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Abbreviations

DGF  Direction Générale des Forêts
DGM  Direction Générale de Migration
DGRAD  Direction Générale des Recettes Administratives, judiciaires et Domaniales et de participation
DRC  Democratic Republic of Congo
FFN  Fonds Forestier National
FIB  Fédération des Industriels du Bois en RDC
MECNT  Ministère de l’Environnement, Conservation de la Nature et du Tourisme
MONUSCO  United Nations Organization Stabilization Mission in the Democratic Republic of Congo
NGO  Non-Governmental Organisation
PCA  Permis de Coupe Artisanale / Small-scale Logging Permit
RWE  Roundwood Equivalent
VPA  Voluntary Partnership Agreement (FLEGT Action Plan)
Acknowledgements

We would like to thank the 40 interviewers who collected the data under difficult and at times dangerous conditions in the provinces of Kinshasa, Bas Congo, Bandundu, Orientale and Nord-Kivu. We are especially grateful to Noël Kabuyaya and Evelyne Malenge, who supervised the survey in and around Kinshasa.

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Last, we wish to express our gratitude to the European Union which funded our research through the PRO-Formal project (Policy and Regulatory Options to recognise and better integrate the domestic timber sector in tropical countries, EuropeAid/ENV/2010-242904/TPS) in order to describe the small-scale chainsaw milling sector in the Democratic Republic of Congo and reflect on ways and means to regulate and formalise it.

Notwithstanding the many partnerships and the support we received, the views expressed in this document are those of the authors alone and do not in any way reflect the official position of the European Union or CIFOR.
In recent years there has been a heated debate on small-scale timber production in the Democratic Republic of Congo (DRC), which seems to identify such activities with a massive misappropriation of artisanal logging permits by big industrial companies, especially in the Bandundu province. But not all such timber production is illegal over the entire national territory, as there exist thousands of individual small-scale chainsaw millers who supply timber products to the domestic market and to neighbouring countries. This sector is largely informal because of legal loopholes and the dubious process for granting permis de coupe artisanale (PCA), small-scale logging permits, especially in the Orientale province.

To assess the size of this sector, a year-long survey was undertaken to monitor domestic timber markets in Kinshasa and Kisangani, and the main passage points for timber entering and leaving Kinshasa, Kisangani and six cities in the east of the country. Altogether we visited 22 ‘territories’ (administrative units) and spoke with 477 chainsaw millers about their way of working and their relations with the other operators of the timber trade.

The surveys showed a substantial increase in small-scale timber production in DRC during the last 15 years. The national annual production now exceeds a million cubic metres of chainsaw timber of which 85% is for the domestic market (see diagram hereunder). The diagram also shows the part (about 112,000 cubic meters) that is exported to the neighbouring countries.

Assuming that the official statistics on industrial timber production are reliable, chainsaw timber production – estimated at 3.4 million m³ per year in Roundwood Equivalents (RWE) – is 13 times more than all the timber produced in the formal sector in DRC. Similarly, at present there is 10 times more chainsaw timber than industrial timber, including the exported chainsaw timber and the industrial scrap consumed in Kinshasa. The volume of small-scale timber production is estimated to be twice as much as it was 20 years ago. The explanation can be traced to the urban population growth and the relative increase in the purchasing power of certain urban classes.

The domestic markets in Kinshasa and in eastern DRC that we monitored generate sales of over US$100 million per year and an annual profit estimated at US$25 million, excluding the profit from the related indirect activities. In the zone
of the market systems. On the other hand in the Orientale province, chainsaw millers who have felling permits are finding it difficult to earn a livelihood because of their expensive permits and their inextricable debt to their ‘patron’. The administration collects about 10% of the net revenue generated by this sector, excluding several taxes which we were unable to estimate for lack of data (VAT and other taxes). Furthermore, since part of the taxes is paid directly to the government representatives, it never reaches the State coffers.

Small-scale chainsaw milling is creating numerous jobs. Our survey shows that about 2000 direct permanent jobs were created in Bas Congo and Bandundu and about 3000 in the Orientale province and in Nord-Kivu. If we add other forest provinces like Équateur, Maniema and Sud-Kivu, the number of rural jobs stemming from the development of small-scale chainsaw milling would be about 7000 people.

The number of jobs created upstream in the sector should be expanded to include jobs connected to the sale of sawn timber on the domestic market. About 2900 permanent jobs and 6500 temporary jobs were created for Kinshasa and Kisangani alone. Looking at the national level, this sector offers at least double the estimated figure for Kinshasa and Kisangani.

By combining the rural and urban zones, the small-scale chainsaw milling sector accounts for at least 25 000 direct jobs in DRC.

Different species are sold in different areas covered by the study. *Entandrophragma spp.* (sapelli, sipo, kosipo) is abundant on all the markets, together with the following:

- iroko (*Milicia excelsa*), limbal/fraké (*Terminalia superba*), and tola (*Prioria balsamiferum*) in the Kinshasa area;
- noble species such as acajou/linzo (*Khaya anthotheca*) and afrormosia/mogoya (*Pericopsis elata*) at Kisangani and for the Ugandan and Rwandan markets;
- eucalyptus (*Eucalyptus spp.*) in the cities in eastern DRC where the substantial consumption can be explained by the presence of old plantations that have been taken over by chainsaw millers.
In each case, the bulk of the chainsaw production is composed of fewer than five species.

Since large-diameter trees were selected, the average volume of the chainsaw timber on the felling sites was rather high – between 3.4 and 5.7 m$^3$ per tree. With a processing rate of about 30%, the volume per tree was between 10 and 17 m$^3$. As a comparison, the government delivers industrial logging permits, and calculates the related taxes on an average estimated volume of 8 m$^3$ per tree for sapelli. The fact that small operators look for large-diameter trees indicates that such trees are still available in the study zones and that the younger, smaller trees are probably left standing. Similarly, the small number of trees felled by the chainsaw millers probably does not endanger the forest, although it could contribute to decreasing the economic value of the forest by degrading it and making the scarce noble species even scarcer.

The decision to specialise in a small number of species and select trees with large diameters often forces the chainsaw millers to select trees that are rather far from the access roads, up to 3 kilometres in the Orientale province. It is difficult to calculate the maximum distance over which the chainsaw millers and their teams can transport the timber without jeopardising their profits. They still have some leeway – especially near Kinshasa since the distance is reasonable – but in the medium- or long-term they will probably select trees with smaller diameters and/or other tree species that are closer to the access roads.

Considering its volumetric and economic prominence, small-scale chainsaw milling is vital to ensuring sustainable, legal forest management in DRC. With reference to results reported and the outcome of the consultation workshops with partners, four lines of actions are being considered to improve regulations and ensure the sustainability of this activity. First of all, there is consensual agreement that the Congolese regulations on small-scale timber production are incomplete and often contradictory. Legal reforms are needed but would not be sufficient to better regulate this sector. Second, ways and means are being considered to improve the implementation of the regulations, starting with efforts in the short- or medium-term to change the behaviour of the actors, especially the civil servants. Third, several types of support could be provided immediately to the small-scale operators to improve their practices and their impact on the national economy. Fourth, several actions are being considered to improve the commercialisation of legally produced timber on the domestic markets.

These strategies have been set out in technical and political options. We have classified the options according to their practicality and reliability, and have given preference to actions that can be implemented rapidly and can be effective in the short- or medium-term future rather than basic reforms that often embrace more than just the forestry sector and require more time. Considering the present situation in DRC, we preferred focusing our recommendations on improvements to current practices, with a view to identifying and then testing good practices that could subsequently be used in revising the law and public policy.

**Technical options**

1. Develop channels of information in rural areas on the state of the domestic markets for chainsaw timber.
2. Offer technical, commercial and financial training adapted to the needs of the (1) existing professional associations and/or (2) chainsaw millers who would like to work as individual operators, especially young people in the rural areas.
3. Facilitate access to credit for small-scale chainsaw millers, especially in the Orientale province.
4. Facilitate access to sawing equipment and consumables for chainsaw millers.
5. File applications for PCAs (small-scale logging permits) with the most decentralised State environment service.
6. In each village engaged in the sector, enrol the support of the formal (local committee) or the informal (clan chief, etc.) community institutions as contacts for the chainsaw millers, but remain accountable to the community and government levels. If the village does not have this type of institution, create a local management committee with the same attributions.
7. Draw up and then popularise a model for the preparation of simplified social provisions for the small-scale chainsaw millers.
8. Convince the government forestry services to keep official records of the volumes of timber sold on the national markets.

9. Introduce a national monitoring system for the PCAs issued in the provinces.

**Political options**

1. Strictly apply the current regulations on the PCAs and stop issuing them to industrial enterprises.

2. Guarantee that public procurement policies and contracts connected to funding from international sources are supplied with chainsaw timber that has been sawn, transported and processed according to legal standards.

3. Promote professional associations for chainsaw millers and thereby better protect their common interests. Professional structures should help the individual chainsaw millers regularise their situation and facilitate their access to training and credit, but not condition such access.

4. Encourage industry to sell its products on the Kinshasa market, especially in the niche market that is not covered by the chainsaw millers.

5. Harmonise, consolidate and popularise the fiscal system that is applicable to the small-scale timber operations. A clear explanation of the taxation system should lead to lower financial costs for issuing permits which are prohibitively expensive and keep the ‘legal’ chainsaw millers in an escalating spiral of debt.

