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Opportunities and Challenges of Chainsaw Milling in the Congo Basin

Paolo Omar CERUTTI[1,2], Guillaume LESCUYER[1,3], Richard Eba'a Atyi[4], Edouard ESSIANE[1], Joachim NGUIEBOURI[1], Jean Pamphile ONDOUA[1]

[1]Center for International Forestry Research (CIFOR) – Central Africa Regional Office
[2]Australian National University (ANU)
[3]Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD)
[4]FORAF Project (EC), Kinshasa, DRC

Abstract

Over the last two decades, in the Congo Basin, the implementation of forest policy reforms has focussed on the regulation of large-scale logging concessions, while small-scale logging activities, carried out mostly with chainsaws, and sourcing the domestic or regional market, have been sidelined by official policy. As a consequence, chainsaw milling developed largely as an informal activity, has been poorly researched in recent decades, and its dynamics and impacts on rural livelihoods, as well as its timber production, remain largely unknown to concerned ministries and are not included in national and international statistics. We found that chainsaw milling, albeit largely informal and illegal, contributes about 1.2m cubic meters of processed products to the domestic markets of considered countries, which is equivalent to the production of the formal, large-scale, industrial forestry sector. Also, chainsaw milling has positive economic impacts on the livelihoods options of many thousands of citizens living in rural areas, with annual financial gains larger than €40m in Cameroon and Gabon. Nonetheless, because of its informal nature, chainsaw milling not only does not contribute to the formal revenues of the State, but also engender corrupt practices that contribute about €10m to the private gains of civil servants. The adoption of legal frameworks adapted to the current needs of the timber domestic market is a necessary (technical) first step towards the professionalisation and formalisation of the sector, but a clear (political) step by concerned governments towards the sanctioning of corrupt practices by civil servants is also badly needed.

Keywords: Central Africa, chainsaw milling, Congo Basin, domestic timber consumption, informal sector, timber.

Introduction

Forest management in the Congo Basin takes place in a context of widespread poverty. It is estimated that over 73% of people in the region are below the poverty line (de Wasseige *et al.* 2009), with the majority living in rural areas where the forest is predominant. Indeed, over the last two decades, forest policies have also been used as a powerful lever to try reducing poverty among the population, while contributing to the development of the States' economies and to the management of biodiversity.

All forestry codes in the region require a management plan to sustainably manage timber resources, primarily within large areas granted to industrial logging companies as long-term forest concessions, but also in protected areas such as national parks. Over the last decade, remarkable progress has been made in the field of forest management. All over the region, about 36.4 million ha have been allocated as 256 timber concessions, and from zero ha in 2000, the region had in 2008 over 11.3 million ha of forest concessions managed in accordance with officially approved management plans (de Wasseige *et al.* 2009). These forests are located in four countries: Cameroon, Congo, Gabon and CAR, but a major change is also underway in DRC, which represent the largest forest surface of the region. There, 65 concessions (about 9.7 million ha) that are presently only legally granted to logging companies, will have to develop management plans within four years, thus almost doubling the total managed surface of the region. Also forest certification has been evolving rapidly during the past three years. Starting from zero hectare at the beginning of 2006, FSC certified forest area amounted to about 4 million ha in 2010, divided among Cameroon (640,000 ha), Congo (2m ha) and Gabon (1.3 million ha).

In 2007, the formal, large-scale, industrial forestry sector in Central Africa produced nearly 8.4 million cubic meters of timber. Gabon, with nearly 3.4 million cubic meters is the largest producer, followed by Cameroon (about 2.3 million cubic meters). The smallest producer is DRC, with 310,000 cubic meters of formal timber production (de Wasseige *et al.* 2009). Unprocessed logs are, by volume, the most important type of products that the forest sector in Central Africa exports to international markets. Gabon has been for many years also the largest exporter of logs – nearly 53% of exported logs in 2007 – but its role is likely to change in the following years as a log-export ban has been adopted in January 2010. The second largest exported timber product is sawnwood. Cameroon, with a partial log-export ban adopted in 1999, is the largest exporter of sawnwood, mostly to the European Union.

