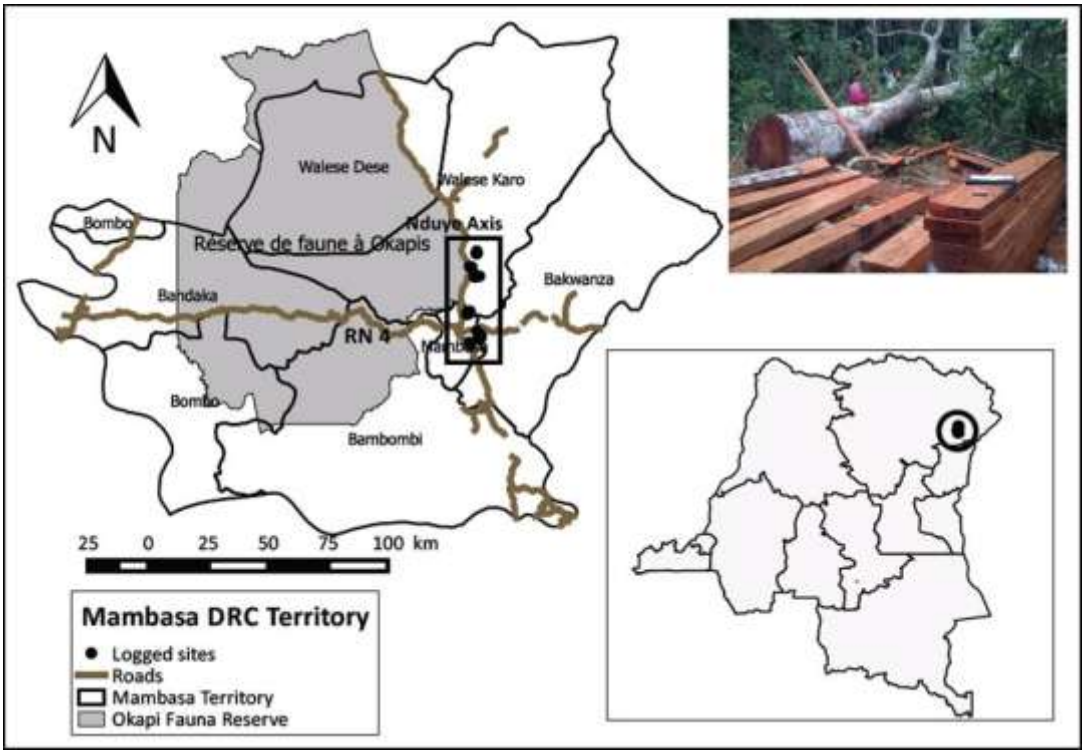

Figure 1: Map showing study zone and post logging sites

2.2. Data collection

To identify logging site, we were assisted by a guide who worked whit the loggers as a transporter of sawed timber from forest to road. For any site the scientific species wood name and local name of the stump or the felled tree was recorded. In the site, dendrometric parameters were measured. For dendrometric parameters, the diameter of stump, the diameter in middle of wasted log and length of wasted log before the first big branch were measured. For the sawed log part, this length represents the distance from stump to wasted log with branches (Fig.2).

Figure 2: Practice used to estimate length of sawed log part

2.3. Data analysis

A total of 53 wasted logs belong to 44 stumps were measured. With the measures taken as cited above, volume of each segment of wasted logs with a diameter > 50 cm as the minimum legal diameter recommended. The volume (V) of wasted log was calculated according to

Eq.1, $V=\frac{\pi D^2}{4} \; x \; L$ (Eq.1)

Where π represents 3.14; D is the diameter in middle of log and L is the length of log segment.

The volume of wasted logs was compared according to the wood species using the Kruskal wallis test, the diameter of stump was compared to the diameter of wasted log and the length of wasted log was compared to the length of sawed log part using non parried t-student test. R2.13.1 software was used for statistic treatments and graphs.

3. Results

Many wasted logs belong to the E*ntandrophrama spp* wood species. The volume of wasted log per tree felled is the same for all wood species (P = 0.2157). The main wasted logs have a volume between 3 m^3 and 6 m^3 (*Fig.3*).