6. Amend the legislation on small-scale chainsaw milling:
   a. specify which authority is empowered to issue the PCAs by amending Order No. 11 of 12 April 2007 and reinstating authority established in Order No. 35 of 5 October 2006;
   b. prepare *cahiers des charges* and simplified procedures to regulate relations between the rural populations and the chainsaw millers;
   c. authorise a one-time 1-year extension of the PCAs;
   d. draw up simple rules for sustainable management of the areas given to small-scale logging, in particular by using the exploitable volume of timber rather than land area as the basis for the PCA.

7. Consider creating a semi-industrial logging title that includes a mandatory sustainable resources management clause.

8. Increase control of the legality of chainsaw millers’ practices through the following five measures combined: (1) pay an appropriate salary to the government employees in the field; (2) mete out effective sanctions for misdemeanours and offences committed by representatives of the decentralised State offices; (3) simplify and broadly publicise the applicable regulations and tax information; (4) introduce a performance bonus for State agents, linked to the application of the law; (5) delegate certain specific control obligations to external actors such as chiefdoms (*chéfetteries*), NGOs and forestry enterprises.

9. Ensure complementarity between national regulations and provincial regulations from the angle of subsidiarity and decentralisation.
Since early 2008, the Center for International Forestry Research (CIFOR) has been studying the domestic timber sector in Cameroon, Gabon, Republic of Congo (Brazzaville, Pointe-Noire), Democratic Republic of Congo, and Central African Republic (Bangui), together with partners based in these countries. Funding to conduct research at the subregional level was granted mainly by the European Union, the Netherlands International Cooperation Agency, FAO and the French Development Agency.

We decided to conduct parallel research on the domestic timber sector in several countries in the Congo Basin for several reasons. First, very little information is available on this sector, which is still largely informal, despite growing demand for its products in urban areas. In all the study countries, this sector produces a sizeable share of the timber production, sometimes even more than the official sector. Second, all five countries have committed to work with the European Union’s FLEGT Action Plan which, through the negotiation of a Voluntary Partnership Agreement (VPA), should guarantee the legality of all products from forestry operations in the short- or medium-term future. Congo and Cameroon have already signed a VPA in which they commit to the legality of all products sold on the national market. The DRC and Gabon are still negotiating but will probably, like the others, decide to include domestic production in the VPA. On the other hand, CAR has already signed its VPA but decided that the first phase of the agreement would not include the domestic market. Last, these countries have similar forestry codes and policies, and the local populations use the lands and forest resources in a similar manner, thus giving relevance to comparisons of chainsaw milling operations at the subregional level.

What is meant by ‘domestic timber sector’? Although the dichotomy between domestic and industrial timber sometimes fades – industrial scrap is sold on the national market and timber produced by chainsaw operators is sold on the international market – the two sectors present clear boundaries which can be used to make a distinction between them (Table 1).

The whole small-scale timber sector is marked by informal practices, from the felling of trees to the selling of chainsaw timber. Although informal methods do not fully respect all the national regulations, they do not necessarily break the law either. That is why we prefer the word ‘informal’ to ‘illegal’. The activities of most of the chainsaw millers could be covered by a small-scale felling.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Artisanal</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felling permit</td>
<td>No (or rarely)</td>
<td>Yes (concession, community forest,… )</td>
</tr>
<tr>
<td>Felling and processing techniques</td>
<td>Chainsaw (sometimes portable saw) for felling and processing in the forest; small number of trees per operation</td>
<td>Heavy equipment, often in the annual allowable cut areas (assiettes annuelles de coupe); large number of trees per operation; processed in processing plant</td>
</tr>
<tr>
<td>Sales</td>
<td>Lower-quality chainsaw timber for national market and neighbouring countries</td>
<td>Logs, chainsaw timber, veneer, plywood, wooden floors, almost exclusively for export</td>
</tr>
<tr>
<td>Taxes and regulations</td>
<td>Mainly informal</td>
<td>Mainly formal</td>
</tr>
</tbody>
</table>
permit but, for various reasons that we will try to explain, the chainsaw millers do not apply for such permits; they prefer to continue operating in the informal economy. The main purpose of this report, therefore, is to explain how the small-scale, artisanal logging sector functions as part of a broader effort to contribute to finding ways to make it legal and secure.

In response to this situation, in 2011 CIFOR published three papers describing small-scale chainsaw milling in Cameroon\(^1\), Gabon\(^2\), and Republic of Congo\(^3\), which are being rounded out in 2014 by a description of the situation in Central African Republic\(^4\) and in the Democratic Republic of Congo. We hope that this research will contribute to improving forest policies at the national and subregional levels by giving this activity, undervalued and all too often criminalised, the position it deserves.

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1.1. Recent changes in DRC forestry policy

With an estimated 155 million hectares of forests (MECNT and WRI 2009) of which two-thirds are rainforest, the Democratic Republic of Congo (DRC) is home to close to half the tropical rainforests of Africa. Early in the 2000s, with a gradual return to peace, DRC undertook a vast political, economic and institutional reform programme that especially focused on the forest (Debroux et al. 2007). In response to pressure from certain international donors (Trefon 2006), a forest code was adopted through Law No. 11/2002 of 29 August 2002 to encourage sustainable resources management and to increase the contributions of the forests to the country’s economic, social and cultural progress. The development of forest concessions was one of the main goals of these new regulations. A special effort was made to demarcate the permanent production forests, but logging contracts for these lands have been subjected to a quota since 2002 when the decision was taken to stop awarding new permits. This moratorium, which was only partly applied, was further developed in 2005 with the publication of a decree on the terms and conditions for converting forest permits into forest concession contracts: 156 permit holders applied for the conversion of a total of 22 million hectares. In early 2011, 80 of the permits were declared ‘convertible’ and covered an ‘administrative’ land area of 12 million hectares. In 2013, 68 permits were being used on close to 10 million hectares (FIB 2013).

Before receiving a forest concession contract, the permit holder had to submit a 4-year development plan (plan de gestion). During that period, the holder has to develop a Management Plan (Plan d’Aménagement), and sign a cahier des charges with the government that defines the terms and conditions of the logging operations and certain socio-environmental conditions. The permit holder also had to sign an agreement with the local communities on the introduction of certain socio-economic measures. In August 2011, since many enterprises were unable to prepare a management plan in a reasonable length of time, the Minister in charge of Forests decided that the social cahiers des charges could be used as the starting point for the procedure leading up to the forest concession contracts. In May 2012, 48 forest concession contracts were signed but only 17 provisional development plans and about 60 cahiers des charges were transmitted to the Ministry of Environment, Nature Conservation and Tourism (MECNT). In 2013 a small number of Management Plans were sent to the MECNT to be read, amended and/or validated.

Besides the cahiers des charges, the Forest Code introduced another major innovation by strengthening the role of the local populations in preparing and carrying out sustainable forest management (Trefon 2008, Van Acker 2013), for instance by recognising the traditional user rights of the riparian communities within the production forests and proposing the local community forest concept.

Together with the new legal framework the DRC government undertook two international processes connected to the sustainable use of forest resources. First, DRC officially appealed to the European Commission in 2010 to start negotiations for a Voluntary Partnership Agreement (VPA). In October 2010, a ‘joint statement by DRC and EU on the opening of negotiations to conclude a VPA in order to fight against illegal exploitation and trade in Congolese wood through the FLEGT action plan’ was signed. This agreement covers both industrial and artisanal timber production as well as timber for the domestic market.
Second, DRC is relatively far along in preparing a Reduced Emissions from Deforestation and Forest Degradation (REDD+) strategy (Mpoyi et al. 2013). According to the estimates by Ernst et al. (2012), DRC has the highest annual deforestation and forest degradation rate in Central Africa. The rate doubled between 1990-2000 and 2000-2005. The net deforestation rate at present is about 0.22%, the net degradation rate is estimated at 0.12%. Industrial timber production is often cited as a cause of deforestation and forest degradation (Van Acker 2013) especially in the primary forests (Zhuravleva et al. 2013). Furthermore, forest road construction has been accelerated since new forest concessions have been awarded (Laporte et al. 2007). But deforestation and forest degradation are the product of a complex combination of multisectoral factors. Most of the reforms and discussions on forest policy focus on the industrial sector, with less attention being given to the importance of the local, often informal practices, because they are less well documented. This especially applies to small-scale timber production.

1.2. The industrial sector, the ‘artistriel’ sector and the artisanal sector

Industrial timber production is not highly developed in DRC, especially when compared to the other producer countries in the Congo Basin: the official wood production figure has never exceeded 400,000 m³, nearly all cut into logs for the export market. According to the Office Congolais de Contrôle industrial timber exports amounted to 36,000 m³ in 2011 (REM 2013) while the International Tropical Timber Organisation (ITTO) gave a volume estimate of 62,000 m³ for that same year.

Despite the low production volume, the industrial sector is essential to the advancement of sustainable forest management. It develops large forest areas that are generally isolated, responds at least partly to local demand and contributes to the development of infrastructure in the rural areas. This sector also generates tax revenue for the State which is easy to collect since it is based mainly on the land area under production and the export volumes (Debroux et al. 2007).