Last in a long list of efforts to better regulate and manage forestry operations in the Congo Basin, the Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan of the EU was adopted in 2004, with the objective to guarantee that only timber of legal origin is imported into the EU market. In order to do so, bilateral trade agreements (Voluntary Partnership Agreements – VPAs) are negotiated and eventually signed between timber producing countries and the EU. In the region, Congo and Cameroon have already signed VPAs (in 2009 and 2010, respectively), and have thus committed to implement audited traceability systems in their forestry sectors.

There is no doubt, thus, that the forest legal frameworks in the Congo Basin improved a lot in recent decades, and that many processes focussing on the effective implementation of those frameworks produced positive impacts. Nonetheless, the vast majority of policy reforms targeted the large-scale, industrial, export-oriented forestry operations, while neglecting the small-scale, chainsaw timber production, which is mostly sold on the domestic timber markets but also exported to the regional one (Plouvier *et al.* 2002; Wunder 2003). Small-scale logging titles that authorise rural citizens to harvest few trees for their personal, non-commercial, needs, are indeed included in all the legal frameworks of the region, but they are generally not adapted to the current needs and dynamics of chainsaw logging, and they remain largely unused by chainsaw loggers. As a consequence of the neglect, and despite its importance, the domestic timber sector remains largely informal and its production, as well as its economic, ecological and social impacts, remains unknown to the national ministries and unaccounted for in national and international statistics.

In Cameroon, the amount of wood illegally harvested by individuals or small enterprises and mostly sold on the informal domestic market was roughly estimated at about 170,000 cubic meters (Round-Wood Equivalent, RWE) in 1993 (Lumet *et al.* 1993), then at about 250,000 cubic meters in 1996 (Enviro-Protect 1997) and at about 700,000 cubic meters RWE in 2000 (MINEFI 2000). Few years later, Plouvier *et al*. (2002) analysed several markets in Yaoundé and Douala and estimated the national production of chainsaw loggers at about 1 million cubic meters RWE, of which about 10% entered the official export market through the Port of Douala, and the rest (900,000 cubic meters RWE processed into about 300,000 cubic meters of sawn wood) was consumed locally. Although such recent estimates of the informal timber sector are not available in other countries of the region, several indications show that it is not negligible.

In Gabon, for instance, rural citizens still use 'family logging authorisations', albeit abolished by the 2001 forest code, to harvest and trade timber around their villages. If we add the fact that many people have been employed by the forestry sector as sawyers, fellers, prospectors, and have thus acquired the necessary skills, rural Gabon offers a large operational capability and availability of resources for the production of informal timber. The law allows small-scale operators to apply for legal logging authorisations, but the administration has been very slow to implement the granting of such titles, and only in mid-2009 the first requests were reviewed by the administration. But the use of these timber permits is still very poorly documented in rural areas, except for some case studies (e.g. Boevinger 2008). Overall, however, there is no data on the urban markets of timber, except the 2007 census of lumber yards in Libreville, the capital city, currently being updated.

In DRC, the management of forest resources is done in a socio-economic and political post-conflict situation, which makes it delicate and peculiar. The last decade, characterized by widespread insecurity, has prompted the vast majority of people to turn to subsistence and informal activities (Debroux *et al.* 2007). The forest sector is no exception to the rule, and the volume of logs produced by the informal sector is inherently difficult to quantify. Nonetheless, it is very important in DRC, as evidenced by the number of rafts that can be seen on the rivers, sawnwood planks that can be found in many markets, or logs cut by ax visible in Kinshasa. Djiré (2003) estimated that artisanal loggers produce between 1.5 and 2.4 million cubic meters, i.e. between 5 and 8 times the official industrial timber production.