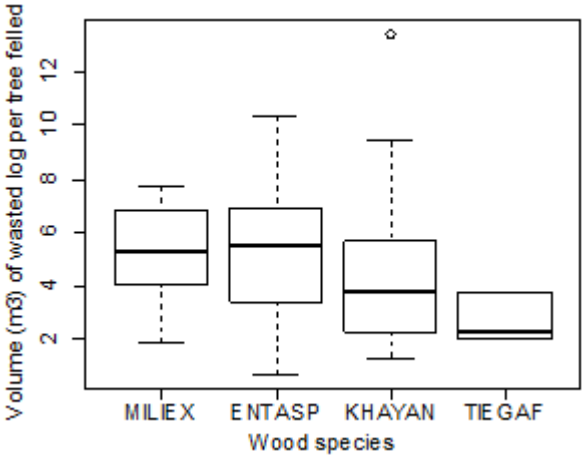

Figure 3: Volume of wasted logs by wood species (MILIEX=*Milicia excelsa*; ENTASP = *Entandrophrama*

spp; KYAYAH = *Khaya anthotheca*; TIEGAF= *Tieghemella Africana*)

The sizes of wasted logs in term of diameter and length (Fig.4 and Fig.5) demonstrate that, logger's looks generally for the big trees with big diameter.

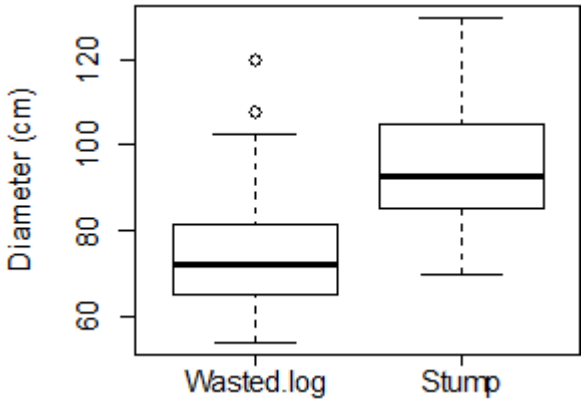

Figure 4: Diameter of wasted log compared to sawed log part

In spite that, the diameter of stump is superior to the diameter of wasted logs (P =1.163e-07) but the length of the wasted log and the sawed log part (Fig.5) are the same (P = 0.2732).

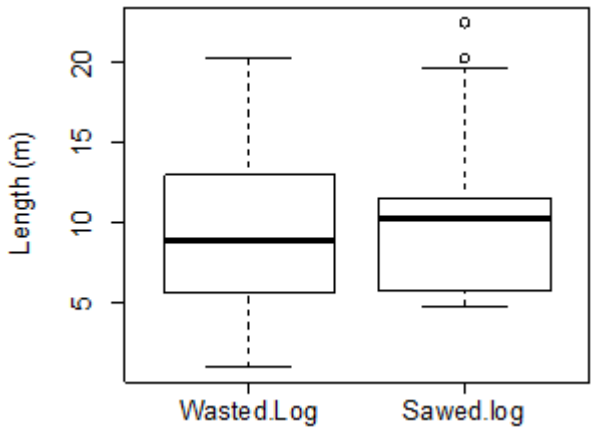

Figure 5: Length of wasted log compared to sawed log part

4. Discussion

In term of length, only the half of top log (trunk from stump to the first big branch) is sawed (Fig.5). In Ghana, the estimate average lumber recovery was about 64 %; artisanal forest logging sawed the same total wood volume with 23.75% of matter yield [3]. At Togo, total of wasted wood (plank and stem) represent about 90.5 % or 10.91 % of yield [10].

The loggers abandoned some logs in forest because of wood defects, tree damaged, tree deformations and market demand. According to [5], the foreign market, particularly the Kivu, Ouganda and Kenya Markets need the big pieces of "red wood" they may locally retransform to other semi-finished product. [1,12] reported other reasons as slit and bit created by tree felling, the distance to village and the abandon of the order by some partners, the poor practices of felling, the height of stump, ... An important quantity of valorous wood is lost when more big trees are felled within some obstacles on ground as hollow, crest, trunk or rock [9].

5. Conclusion

In uncontrolled chainsaw milling, there are not an optimize logging to valorise wood matter. Only a few species are logged and the transformation concerns the half total wood volume of the trunk. It is important to promote techniques in order to reduce wood residues generation. For a sustainable forest management, it is also necessary to increase the matter yield and not only transformed the trunk part. A rational valorisation of wood matter would reduce the number of trees logged and satisfy the meet demand.

6. Acknowledgement

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