Because of these constraints, it is difficult for certain enterprises, whose technical and financial capacity places them in the industrial sector, to adopt sustainable practices in their forest concessions. For the last few years, several of these companies have illegally obtained PCAs which are normally reserved for individual Congolese operators. They are called ‘artistriel companies’ and nearly always produce logs for the export market that transit through Kinshasa. This usurpation of the PCAs by industrial enterprises is most common in the regions near Kinshasa like Bandundu where studies have been made recently (Greenpeace 2012, 2013; Global Witness 2012) and where the ecological, socio-economic and institutional effects are very negative. This fraudulent use of the PCAs is limited to a small area and, considering the results presented in this report, should not be extrapolated or assimilated to the small-scale timber production at the national level.

On the other hand, it is essential to distinguish between the fraudulent use of the PCAs by the ‘artistriel’ enterprises and the artisanal chainsaw milling by individual operators who mainly supply the domestic market. Any amalgamation of these two types of operators could lead to an overall suspension of the PCAs, which would be very detrimental to the real small-scale millers. Similar abuses were observed in Cameroon in 1999 when criticism of the illegal use of certain small-scale permits by industrial companies persuaded the Ministry to suspend all small-scale permits, thus forcing the chainsaw millers to adopt illegal processes for several years (Cerutti and Tacconi 2008).

This report focuses on the real small-scale milling sector, not the illegal use of PCAs by industrial companies in the Bandundu region. Artisanal timber production is defined as a series of operations carried out, with or without permits, by individual small-scale millers (Photo 1) whose main purpose is to supply sawnwood to the domestic market (Benneker et al. 2012). This sector, which mainly operates in forests near access routes and provides jobs and income to its rural workers, offers inexpensive products to the urban consumer and thus is complementary to the industrial sector.
The domestic market for small-scale chainsaw milling in the Democratic Republic of Congo

The methods used in small-scale chainsaw milling at the national level in DRC are not fully understood (Debroux et al. 2007). In the early 1990s, the study by Gerkens et al. (1991) showed that the production of timber in the informal sector (525 000 m³/yr) was far greater than in the industrial sector (132 000 m³/yr), but this study is more than 20 years old. More recently, Djiré (2003) studied 103 timber outlets in Kinshasa, Matadi and Boma and estimated the production from the informal sector at 1.5-2.4 million m³ of chainsaw timber per annum. But the sample in their study was not large enough or long enough to produce a representative estimate of the national production from this sector. Many field studies have been criticised for the same reason, especially in Orientale province (Nkoy Elela 2007, Abdala et al. 2010, Begaa Yendjogi 2012), where credible data were collected but over too small an area or for too short a period of time to be extrapolated.

Mbembé et al. (2009) focused on the Kinshasa market and estimated annual consumption of chainsaw timber in the capital at 68 000 m³ but the survey protocol was incomplete. The survey was only carried out on three timber transit points and only during the daytime. A more recent report that applied data extrapolated from the Mbembé et al. (2009) study to the national scene estimated that small-scale chainsaw milling accounted for 90% of the forest operations in DRC (Lawson 2014). There are other sources that estimate the importance of small-scale milling at the national level but do not indicate their sources or explain their calculations. Pourtier (2008) wrote that DRC produced about 2 million m³ of timber, mainly to supply the domestic market. Others were more optimistic: Durrieu de Madron et al. (2012) and REM (2012a) estimated production at 4 million m³ per year.

In October 2012, the MECNT announced its intention to introduce regulations to make the small-scale timber production sector more efficient. We hope that the figures collected over several months in a large sample of cities and provinces (Lescuyer et al. 2012) will contribute to this work by facilitating the identification of creditworthy political and technical options for improving regulations for the artisanal timber production sector. Section 2 provides a brief overview of the current legislation on the small-scale timber production sector in DRC, with its weaknesses and contradictions. Section 3 describes the survey and analytical methods used in this report. Section 4 presents and discusses the upstream and downstream results and the last section sets out to a list of technical and political options for the promotion and regulation of the small-scale timber production sector.

Photo 1. A team of chainsaw millers (Photo: G. Lescuyer)
Forest management in DRC was governed by a colonial decree of 11 April 1949 until Law No. 11/2002 of 29 August 2002, or Forest Code, entered into force. The new Code was innovative by providing for access of local communities to forest resources, ownership of trees located around the villages, and participation of Congolese citizens in logging operations, especially by granting them exclusive rights to the PCA (permis de coupe artisanale). Article 8 of Order No. 35 of 5 October 2006 on forest operations stipulates that the PCA is allocated to individuals 1) of Congolese nationality, 2) who have been accredited, 3) who own their pitsaw or chainsaw as their work tool and 4) who operates in local community forests and nowhere else. Implementing these laws is difficult in DRC (Esuka Alfani 2012), for three types of reasons.

First, the issuance of PCA has been suspended in the Bas Congo province since 2007 because of the very degraded condition of the forests (REM 2012b, Belesi et al. 2013). This inhibits any attempt to legalise or formalise small-scale timber production. Conversely, in Orientale province, dozens of PCAs are officially delivered every year. The implementation of this regulation is very different from one part of the country to the other, but the central government has not organised a permits monitoring programme to keep track.

Second, legislation on small-scale chainsaw milling establishes goals that are out of reach for the actors in this sector, and is based on documents that are incomplete or unclear.

The implementation of the PCA entails many technical and financial restrictions, and is only applicable to local community forests (art. 112 of the Forest Code and art. 8 of Order No. 35) after the negotiation of a formal agreement with the community that ‘owns’ the forest. This type of forest concession only enters into force after a Forest Management Plan has been drawn up (art. 71 of the Forest Code). The fact that PCAs are only valid for local community forests and require the submission of a Forest Management Plan causes two problems. The first is connected to the legality of the permits delivered since no forests have yet been turned over to the communities. And second, the maximum forest area for a PCA is 50 ha for a timber production level of 350 m³. A chainsaw miller may apply for two permits per year, i.e., a total of 100 ha. Technically it is very difficult to make a Forest Management Plan for a mere 50 or 100 ha. Furthermore, the cost of drawing up a plan can be dissuasive for local communities and chainsaw millers since the law does not make a clear distinction between the development of industrial concessions and the development of land areas authorised for PCAs.

Besides imposing conditions that the chainsaw millers can hardly meet, the law on forest management refers to the implementation texts that do not exist (Tegmeyer et al. 2007). Article 22, for instance, on the responsibility incumbent on local communities to determine the conditions for awarding forest concessions, refers to a presidential decree that has not been enacted. Furthermore, why refer to a presidential decree in a field where a decree signed by the prime minister or even a ministerial order would have provided more flexibility? The same applies to article 25 of Order No. 35 which refers the decision on the rate of the attribution tax for chainsaw milling to an interministerial order that does not yet exist. This shortcoming has caused certain decentralised
The domestic market for small-scale chainsaw milling in the Democratic Republic of Congo

5

territorial entities to take actions that ignore or violate the law, e.g., in Orientale province, Decree No.005/12//2009 establishing the surface area and the rate of provincial taxes and fees sets the attribution price at 500 Congolese francs while the Forest Code indicates that the price will be decided by the national authorities. Similarly, the provincial decree institutes ‘semi-industrial logging’ as an intermediary category while the forest legislation only recognises industrial and artisanal logging. Last, article 243 of the decree states that the tax covers accreditation for one year while article 26 of the Forest Code states that accreditation is granted for 3-year periods.

Another conflict of authority between the central and the provincial authorities concerns the delivery of the PCAs (REM 2012a). Article 8 of Order No. 035 of 5 October 2006 empowers the provincial governor to award PCAs upon a proposal from the provincial forest administration. This provision is contradicted by article 11 of Order No. 11 of 12 April 2007 that regulates industrial logging authorisations and timber purchase, sales and export authorisations and explicitly empowers MECNT by repealing the provisions of article 8 of Order No. 35. From a legal standpoint Order 035 does not contradict the provisions of the Forest Code for two reasons: first, the Forest Code specifically empowers the governor to issue permits to chainsaw millers (art 112), and second, article 98 of the law refers the question of permits to the regulatory services in the ministry. Article 98 states that logging permits ‘are regulated by an Order of the Minister who determines the types (of permits), the conditions for awarding them, the related rights and the period of validity and also decides which authorities are entitled to deliver them.’ The Minister, thus, has the leeway to delegate the issuing of PCAs to the provincial or central authorities and the text is clear enough to avoid any conflict of authority. The result is that all the PCAs delivered by the governors after 12 April 2007, the date of Order No. 11 are illegal, since, according to article 205 of the Constitution, national law supersedes provincial decrees.

The weak governance of the forest sector is due more to a political-economic system in which politicians and civil servants receive unearned income (rente), than to the culmination of abuses by unscrupulous agents who base their decisions on regulatory loopholes or rare audits, (Ascher 1999, Cerutti et al. 2013) thus participating in the revival of the rentier state model instituted during the Mobutu era. For the forest law to be applied, the legal texts will have to be improved to fill the present gaps, and the practices of the actors will need to be better understood so that solutions can be proposed that will change their behaviour. Better legal text must be combined with technical and political actions that would be more enabling if they were based on a thorough understanding of the small-scale chainsaw milling sector and its political-economic context.
3 Survey and analytical methods

This report includes an analysis of four facets of the small-scale chainsaw milling sector: (1) production and processing in rural areas, (2) timber sales in the cities of Kinshasa and Kisangani, (3) timber flows into Kinshasa and Kisangani, and (4) timber flows to Nord-Kivu, Uganda and Rwanda. A different method was adopted for each of these parts. All survey protocols were divided into three phases: a preliminary diagnostic, a 2-month pre-study, and monitoring over a period of one year or more.