In the Republic of Congo, the law allows for 'special permits' to be asked by small-scale loggers to exploit timber and non-timber forest products. In the case of timber, special permits allow the harvesting of 3 trees for domestic purposes and 5 trees for commercial one. The latter is issued only in areas where people face the difficulty of obtaining supplies of industrial scraps. The difficulty of acquiring this permit, however, especially in rural areas, push many operators to remain in the informal sector, against which the administration has established checkpoints and mobilised patrol teams. The informal timber market in Brazzaville seems to have declined considerably after the intensive activity observed in the early 90s (Ampolo 2005). However, except a few case studies carried out in the batéké highlands, no data at the national level confirm or refute this finding.

Overall, thus, given the lack of information on chainsaw milling in the Congo Basin, as well as on its social, economic, and ecological dynamics, it is imperative to conduct systematic studies for an effective reform of the forest sector. This is the objective of this paper, that shows the preliminary results of an on-going research started in 2008 in four Central African countries, namely Cameroon, the Republic of Congo, Democratic Republic of Congo and Gabon.

The next section briefly introduce the methods used for the research. Next, results are presented and discussed, while the last section concludes.

Methods

The informal use of timber in Central Africa takes various forms. It largely sources the national timber markets, thus meeting domestic demand, but it can partly be exported. In addition, concerned trade generally focuses on sawnwood but can at times include logs, as it may be the case in Gabon and DRC. We decided to focus our attention only on sawn products sold on domestic markets, which are sourced all over the region using both legally produced timber, such as scraps from industrial sawmills or regularly attributed small-scale logging titles, and illegally produced timber, such as the vast majority of the chainsaw production.

For this, a similar approach was adopted in the four countries, following a three steps approach. First, a weekly monitoring of a sample of outlets located in all districts of the main cities. The flow of wood sold and purchased in each counter is recorded in a comprehensive manner one day a week. They are then extrapolated to other days of the week, then to the total number of outlets selling timber in the concerned city. Second, a weekly monitoring (day and night) of timber flows entering the cities, following the same frequency and the same method of extrapolation. Third, surveys in the rural areas with informal sawyers, and within cities with timber sellers, to analyse their activities and quantify their costs and margins.

Table 1 summarizes the implementation of these surveys in four selected countries. Surveys started between March and November 2008 and are still on-going.

Table 1. Sampled cities and outlets

	Cameroon	Congo	Gabon	DRC
	Bertoua, Douala, Yaoundé, Limbe, Kumba	Brazzaville, Pointe Noire	Libreville	Kinshasa
# Outlets	882	127	210	200
# Outlets followed	177	77	30	20
# Supply routes followed			6	
# Surveys in rural areas	340		212	

Results and discussion

Harvesting and processing

In addition to tracking data on consumption of lumber in urban markets, about 550 surveys were conducted in rural Cameroon and Gabon to better appreciate the dynamics of upstream operations. In Cameroon, such surveys were conducted in 48 municipalities while they were administered in four departments bordering Libreville in Gabon.

In general, it appears that the operation is a profitable business. On average in Cameroon, profits for chainsaw loggers are about €11.8 per cubic meter, while operating costs are at about €33.8 per cubic meter of roundwood. The profit rate is about 35%. In Gabon, the profit is around €20.2 per cubic meter, with operating costs estimated at around €37.1 per cubic meter roundwood. The profit margin exceeds 50%. Given the total volume of sawnwood sold on the domestic market, the financial gain generated by the informal sector is estimated around €39m per year for Cameroon and €2.4m for Gabon.

It may be useful however to distinguish different modes of operation and / or marketing of sawnwood in rural areas. There exist, in fact, a significant difference between on the one hand, semi-professional sawyers moving out of urban centers with clear orders for timber species and products, and on the other hand, rural loggers in need of cash who harvest timber without a prior idea of their final customer.

If the difference between these two marketing methods is negligible in Gabon, it is very important in Cameroon. Semi-professionals loggers, with better equipment and especially good coverage in terms of financial needs and political sponsors, produce a financial margin of about €18.2 per cubic meter, while the margin of freelance rural sawyers tends to zero. The latter are frequently subjected to external pressures, including the seizure of all their wood, which reduces their average profits. In addition, many of these independent loggers are forced to continue their work to repay debts incurred during previous operations and because they have defaulted to sell their wood seized by the authorities.