3.1. Production and processing in rural areas

The upstream analysis of the sector was based on sample territories and chainsaw millers. While firewood and charcoal are produced mainly in the periurban areas of Kinshasa and Kisangani (Trefon 2011, Vermeulen et al. 2011), chainsaw millers operate dozens or even hundreds of kilometres from these cities in the rural areas where forestland is still available. Using the information collected during the initial diagnostic phase, we were able to identify certain districts and territories that supply significant quantities of timber to the markets regularly (Table 2). Figures 1 and 2 indicate the areas visited in western and eastern DRC.

In each of these territories, a questionnaire was filled in with authorities who were directly or indirectly involved in small-scale chainsaw milling operations: state services, elected officials, village chiefs and NGOs. The questionnaire focused on the background of the informal timber sector in the area, the actors involved and their technical resources, the benefits and problems related to this activity, and potential solutions.

In the second phase, several millers in the informal sector were interviewed using a semi-structured interview grid that included their motivation, species sought, the use of income generated by this activity, difficulties encountered, and solutions envisaged. The millers were also asked to make a list of costs and benefits from their most recent timber production operations. Altogether 592 operations were described by 477 chainsaw millers.

Table 2. Sample of decentralised entities and persons interviewed

<table>
<thead>
<tr>
<th>Province (ville, district, territory)</th>
<th>Number of territories visited</th>
<th>Number of millers interviewed</th>
<th>Number of logging operations monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bas Congo (Cataractes, Bas Fleuve)</td>
<td>4</td>
<td>86</td>
<td>83</td>
</tr>
<tr>
<td>Bandundu (Mai Ndome, Plateaux)</td>
<td>2</td>
<td>70</td>
<td>69</td>
</tr>
<tr>
<td>Orientale (Kisangani, Tshopo, Ituri, Haut Uélé)</td>
<td>13</td>
<td>272</td>
<td>377</td>
</tr>
<tr>
<td>Maniema (Lubutu)</td>
<td>1</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>Nord-Kivu (Beni, Lubero)</td>
<td>2</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>477</td>
<td>592</td>
</tr>
</tbody>
</table>

5 Supports used in the surveys are all available on www.cifor.org/pro-formal.
3.2. Timber sales in Kinshasa and Kisangani

The national timber market was monitored in two large cities: Kinshasa and Kisangani. Data were collected between March 2011 and April 2012 in Kisangani and between January and December 2012 in Kinshasa.

The preliminary survey

A preliminary survey of the timber markets in Kisangani and Kinshasa was made in 2010 that included an assessment of 21 sufficiently big markets whose year-round activity was worth regular monitoring. Each market had a more or less large number of outlets (Photo 2). 1193 outlets were identified (Table 3).

Table 3. Markets and outlets listed and monitored in Kinshasa and Kisangani (2011-2012)

<table>
<thead>
<tr>
<th>City</th>
<th>Markets</th>
<th>Outlets</th>
<th>Outlets with data for one year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinshasa</td>
<td>13</td>
<td>1 035</td>
<td>145</td>
</tr>
<tr>
<td>Kisangani</td>
<td>8</td>
<td>158</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>1 193</td>
<td>205</td>
</tr>
</tbody>
</table>

After listing the markets and the outlets, meetings were held with representatives of each market, generally the chef de marché (market representative) who also represented the market vendors. For markets that did not have a market representative, discussions were held with groups of vendors. The purpose of the meetings was to: 1) explain the goals of the study and receive their agreement to participate; 2) obtain information on the size and the structural organisation of the market (existence of professional associations, relations with various
actors, logistics of the outlets) and 3) help choose groups of outlets that would agree to participate in collecting data. This acquaintanceship phase took several weeks because the subject is touchy and the cities are large. We promised to keep the informants and the data collected anonymous.

**Sampling and data collection**

Because of the large number of outlets, budget restrictions and the difficulty in recruiting outlet owners who were willing to be monitored over a long period of time, the sample was limited to 5 outlets for each market that had fewer than 50 outlets. For the large markets, the sample was composed of 15 to 30 outlets. A total number of 205 outlets, or about 17% of the total number of outlets identified at the beginning of the survey, were monitored continuously for at least 12 months.

Since too little data were generally available on the structure of the markets, the first interviews with the market representatives were used to prepare a stratified sample of the outlets in the markets. The market representatives and the outlet owners were requested to divide the outlets into 2 or 3 groups – big, medium and small – according to the annual sales volume and their estimated sales figures. Gerkens *et al.* (1991) used a similar stratification to evaluate the consumption of chainsaw timber in Goma two decades earlier. In two markets where stratification was impossible because of the similarity in the size of the outlets, outlets for the sample were selected by vendors who agreed to collect the data.

After accompanying our interviewers regularly for 1 or 2 months, the person responsible for data collection was instructed to collect data once a week, the same day every week, but to avoid overestimating sales, not the busiest day of the week. Mostly, the data collection days and the persons in charge of data collection did not change during the survey period.

The following data were required: the number of employees (full-time and part-time), estimated salaries, types of products sold, timber species, dimensions of products, origin (village, city, *district*, or province), stocks, deliveries and number of pieces (per product type and specie) sold on the survey day and purchasing prices.

Once the market actors (vendors, brokers, transporters, owners of outlets not in the sample) felt at ease, 54 formal, unstructured interviews were held within a 1-year period. The interviews dwelt on general questions such as the functioning of the market, taxes, and relations between the professional groups.

**Data analysis**

Two hypotheses were used in estimating annual sales. First, the data collection day was assumed to be representative of sales on the other days of the week. Second, markets were assumed to be open 6 days a week although some markets sold their products 7 days a week.

Annual sales in this study were estimated by adding up weekly sales over a continuous period of 12 months. The average annual sales figure for outlets in the same group, i.e., large, medium, or small, was then multiplied by the number of outlets in that group in a given market, using pre-survey stratification. The same procedure was used to calculate costs, profits and payments within the market.

**3.3. Fluxes of timber in Kinshasa and Kisangani**

Records were kept of unofficial timber flows into Kinshasa and Kisangani. The data were recorded between March 2011 and April 2012 in Kisangani and between February and December 2012 in Kinshasa. The interviewers only registered wood and wood products that did not bear official markings and the sawmill scrap, thus no timber that bore official markings.

A preliminary survey of the entry points for timber arriving in the two cities was made in 2010 and 2011. In Kinshasa, 4 roads and 12 ports were identified as possible timber entry points. In Kisangani, 7 roads (Lubutu, Ubundu, Ngene Ngene, Alibuku, Opala, Yangambi,
Yanonge) and 15 wharves for landing timber upstream and downstream on the Congo and the Tshopo rivers were studied. All these sites were monitored for two months to measure the volume of unofficial timber flows and to select sites for annual monitoring.

This pre-survey was used to eliminate the minor timber transit sites and redundant survey points since some of the products passed through several checkpoints. The survey focused on the main access points for timber entering these two cities, with a special effort to avoid counting the same products twice. A total of 18 transit points were monitored (Table 4, Figures 3 and 4).

Logistical problems prevented regular annual monitoring in some of the survey sites. In Kinshasa it was not always possible to make year-round surveys. To make annual estimates, the volume of the timber flows that were not recorded by the interviewers for a given month were assimilated to the average monthly volume of the whole survey period. Night-time monitoring was often dangerous for the interviewers and was stopped everywhere but in Matadi Mayo. Thanks to the presurvey we were able to know which passage points were open at night. Furthermore, discussions were held with the transporters, persons posted at night near the roads (sentries, government agents, etc.), sawyers and urban vendors about each passage point in an effort to compare the night-time and daytime timber flows. A credible – but conservative – hypothesis was formulated using informally collected information to extrapolate night-time flows on the basis of observations of daytime flows.