All in all, chainsaw milling provides financial contributions to rural economies which are largely ignored. In fact, a number of costs incurred by sawyer in the locations where harvesting occurs, make up the largest part of the annual revenues of rural people living close to harvesting sites. In Cameroon, for example, almost 50% of the operating costs are made up of payments to the local workforce (e.g. help-sawyer, carriers, assistant prospector) while 7% of the total cost is the remuneration of the customary owner of the felled tree. In Gabon wages make up 55% of the total cost, although compensation to the customary owner lower than in Cameroon (Figure 1).

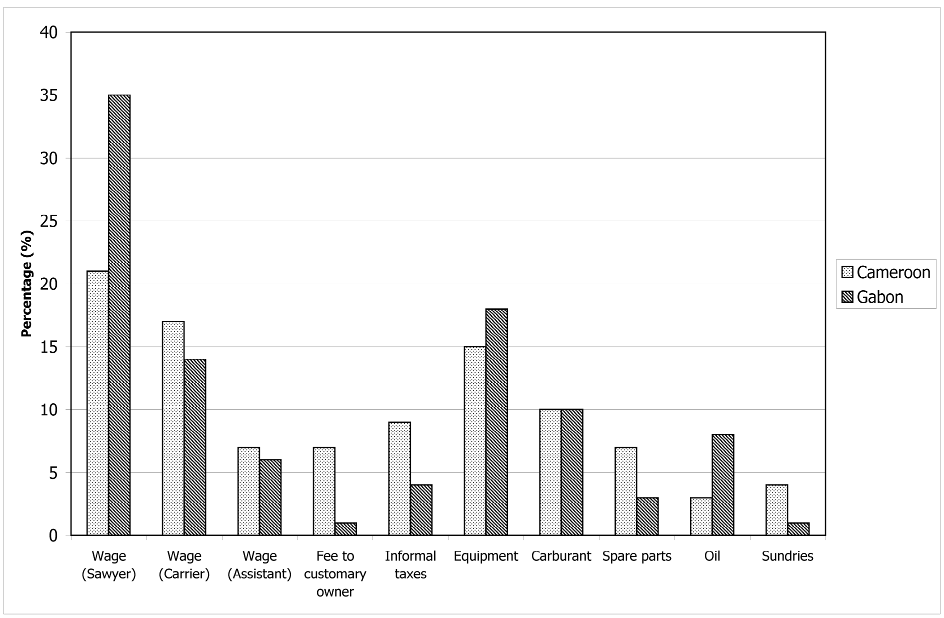

Figure 1. Costs of chainsaw millers (percentage of total costs)

The informal use of timber is a source of income also for actors outside the village economy, as government officials and local elites, mostly through informal payments required to allow the smooth development of activities by chainsaw loggers and timber sellers. These payments are on average about 4% of total operating cost in Gabon, and 9% in Cameroon (Figure 1). This may represent a small transaction cost for chainsaw millers, given the overall positive impact of harvesting activities on the village economies. However, informal payments may also be considered as revenue losses by the State, and if they are extrapolated to the overall volume of informal production, those losses results in about €10m in Cameroon and Gabon to €1.8m.

Indeed, when asked about the most important problems encountered in carrying out their activities, chainsaw millers and timber sellers list administrative harassment and abuses of power by various authorities on top of their lists (Table 2).