Data were collected one day a week, from 6 am to 6 pm, at all the sites and one night a week (6

| Table 4. Points monitored for unofficial timber flows into Kinshasa and Kisangani |
|---------------------------------|-----------------|-----------------|
| **Survey period**               | **Number of days / weeks** | **Amount of night-time flows** |
| Kinshasa Beach Ngobila 1 port   | Feb-Nov 2012     | 6               |
| Beach Ngobila 3 / Dokolo port   | Feb-Nov 2012     | 6               |
| Kinkole port                    | Feb-Dec 2012     | 6, 20% daytime flows |
| Makayabu road                   | Feb-Dec 2012     | 7, 30% daytime flows |
| Maluku port                     | Feb-Dec 2012     | 7, 20% daytime flows |
| Mangalu port                    | Feb-Dec 2012     | 6               |
| Matadi Mayo route               | Feb-Dec 2012     | 7, Flows monitored |
| Sodefor port                    | Apr-Dec 2012     | 6               |
| Kisangani Old Buta Road road    | Apr 2011-March 2012 | 7, 100% daytime flows |
| Avebo port                      | Apr 2011-March 2012 | 7               |
| Baramoto port                   | Apr 2011-March 2012 | 7               |
| Basoko port                     | Apr 2011-March 2012 | 7               |
| Lisomba port                    | Apr 2011-March 2012 | 7               |
| Cimestan port                   | Apr 2011-March 2012 | 7               |
| Djubu Djubu port                | Apr 2011-March 2012 | 7               |
| Tshopo Bridge road              | Apr 2011-March 2012 | 7, 70% daytime flows |
| Ituri Road road                 | Apr 2011-March 2012 | 7, 70% daytime flows |
| Ferry crossing road             | Apr 2011-March 2012 | 7               |
pm to 6 am) in Matadi Mayo. The same series of data were collected at each passage point: date and time, type of vehicle, type of product and number of pieces transported, species, origin and various commentaries. To transform the logs into chainsaw timber, we applied an average processing coefficient of 30% as suggested by Tevo Ndomateso (2007) and Bugale Matenga (2009) for DRC, and Cerutti and Lescuyer (2011) for Cameroon.

3.4. Timber flows to Nord-Kivu, Uganda and Rwanda

Besides monitoring consumption in Kinshasa and Kisangani, the survey also covered chainsaw timber flows to Nord-Kivu, Uganda and Rwanda; this is timber that the brokers do not sell on the urban markets. The chainsaw millers sell this timber direct to businessmen who handle the transport and delivery to the final customers in the countries of destination.

Several cities and passage points were selected on the basis of information from Forests Monitor (2007) and a diagnostic mission carried out in March 2011: Goma, Butembo, Beni in the Nord-Kivu province and Bunia, Aru and Ariwara in Ituri district (Orientale province). The survey was tested from August to November 2011. Flows were monitored from April 2012 to March 2013 at 16 observation points with the assistance of 16 interviewers in the field.

Substantial data were collected from timber-laden vehicles at transit points: time, type of vehicle, load (one-quarter full, half full, three-quarters full, full, overloaded), products transported, species and quality of chainsaw timber (sawmill scrap and chainsaw timber). All this information was entered on the standardised observation grid, which made it easier to record future data.

The chainsaw timber transport capacity was estimated for various categories of vehicles and then used to estimate the cubic volume transported (Photo 3).
Each passage point was supposed to be systematically monitored 4 times a week to record data for night-time passages (6 pm – 6 am) twice, and data on daytime passage (6 am – 6 pm) twice. This was not possible for several reasons – passage point closed, poor roads, insecurity – as shown by the real frequency of the data collection at each site (Table 5).

Data were extrapolated to the monthly level on the basis of the real data collection intervals. The incomplete implementation of the protocol drawn up at the beginning of the survey tends to increase the importance of extrapolation in estimating final volumes. This is true for most of the surveys on the informal exploitation of natural resources, especially when the products are transported at night in areas where safety is a problem.

The annual monitoring of chainsaw timber flows has generated information needed to estimate domestic consumption in the cities in this survey. For each of the cities, the outgoing flows have been deducted from the entering flows in calculating the estimated local wood consumption. Similarly, timber flows from the cities of Aru and Beni were used to estimate exports to Uganda and timber flows from Goma were recorded as exports to Rwanda.

Table 5. Frequency of data collected on the transport of chainsaw timber, per site, per week

<table>
<thead>
<tr>
<th>City</th>
<th>Site</th>
<th>Destination</th>
<th>Number of days with passage (6 am -18 pm)</th>
<th>Number of days with passage (6 pm – 6 am)</th>
<th>Number of daytime surveys</th>
<th>Number of night-time surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ariwara</td>
<td>Angarakali</td>
<td>½ flow entering Ariwara, ½ flow entering Aru</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Aru</td>
<td>Apinaka</td>
<td>Flows entering Aru</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Aru</td>
<td>Aru-Customs</td>
<td>Flows leaving Aru for export to Uganda</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Beni</td>
<td>Ndindi</td>
<td>Flows entering Beni</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Beni</td>
<td>Mavivi/Mbau</td>
<td>Flows entering Beni</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Beni</td>
<td>Mabolio/Tuha</td>
<td>Flows leaving Beni for export to Uganda</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Beni</td>
<td>TCB</td>
<td>Flows leaving Beni for export to Uganda</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Bunia</td>
<td>Mudzipela</td>
<td>Flows entering Bunia</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Bunia</td>
<td>Lengabo</td>
<td>Flows entering Bunia</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Butembo</td>
<td>Kangote</td>
<td>Flows entering Butembo</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Butembo</td>
<td>Komba</td>
<td>Flows entering Butembo</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Butembo</td>
<td>Kyambogho</td>
<td>Flows leaving Butembo for Goma</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Goma</td>
<td>Kanyaruchina</td>
<td>Flows entering Goma</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Goma</td>
<td>Rutoboko</td>
<td>Flows entering Goma</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Goma</td>
<td>Matcha</td>
<td>Flows entering Goma</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Goma</td>
<td>Petite barrière</td>
<td>Flows leaving Goma for export to Rwanda</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>1.5</td>
</tr>
</tbody>
</table>
4 Results

4.1. Upstream in the sector: evolution and main characteristics of small-scale chainsaw milling in the Kinshasa supply basin

Discussions with the territorial authorities and the chainsaw millers tell the same story of small-scale chainsaw milling in the provinces around Kinshasa. It started towards the end of the 1970s but at that time was based on manual sawing with a simple saw (Gerkens et al. 1991). The profession grew in the 1980s. The simple saw was replaced by the chainsaw towards the end of the 1980s. In the mid-1990s the number of chainsaw millers soared, as seen in Figure 5 which plots the annual number of new sawyers on the basis of our sample of 156 sawyers who we interviewed.

On the basis of the information we received from the authorities and the chainsaw millers, we estimate that about 400 sawyers are now working in the Bas Congo and Bandundu provinces. They are not evenly distributed since some territories like Lukula and Seke Banza have a large number (about 50) while other territories in the Bandundu region have far fewer. Each chainsaw miller creates an average of 4 jobs which means that for at least 2000 people in these two provinces, small-scale chainsaw milling is the main activity and source of income. In two-thirds of the territories visited, the small-scale operators had a primary and secondary timber processing capacity and in each of these territories they had an average of 14 pieces of processing equipment such as planers and edgers. Most of the wood that is produced or transformed in an artisanal processing unit is for the Kinshasa market, as Djire (2003) also showed, while the scrap is sold on the local market. Some border districts are specialised in exporting informal timber to Angola.

The socio-economic characteristics of this group of small-scale operators are rather similar: 53% of them are native of the province where they work, 76% of them own their own chainsaw (average purchase price was US$1644, almost always second or third hand), 80% worked without purchase orders and 96% never had a proper logging permit. This confirms the findings of Global Witness (2012) and Greenpeace (2012) in Bandundu province that official companies were the only ones to obtain PCAs to produce timber for export, and they obtained these permits illegally.

There is no chosen path to becoming a chainsaw miller; they come from various sectors, although the largest number had jobs related to trade (Figure 6).

Most of the income from chainsaw milling is used to cover basic necessities (Figure 7) although just under one-third is used for productive investments, mainly the creation or support of commercial ventures.
The domestic market for small-scale chainsaw milling in the Democratic Republic of Congo

The local authorities and the chainsaw operators were asked to describe the main problems facing the small-scale chainsaw milling sector in their area (Table 6). Both recognised two problems – transporting products to the city and poor quality equipment (Photo 4). The community representatives were also concerned about the scarcity of the resource, while the small-scale operators put more emphasis on ‘hassle’ by state and customary authorities and the difficulty of recruiting reliable employees at a reasonable cost.

Both the communities and the operators proposed relatively similar solutions (Table 7).
The main ones were a repetition of a request made 20 years ago, i.e., to improve the transport of chainsaw timber and facilitate access to good quality equipment at a reasonable price (Gerkens et al. 1991).

Neither of the groups felt that access to official permits for small-scale chainsaw milling was crucial, probably because they knew that present regulations, especially in Bas Congo, would probably not be changed.

4.2. Upstream operations: background and scope of artisanal timber production in the Orientale province

Chainsaw milling developed rapidly as of the year 2000 in Orientale province according to the local authorities and Figure 8, which depicts interviews with the small-scale operators. Mayange Nkubiri (2012) and Muganguzi Lubala et Benneker (2012) observed the same trend.

Table 7. Solutions to improve small-scale chainsaw milling in the Kinshasa area

<table>
<thead>
<tr>
<th>Communities</th>
<th>Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better organisation of transport</td>
<td>30%</td>
</tr>
<tr>
<td>Easier access to equipment and consumables</td>
<td>25%</td>
</tr>
<tr>
<td>Diversification of areas and resources to be exploited</td>
<td>20%</td>
</tr>
<tr>
<td>Stronger, motivated, State controls with sanctions</td>
<td>15%</td>
</tr>
<tr>
<td>Reforestation of felled tree areas</td>
<td>10%</td>
</tr>
<tr>
<td>Provision of technical and institutional supervision for chainsaw operators</td>
<td></td>
</tr>
<tr>
<td>Improved understanding of the markets</td>
<td>3%</td>
</tr>
</tbody>
</table>

In this province, the total number of chainsaw operators was estimated at about 600, and they generate about 3000 regular jobs. By way of comparison, Assumani et al. (2012) gave an estimate of 450 chainsaw operators working in the Kisangani area. Chainsaw milling is a bustling profession in the city of Kisangani and the Tshopo and Ituri districts, but not in Haut-Uélé and Bas-Uélé which are relatively isolated and far from the markets. Unlike the provinces neighbouring Kinshasa, the Orientale province has very few small facilities for secondary processing of chainsaw timber since there are only about, on average, 3 pieces of equipment such as planers and edgers for each territory, and they only existed in half the communities visited. Half of the territories send their chainsaw timber output to distant markets such as Kivu and Kinshasa, one-third produce for the Kisangani market and the rest is to meet local demand.

In the Kinshasa area, a vast majority (70%) of the sawyers work in their home province, and 43% of them were born in the territory where they are working. One-third of the sawyers interviewed came from other provinces, mainly Nord-Kivu, as Muganguzi Lubala and Benneker (2012) also reported. Regardless of origin, nearly all the sawyers have their own chainsaw, which they usually bought second-hand for an average of US$1420. The much higher price – US$3200 in Maniema – which Schmitt and Belani (2012) estimate, reflects the difficulty of penetrating the Kindu market. Only 23% of the chainsaw sawyers in the survey worked to fill purchase

Figure 8. Number of new chainsaw operators per year in Orientale province

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orders, since the system requires regular relations with the urban buyers. Assumani et al. (2012) made a similar diagnostic. The diversity in the sawyers’ professional origins (Figure 9) and the main use of the income from chainsaw milling (Figure 10) are similar to the situation observed in the Kinshasa area.

One major difference is the possession of PCA by 36% of respondent sawyers in Orientale province (Figure 11) while the sawyers without permits had to rely more on the customary authorities for access to lands and resources (Adebu and Abdala 2012).

Overall, more than half the chainsaw operators have an ‘official’ document that allows them to claim that they are working legally, but many of these ‘permits’ are not legal. There are many different documents that are used as logging permits in the field that have no legal basis. Makana (2005), Nkoy Elela and van Puijenbroek (2012), Muganguzi Lubala and Benneker (2012) and Durrieu de Madron et al. (2012) gave examples of the great diversity and originality of these illegal permits. Many State officials deliver these documents (at a price) which are used more or less successfully in giving official status to artisanal logging, but these documents do not exist in any current national or provincial regulations.

The second problem is connected to the application of the official small-scale felling permits, as also mentioned by Lescuyer (2010) and Benneker et al. (2012). Rather than renewing...
their permits every year, the operators, within the framework of their permits, apply for permission to harvest an area of 5 or 10 ha. (coupe annuelle) for the second year. The operator has to pay 50 USD per hectare, which explains the limited number of hectares requested. It is highly unlikely that the chainsaw milling operation for the year is restricted to the area covered by the permit. In other words, even if the permit is legal, the legality of the chainsaw milling operation is always doubtful. The administration seldom checks the permits: between 2007 and 2010 the head of the Mambasa Environmental Department did not issue any penalties or make an infraction reports against artisanal loggers. For more or less the same period, our surveys – like those of Muganguzi Lubala and Benneker (2012) – show that a land area of an average 99 ha. is officially allocated to permit holders and that 23% of the permit holders exceed - sometimes greatly - the legal limit of 100 ha.

The small-scale chainsaw millers have to pay certain costs to obtain official access to the forest resources namely the formal and informal costs connected to obtaining a logging permit and, the fulfilment of the cahier des charges (a social responsibility contract) that is drawn up together with the customary chiefs. The application cost for a small-scale chainsaw milling permit has been determined by the administration as follows: (1) US$500 for the professional 3-year licence; (2) at least US$600 for the local authorities to draw up a land vacancy notice for a specific ‘concession’ (between 25 and 200 ha); (3) US$50/ ha for authorisation to log a given land area in the concession for a period of one year (the operators usually ask for 5 to 10 hectares per year).

Furthermore, a community will only award concessionary rights after a cahier des charges specifies what the operator must deliver in kind to the local population, in other words, nearly always to the head of the community and his relatives, as shown also in the writings of Trefon (2008) and Nkoy Elela and van Puijenbroek (2012). The cahier des charges is a written document a copy of which is usually kept by the operator and the village chief. The contents of the cahiers des charges are usually quite similar: corrugated sheet metal, bicycles, motorbikes, pieces of traditional cloth, cattle, etc. Expenses incurred under the cahier des charges have risen greatly and now average US$1960 while Muganguzi Lubala and Benneker (2012) estimated the amount in 2010 to be about US$1275.

The ‘patron’ usually advances the price of the fixed costs since the local operator is rarely in a position to disburse over US$3000 before even starting his work.

According to the millers we interviewed, the financial dependency of a major part of the small-scale loggers working in Orientale province to supply the cities in Kivu and the export market is slowing down the development of this sector (Table 8). The hassle, the corruption and the unclear, unstable fiscal system are major problems to both groups of actors, who also unanimously agree that the wood is difficult to transport and that the quality of the equipment is poor. On the other hand, unlike the local authorities, the operators do not complain about breach of trust nor potential rarity of the resource.

<table>
<thead>
<tr>
<th>Table 8. Main problems in small-scale chainsaw milling in Orientale province</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Hassle and corruption (admin and cust authorities)</td>
</tr>
<tr>
<td>Breach of trust between employer and miller</td>
</tr>
<tr>
<td>Product removal</td>
</tr>
<tr>
<td>Conflict over land tenure with or among the heirs</td>
</tr>
<tr>
<td>High cost and poor quality of equipment</td>
</tr>
<tr>
<td>Scarcity of resources</td>
</tr>
<tr>
<td>Access to financing</td>
</tr>
<tr>
<td>Insufficient repercussions for the communities</td>
</tr>
<tr>
<td>Drudgery and risks at work</td>
</tr>
<tr>
<td>Insecurity in the felling area</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>
There are major differences between the solutions proposed by the administrative elite and the local customary chiefs, on the one hand, and the small-scale chainsaw millers on the other (Table 9). It is not surprising that the professionals are calling for a reduction in taxes – especially the informal ones – and easier access to credit while the authorities are anxious to strengthen the role of the State in the fight against illegal forest operations, oversee the profession and organise the market. Easier legal access to small-scale timber permits is seldom suggested as a solution by any of the groups of actors.

4.3. The economic importance of small-scale chainsaw milling in the rural areas

Small-scale chainsaw milling is almost always financially profitable, although it is much less profitable in the Orientale province than around Kinshasa (Figure 12 on profits and costs around Kinshasa and Figure 13 on profits and costs in Orientale province).
The sales price for chainsaw products – all fuel, sales venue and products combined – is about 233 US$/m³ in Kinshasa and 183 US$/m³ in Orientale province. This is especially surprising since the species from Orientale province are much more noble than those sold on the Kinshasa markets. There are two possible reasons for this difference.

First, on the supply side, the cost price for chainsaw products – wages, tree purchases and especially transport – is generally higher in the western part of DRC than in Orientale province (Figure 14), which increases the final sales price on the Kinshasa market.

Second, on the demand side, the small-scale chainsaw products in Orientale province are monopolised by a handful of brokers based in the Kivu, who form an oligopsony that enables them to buy at a low price direct from the sawyers (Umunay and Makana 2009). Although selling prices are far higher than in 2006 (Makana 2006), they represent only about half of the price of these products ex-border and less than one-third of the selling price on foreign markets such as Kampala and Nairobi.

The lower per unit selling price of chainsaw timber to urban sellers in Orientale province (compared to Kinshasa) affects the chainsaw millers’ average profit, which is around 33 US$/m³ (14%) in Kinshasa and about 15 US$/m³ (8%) in Orientale province.

In both places, the chainsaw millers who work to fill purchase orders make high, even very high profits. Only about 20% of the ones in the sample had orders to fill. This low percentage reflects the difficulty in establishing regularly relations with the urban markets or with buyers, as most small-scale millers live in isolated areas.

Felling operations cost the chainsaw millers an average of $150/m³ and $200/m³ in the two study zones. The chainsaw millers who have a felling permit have additional fixed costs connected to the purchase of the logging permit and the obligation to respect the cahier des charges. Because of these charges, ‘legal’ chainsaw milling in Orientale province is a losing proposition. The chainsaw millers who have a permit have to pay formal and informal taxes that are twice as high as the taxes paid by the other types of chainsaw millers. This is the result of costly access to legal permits and oligopsonic trade relations. The vast majority of the artisanal loggers who have permits depend on the traders and transporters established in the Kivu, Uganda and Kenya for materials and funding (Forests Monitor 2007, Umunay and Makana, 2009, Chishweka 2012). This leads to a vicious circle of indebtedness that prevents the operators from negotiating with their ‘patron’ over the price of the timber, since the timber delivery is used to pay off part of the operator’s never ending debt. Another outcome of this asymmetrical patron-client relationship is the systematic under-estimation of the volumes sold by the small operators (Photo 5). The buyer-cum-boss uses the pretext that the pieces delivered had to be re-shaped and sometimes resized, to apply fictitious cubage standards that reduced the real volume of our sample by 9%, and in some cases, up to 60% (Lescuyer 2010).