Table 2. List of problems reported by chainsaw millers and timber sellers

	Gabon	Cameroun
Administrative hassles	41%	71%
Technical (mechanical) problems	17%	13%
Difficulty in accessing a legal title	13%	10%
Abuse of power (businessmen, client, worker)	10%	41%
Lack of infrastructures	8%	11%
Relations with customary owners	5%	22%
Lack of capital	3%	7%
Rarity of the resource	2%	11%

There are roughly the same concerns in Cameroon and Gabon, ranging from technical issues to problems related to establishing effective trade networks. Importantly, Table 2 also shows that only a small fraction of interviewees (13 and 10 percent in Gabon and Cameroon) list the difficulty in accessing a legal title as a problem. Thus, not only the vast majority of chainsaw millers harvest without a legal title (in Cameroon, about 85% of all interviewees admit to have never used a legal timber authorisation during their career), but the lack of the latter is clearly not even a major concern for operators in both countries. This may indicate that, if one agrees to play by the rules of well established informal networks, illegal timber harvesting and laundering through official channels is not a very difficult task.

Timber sales

The estimates presented below for Cameroon and Gabon are based on 12 months data collection, while estimates for Congo and DRC are based on 6 months data collection extrapolated to the year.

In Cameroon, average annual sales, estimated over the period July 2008 – June 2009, total about 990,000 cubic meters of sawn timber. Total consumption is estimated at about 860,000 cubic meters, as about 130,000 cubic meters are sold from markets to other markets before reaching the final user. Timber sold is largely sourced from chainsaw milling operations in the forest. Nonetheless, about 27 percent of sold products is sourced from industrial sawmills, with varying degrees among cities. These data corroborate past estimates of industrial sourcing for the local market, which ranged between 10–40% (ONF-International *et al.* 2002; Plouvier *et al.* 2002).

Timber sold on the market and sourced directly from chainsaw milling operations in the Cameroonian's NPFD is thus estimated at about 662,000 cubic meters. This suggests a twofold increase from 2002 values (300,000 cubic meters of sawn timber) estimated by Plouvier *et al*. (2002) for the entire country. Most notably, domestic timber sales are larger than the industrial production and exports of sawn timber, which has been decreasing in recent years, from 580,000 cubic meters in 2008 to 360,000 cubic meters in 2009 (MINFOF 2008; 2009).

In Gabon, the amount of lumber consumed in Libreville is about 70,000 cubic meters per year. This estimate is supported both by figures of outlets' sales and by monitoring the flow of supplies to the city by roads and waterways. Compared to the total official industrial production, at about 3.3m cubic meters in 2007 (de Wasseige *et al.* 2009), the informal sector production remains more modest than in Cameroon. Yet it represents about 23 percent of the industrial production and exports of sawnwood, at about 300,000 cubic meters in 2007. Also, the ratio of timber consumption per habitant in Gabon (about 1.5m inhabitants) and in Cameroon (about 19m inhabitants) is very similar.

Preliminary data collected in the Republic of Congo show annual timber sales at about 78,000 cubic meters. Formal national production was about 1.3m cubic meters in 2007, with about 210,000 cubic meters of sawnwood exported. The small-scale, informal production thus represents about 35 percent of industrial production. The ratio of timber consumption per habitant in Congo (3.6m inhabitants) is about half those of Cameroon and Gabon.

Finally, preliminary estimates for the DRC show that the city of Kinshasa alone could consume a volume of informal sawnwood of about 350,000 cubic meters per year. Official figures show that industrial sawnwood exports amounted to about 30,000 cubic meters in 2007. Although official figures are notoriously incomplete in DRC, with much of the production and exports taking place in the East and North of the country only partially recorded by official statistics, collected data in Kinshasa show that the informal timber production may largely be above the formal one.

Overall, data show that chainsaw timber production, albeit largely informal and, often, illegal, in the Congo Basin is much more important than the attention given to it in the regulatory frameworks suggests. In Cameroon and the DRC, but also to a lesser extent in Gabon and Congo, its volumes and dynamics call for a renewed vision to be adopted on forest policies that, to date, put primary emphasis on regulation of the timber sector through control of large-scale, industrial, forest concessions.