The combination of a low per cubic metre purchase price and the under-estimation of volume is aimed at keeping the small-scale operators under the control of the buyers-traders in Kivu and the neighbouring countries.

The breakdown of the variable operating costs is quite similar in the two logging areas (Figure 14).
The domestic market for small-scale chainsaw milling in the Democratic Republic of Congo

The tree purchase price is still relatively low, probably because of asymmetrical information on the real value of the trees between the chainsaw millers who buy the trees and the customary owners (Muganguzi Lubala and Benneker 2012, Serre Duhem and Belani 2012). Furthermore, unlike the periurban zones where access to the resource is based on a hybrid modern-customary land tenure system (Trefon 2011), tree purchases in the rural areas are based largely on traditional systems of resource access and use in which the village chief or his relatives have the casting vote. Many artisanal operators who are ‘native’ to their logging zone can easily come to an understanding with their family or friends and benefit from low prices. Furthermore, these trees often have large diameters and can be used to produce at least 3 m³ of sawn timber per tree (Table 10). This explains the lower average cost compared to the total felling cost.

Salaries paid locally are a major component of expenses. In Orientale province, many of the workers come from the Kivu specifically to engage in small-scale logging operations. This same phenomenon was recorded by Lescuyer (2010) and Muganguzi Lubala and Benneker (2012). It is surprising to see that even for menial tasks like porterage, very few people are recruited locally, and that the locally-recruited carriers are often paid less than the non-natives. This was also noted by Nkoy Elela (2007), Nkoy Elela and van Puijenbroek (2012), and Schmitt and Belani (2012).

There are sundry taxes that bog down the artisanal operations (Schmitt et Beltani 2012), up to 34 such taxes in Ituri according to Polepole (2008). Many of them did not exist in 2005. Most of them are illegal and thus are not systematically applied. The introduction and increased application of these informal taxes can be explained both by the historical existence of a rentier State (Matti 2010) and the decentralisation process encouraged by the Congolese Constitution that empowers the provinces and the local communities to receive rente (Jacquemot 2010). Most of these taxes are based on the volume produced or transported and are collected at the place where the sawn timber is loaded onto the trucks or along the road. In most cases, receipts are not given and the money is not paid into the state coffers (Forests Monitor 2007). Fiscal and parafiscal payments account for 7% of the total costs of artisanal operations in the western part of the country and 12% in the eastern part. In comparison with the practices of the other countries in Central Africa in this sector DRC is at the lower end of the parafiscal payments. Parafiscal levies, ever uncertain and fluctuating, are a major problem for the sawyers. In some cases, sales are

![Figure 14. Breakdown of costs for chainsaw timber in rural areas](image)

### Table 10. Distance to and volumes of felled trees

<table>
<thead>
<tr>
<th></th>
<th>Congo (Lescuyer et al. 2011)</th>
<th>Cameroon (Cerutti and Lescuyer 2011)</th>
<th>RDC – Orientale province</th>
<th>RDC - Kinshasa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average distance</td>
<td>4.2 km</td>
<td>&lt;1 km</td>
<td>3 km (σ=1.75 km)</td>
<td>1.3 km (σ=2.73 km)</td>
</tr>
<tr>
<td>from felling site to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>market</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average volume</td>
<td>0.52 m³</td>
<td>3.18 m³</td>
<td>5.7 m³</td>
<td>3.4 m³</td>
</tr>
<tr>
<td>of chainsaw timber</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>per felled tree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
made without being ‘taxed’ by the administration, in other cases the whole delivery is confiscated and thus lost for both the sawyer and the seller.

The geographical isolation of the survey zone partly explains the high cost of equipment and intermediary consumables. Spare parts for the chainsaw, fuel and lubricants are especially costly. Many chainsaw millers replace their chainsaw regularly in order to reduce the repair costs. In so doing, in the Orientale province especially, they increase their dependence on the patrons in Kivu and Uganda who send in relatively inexpensive equipment (Chevallier and du Preez 2012) and then deduct the price of the equipment from the value of their next timber delivery.

A major part of the variable costs for artisanal sawing operations – 52% around Kinshasa and 40% in Orientale province – are incurred at the local level and thus provide a significant source of income for the rural areas. This was already the case 20 years ago (Gerkens et al. 1991).

4.4. Ecological impact of small-scale chainsaw milling

Interviews with the sawyers give an idea of the potential ecological impact of their activity. First of all, the sawyers are generally interested in a small number of species:

- in Bas Congo and Bandundu, only 15 tree species are mentioned and 3 of them account for 63% of the citations: le limba/fraké (*Terminalia superba*), iroko (*Milicia excelsia*) and le bosse (*Guarea cedrata*). Great volumes of these species are sold on the markets in Kinshasa (Figure 24);
- in Orientale province, the artisanal operators concentrate on 19 species but here again, 3 of them account for 66% of the citations: sipo (*Entandrophragma utile*), acajou (*Khaya anthotheca*), and afrormosia (*Pericopsis elata*). These three species are felled mainly in the primary forest as shown in Figure 15 and explained by Begaa Yendjogi (2012) for the Isangi Territory.

Photo 6. Artisanal felling and processing a sipo (Photo: P. Tchimpanga)

Another characteristic of artisanal logging in DRC is the felling of trees with a large diameter (Table 10, Photo 6). This is also shown by Serre Duhem and Belani (2012) in Maniema but contradicts the writings of Debroux et al. (2007).
For the Kinshasa, and the Orientale province timber basin – and more specifically for Kisangani, as shown by Bugale Matenga (2009) and Assumani et al. (2012) – the average volume is higher than the estimated volume in Cameroon and far higher than the estimated volume in the Republic of Congo. Since felling and processing techniques were comparable in all three countries, these major differences can be traced to the size of the felled trees. As Cerutti and Lescuyer (2011) showed for Cameroon, the bigger the tree, the higher the yield from artisanal sawing operations, although in the area around Kisangani, the results vary, depending on the species (Tevo Ndomateso 2007, Bugale Matenga 2009).

This focus on artisanal felling of large trees proves that they are still available in the survey zones and that the smaller trees are not yet being exploited on a large scale. Similarly, the small number of species being felled by the chainsaw millers apparently does not threaten the integrity of the forest (Benneker et al. 2012), although this narrow focus could contribute to localised harm to the ecosystem and a gradual reduction in forest productivity.

The chainsaw millers’ preference for a small number of species with large diameters forces them to go farther away from the access roads. This is especially true in Orientale province where the average distance to the felling site is a 3-kilometer walk. It is difficult to calculate the maximum distance over which the chainsaw millers and their teams can transport their timber without jeopardising their profitability. In Befale Territory, Équateur, the chainsaw millers fell trees that are less than one kilometre from the river banks (Lokota 2012). They still have some leeway – especially near Kinshasa since the distance is reasonable – but in the medium- or long-term will probably prefer trees with smaller diameters and/or other tree species if they are closer to the access roads, until they too become scarce, as in Bas Congo where the loggers have to trek deep into the forest even to find small-diameter trees (Lescuyer et al. 2011). The ecological impact of more intensive timber production needs to be carefully monitored, especially since the local communities are not taking steps to replant stripped forests (Muganguzi Lubala and Benneker 2012). Furthermore, reducing the distance to the felling areas may enable the neighbouring communities to capitalise the scrap from the felling operations by turning them in charcoal, for instance.

4.5. Estimates of domestic consumption and production and chainsaw timber exports

Two approaches were used to estimate domestic consumption of chainsaw timber in the cities in the sample:

- for Kinshasa and Kisangani and for the cities in eastern DRC urban consumption estimates were based on the difference between the chainsaw timber entering and leaving the cities;
- for Kinshasa and Kisangani, consumption was also based on the volumes sold in a sample selection of outlets located in various markets throughout the city. Double sales, i.e., inter-market sales, were deducted in estimating the chainsaw timber consumption of course.

Chainsaw timber is not only sold for urban consumption in DRC, it is also exported to Uganda and Rwanda. The export volume is calculated on the basis of timber flows to the border, as described in the methodology section.

Estimates of chainsaw timber consumption in the cities surveyed and exports to neighbouring countries.

Monitoring incoming and outgoing flows of artisanal timber provides data for a preliminary estimate of volumes consumed in the cities surveyed and volumes exported to countries east of DRC (Table 11) using an average processing coefficient of 30% (Cerutti et Lescuyer 2011).

Monitoring annual sales on the Kinshasa and Kisangani markets provided data for a second estimate of timber consumed in these two cities (Table 12).
Guillaume Lescuyer et al

Estimates based on flow analyses and on sales in the two cities are very similar and are evidence of the robustness of the survey protocol. In general the flow volumes were higher than the sales figures since part of the timber reaches the end user without entering the markets or are ‘laundered’ by the formal industrial sector.

Kinshasa is the biggest market for chainsaw timber, mainly because of the size of its population. The consumption in Kinshasa accounts for half of the total consumption of the flows we monitored. A significant part [although less than 20 years ago (Gerkens et al. 1991)] of the chainsaw timber sold in Kinshasa comes from industrial scrap. Close to 175,000 m$^3$ of chainsaw timber is consumed annually, which is far more than the 68,000 m$^3$ estimate in the survey by Mbemba et al. (2009) but their survey only covered day-time flows, at three access points.