The informal timber sector also provides thousands of jobs in the different countries considered. In Pointe Noire, Brazzaville and Libreville, approximately 1,000 people derive their income directly from timber sales, while in the cities sampled in Cameroon, about 4,000 people sell timber. These estimates only consider the last, and easiest to quantify, part of the chain that goes from harvesting to transport to selling. But they do not include the thousands of jobs provided in rural areas as harvesters, carriers, holders, and many other. In Cameroon alone, the total number of people employed by chainsaw milling is estimated at about 45,000, about 4 times the number of direct jobs provided by the industrial timber sector (MINEFI 2006).

Products, species and prices

Timber species required by the domestic markets are not fundamentally different from those produced by the industrial sector for the international market. In Congo, for example, bahia (*Mitragyna ciliata*), bilinga (*Nauclea diderrichii*), moabi (*Baillonnella toxisperma*), okoumé (*Aucoumea klaineana*), niové (*Staudtia kamerunensis*) and sapelli (*Entandrophragma cylindricum*) cover large part of total sales, while in Gabon okoumé is largely dominant. Overall, about 90 percent of sales concern products largely used for building and infrastructure, such as planks, formwork and rafters.

In Cameroon, where the longest and more complete time series are available, data show that planks alone represent about 41% of all timber sourced from chainsaw milling and about 56% of timber sourced from industrial scraps, while the five most harvested species cover about 70 percent of total sales. Ayous (*Triplochyton scleroxylon*) is the most used species (35 percent of total sales), followed by movingui (*Distemonanthus* *benthamianus*), iroko (*Milicia excelsa*), sapelli and bilinga. While the vast majority of ayous and bilinga is sourced from chainsaw milling, about half of all other species is sourced from industrial scraps.

Selling prices vary with the quality, type and origin of product, as well as the timber species. In Cameroon, average prices for planks and formworks of ayous (21% of total sales) reach about €26 and €24 per cubic meter RWE (Table 3).

Table 3. Selling prices of the most used products per species

A. Source	B. Product	C. Species	D. Sales (%)	E. Selling price (€/m3 RWE)	F. FOB price (€/m3 RWE 2009, Cameroon)	G. E/F (%)
Chainsaw milling	Plank	Ayous	4.7	26	140	18
	Formwork	Ayous	16.3	24	140	17

The prices of products sold on the domestic market (column E, Table 3) are on average about 80 percent lower for timber sourced from chainsaw milling than the FOB prices – linked to the international market – applied for the industry in Cameroon (columns F and G, Table 3). Several reasons may justify such differences. First and foremost, the quality of the final product required by the international market is higher, and specifications stricter. Also, domestic timber is not charged with formal taxes – stumpage, sawmill entry, export –, and production costs are thus lower than industrial ones. Prices may also be lower because there is much more competition on the domestic market, with thousands of chainsaw loggers able to source the market, than on the industrial one, where only a handful of logging companies specialise on few products and species. Also, access to timber is much cheaper for chainsaw loggers, as lack of information of customary owners vis-à-vis the industrial timber sector in particular and the international timber market more generally, makes it possible for chainsaw loggers to pay very low prices for valuable tree species.

Lack of information is certainly an advantage for both chainsaw loggers and timber traders, because it results in lower costs to access the resource, but it raises the issue of a precious resource being sold well below its average market value. This may increase waste and result in a sub-optimal use of the forest.

Conclusion

The role of chainsaw lumber production in the forestry sectors of the countries of the Congo Basin has generally been neglected by official policy and under-researched. Overall, there has been a trend for chainsaw, or small-scale, lumbering to develop in parallel with the industrial timber sector, although the lack of adapted legal frameworks and widespread vested interests forced it to develop as an informal activity.
As a consequence, data about the sector, as well as about its impacts on rural and national economies, are more often than not excluded from official statistics.

This paper argues there exist a lot of opportunities for chainsaw milling in the Congo Basin. Preliminary results show that the domestic timber market has been booming in recent years, with an overall annual production – about 1.2m cubic meters of processed products – similar to the industrial one, and important impacts on local economies, rural livelihoods, and governance.

The challenges ahead, however, in order to professionalise, formalise and improve the sector's contribution to the formal national economies, are many. Results show that public policies and national strategies have not been developed to drive the sector through a formal, transparent, and equitable growth, forcing thousands of people to produce and sell illegal timber, because of the lack of a legal framework where to develop their activities, and also because many vested interests challenge the development of a national formal timber market.

The development of long-term strategies, thus, as well as public policies concerned with the domestic timber sector are badly needed all over the Congo Basin. First and foremost, they should aim at improving the working environment of chainsaw loggers, with the development of *ad hoc* legal frameworks adapted more on the needs of local actors than those of the central administrations. In that sense, the adoption and decentralised distribution of logging authorisations is a necessary first step. Second, reform should aim at professionalising chainsaw millers, while concurrently providing workable incentive schemes for civil servants, in order to decrease current corrupt practices. Coupled with incentive schemes, though, an effort is also urgently required by the concerned governments to issue and implement effective sanctions for civil servants that participate in corrupt practices, in order for the overall governance of the sector to be improved.

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Bibliography

Ampolo, N. A. (2005). La transformation artisanale des bois tropicaux : cas des scieries artisanales au Congo Brazzaville. Ecole Nationale du Génie Rural, des Eaux et Forêts (ENGREF). Montpellier, France. Mémoire de fin d'étude.

Boevinger, S. (2008). Etude de marché et potentiel de développement de l'exploitation artisanale du bois dans le contexte de la mise en place des forêts communautaires pilotes dans le Nord-Est du Gabon. Faculté universitaire des sciences agronomiques de Gembloux. Gembloux, Belgium. Mémoire de fin d'étude.

de Wasseige, C., D. Devers, P. de Marcken, R. Eba'a Atyi, R. Nasi and P. Mayaux, Eds. (2009). Les Forêts du Bassin du Congo – Etat des Forêts 2008, Office des publications de l'Union européenne.

Debroux, L., G. Topa, D. Kaimowitz, A. Karsenty and T. Hart (2007). Forests in post-conflict Democratic Republic of Congo. Bogor, Indonesia, Center for International Forestry Research (CIFOR).

Djiré, A. (2003). Le secteur informel du bois d'œuvre. Rapport d'appui à la revue du secteur forestier en RDC - Rapport technique. Montpellier, France, Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD).

Enviro-Protect (1997). Illegal logging and timber trade in Cameroon: background and consequences. Yaoundé, Cameroon, Enviro-Protect.

Lumet, F., E. Forni, D. Laurent and H. F. Maitre (1993). Etude des modalites d'exploitation du bois en liaison avec une gestion durable des forets tropicales humides - Quatrième et dernière Etude de Cas: Le Cameroun. Nogent-sur-Marne, France, CIRAD-Foret (ex CTFT).

MINEFI (2000). Audit économique et financier du secteur forestier au Cameroun - Rapport final - Février 2000. Yaoundé, Cameroon, Ministère de l'Économie et des Finances (MINEFI).

MINEFI (2006). Audit économique et financier du secteur forestier au Cameroun - Draft n°1 - Août 2006. Yaoundé, Cameroun, Ministère de l'Économie et des Finances (MINEFI).

MINFOF (2008). Rapport d'activites de specification des produits forestiers au port de Douala. Douala, Cameroon, Ministry of Forests and Fauna.

MINFOF (2009). Rapport d'activites de specification des produits forestiers au port de Douala. Douala, Cameroon, Ministry of Forests and Fauna.

ONF-International, ERE-Développement and CERNA (2002). Etude en vue de la définition d'une politique sectorielle de transformation et de valorisation du bois au Cameroun. Yaoundé, Cameroon, Ministry of Environment and Forests.

Plouvier, D., R. Eba'a Atyi, T. Fouda, R. Oyono and R. Djeukam (2002). Etude du sous-sector sciage artisanal au Cameroun. Yaoundé, Cameroon, Ministry of Environment and Forests.

Wunder, S. (2003). Oil Wealth and the Fate of the Forest. London and New York, Routledge.