Kisangani and Goma were second with annual consumption figures of close to 60,000 m$^3$. Gerkens et al. (1991) made estimates – at that time, 0.11 m$^3$/pers/yr – that were very close to the present per capita chainsaw timber consumption in Goma. The explanation for this high rate in Goma can probably be traced to the economic development of the city and the presence of the MONUSCO forces that need timber to build infrastructure.

The same volume of chainsaw timber crossed the DRC border, mainly to Uganda, which confirms the general figures reported by Forests Monitor (2007), Nkoy Elela and van Puijenbroek (2012) and WWF (2012), but is far lower that Chishweka’s (2012) extrapolated figures. Large amounts of chainsaw timber are exported east of DRC but the volume is far less than the domestic consumption in the cities in Kivu, unlike the supposition put forth by WWF (2012).

### Table 11. Urban consumption and exports of chainsaw timber based on a flows analysis (m$^3$/yr)

<table>
<thead>
<tr>
<th>Consumption (m$^3$)</th>
<th>Number of inhabitants</th>
<th>Per capita consumption (m$^3$/pers/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ariwara 3 862</td>
<td>60 000</td>
<td>0.064</td>
</tr>
<tr>
<td>Aru 2 429</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beni 9 602</td>
<td>99 500</td>
<td>0.096</td>
</tr>
<tr>
<td>Bunia 28 130</td>
<td>366 000</td>
<td>0.077</td>
</tr>
<tr>
<td>Butembo 8 417</td>
<td>217 000</td>
<td>0.039</td>
</tr>
<tr>
<td>Goma 57 482</td>
<td>432 000</td>
<td>0.133</td>
</tr>
<tr>
<td>Kinshasa 259 959</td>
<td>9 463 000</td>
<td>0.027</td>
</tr>
<tr>
<td>Kisangani 61 942</td>
<td>936 000</td>
<td>0.066</td>
</tr>
<tr>
<td>Exports to Uganda 59 423</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports to Rwanda 5 616</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 12. Consumption of chainsaw timber calculated by analysing sales on the Kinshasa and Kisangani markets

<table>
<thead>
<tr>
<th>Consumption (m$^3$)</th>
<th>Number of inhabitants</th>
<th>Per capita consumption (m$^3$/pers/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinshasa (26% from the sawmill) 235 972</td>
<td>9 463 000</td>
<td>0.025</td>
</tr>
<tr>
<td>Kisangani 58 207</td>
<td>936 000</td>
<td>0.062</td>
</tr>
</tbody>
</table>

Estimated national production of chainsaw timber for urban consumption and export

The sample cities monitored in the survey account for slightly less than half of the urban population of DRC. The cities of Katanga and Kasaï are highly
populated and consume chainsaw timber to meet their development needs. Gerkens et al. (1991) for instance reported that Lumumbashi used large volumes of pitsaw timber at the beginning of the 1990s. Yet many of these cities are located far away from the rain forests, which probably reduces their dependence on timber. By applying the per capita consumption rate estimate for Butembo – in other words, a figure in the lower range of the estimates – to the urban consumers not covered in our survey, the total chainsaw timber consumption would amount to about 560 000 m³ per year. Factoring in annual exports to Uganda, Rwanda and Angola would raise the artisanal chainsaw timber production for national and sub-regional markets to over a million cubic meters per year, or about 3.4 million cubic meters in RWEs (Table 13).

Assuming that the official statistics are reliable, the RWE production of chainsaw timber is 13 times greater than the formal sector’s production of all wood products. The ratio of chainsaw timber to sawnwood and industrial scrap (exported or consumed in Kinshasa) is about the same. Current estimates of the volume of chainsaw timber produced is double the figure (around 525 000 m³) put forth by Gerkens et al. (1991) about 20 years ago. This can be explained by the higher urban population figures and the increase in the purchasing power of certain urban classes of society over the last 20 years.

The market for chainsaw timber usually experiences intra-annual fluctuations with sales peaking during seasons when timber transport is easier and/or construction sites have resumed their work (Figure 16).

Seasonal sales peaks have also been observed in average sales in the sample outlets serving Kinshasa and Kisangani (Figure 17). Figure 17 shows an average sales volume per outlet in Kisangani – around 30 m³/month – that is higher than the sales volume in Kinshasa, a situation that can undoubtedly be explained by the smaller number of vendors, although the number is equivalent to the number in a city like Yaoundé (Cerutti and Lescuyer 2011).

---

### Table 13. Estimate of national production of artisanal chainsaw timber in DRC (m³/yr)

<table>
<thead>
<tr>
<th>Consumption and export zones</th>
<th>m³/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinshasa - chainsaw timber</td>
<td>174 619</td>
</tr>
<tr>
<td>Kinshasa - industrial scrap</td>
<td>61 353</td>
</tr>
<tr>
<td>Kisangani</td>
<td>58 207</td>
</tr>
<tr>
<td>Cities in eastern DRC in sample</td>
<td>109 922</td>
</tr>
<tr>
<td>Kindu - Maniema (Serre-Duhem and Belani Masamba 2012)</td>
<td>8 750</td>
</tr>
<tr>
<td>Other cities in DRC</td>
<td>560 195</td>
</tr>
<tr>
<td>Exports to Uganda</td>
<td>59 423</td>
</tr>
<tr>
<td>Exports to Rwanda</td>
<td>5 616</td>
</tr>
<tr>
<td>Exports to Angola (Djire 2003)</td>
<td>47 000</td>
</tr>
<tr>
<td>Total artisanal chainsaw timber</td>
<td>1 023 732</td>
</tr>
<tr>
<td>Total artisanal chainsaw timber (RWE)</td>
<td>3 412 440</td>
</tr>
</tbody>
</table>

| Official exports of chainsaw timber in 2011 (OCC) | 36 000 |
| Official production, all wood products (RWE) in 2001 (DGF) | 256 208 |

---

6 Serre Duhem et Belani (2012) for instance estimated annual consumption of chainsaw timber per inhabitant in Kindu at 0.064 m³, or close to two times more than the figure used in extrapolations.
By monitoring the timber outlets throughout the year, we were able to identify the zones that supply the urban markets of Kinshasa (Figure 18) and of Kisangani (Figure 19). The Bas Congo province was also the main source of chainsaw timber for the Kinshasa market, according to the study by Mbemba et al. (2009), in spite of the official suspension of chainsaw milling in 2007. As indicated by REM (2012b), this sector is still well structured, and is partly under government oversight to ensure security.

Kinshasa and Kisangani have various sources of wood to meet their urban demand. In both cities, four sources contribute between 12% and 32% of the total volume sold. From the geographical vantage point, timber is harvested in an area more or less distant from the cities and transported by road or river using the existing facilities. The diversity of sources does not make it easy for the administration to control this sector.

Unlike Kisangani, the Kinshasa outlets also receive sawmills products from local sawmills. These products are not available on the Kisangani markets although a certain volume of downgraded wood is sold ex-factory, but we were not able to make an estimate of the volume. In both cities, sawnwood from industry is a secondary product that is seldom upgraded in the factories. This situation is paradoxical since industrial scrap is...
equivalent to twice the volume of scrap from industrial timber exports.

**Types of products sold**

The chainsaw timber sold on the domestic market (Figure 20, Figure 21, Figure 22) is the same as the chainsaw timber exported to Uganda and Rwanda (Figure 23). The deliveries are composed mainly of boards (*panneaux*) and beams (*madriers*), but scantlings (*chevrons*) are also popular on the Kinshasa and Kisangani markets.

**The main species sold.**

The species sold at the survey sites have noteworthy differences. The *Entandrophragma* spp. (sapelli, sipo, kosipo) are abundant on all the markets we monitored. The following species are also available:

**Figure 20. Type of chainsaw timber sold in Kinshasa**

**Figure 21. Types of chainsaw timber sold in Kisangani**

**Figure 22. Type of chainsaw timber sold in the cities of eastern DRC**

**Figure 23. Types of chainsaw timber exported to Uganda and Rwanda**
• in Kinshasa (Figure 24) precious wood species like iroko, limba/fraké, and tola (Prioria balsamifera) for the national market, and also faro/bolengu/afzelia (Daniella pynaertii) from the Équateur province that is used to make rafts to float down the river (Lokota 2012);
• in Kisangani (Figure 25) and in the area near the Uganda and Rwanda markets (Figure 27), the specialty is some very precious species such as acajou/linzo and afrormosia/mogoya. Assumani et al. (2012) note the very same variety available on the Kisangani markets.
• In the cities in eastern DRC (Figure 26), traders from Goma buy large volumes of eucalyptus (Eucalyptus spp.) growing on old plantations that are now run by small-scale operators. This was already the case in the early 1990s (Gerkens et al. 1991).
Besides the eucalyptus, the small-scale operators look mainly for the same species that are felled and exported by the industrial sector in DRC.

### 4.6. Economic importance of the small-scale chainsaw milling sector

The Kinshasa and Kisangani markets do not only have different species, they also have different prices, as seen from the prices charged by the small-scale chainsaw operators in the two sites (Figure 12, Figure 13). Prices for chainsaw timber are much higher in Kinshasa. Table 14 compares domestic prices with market prices for DRC square-edged sawnwood exports.

In urban markets in Central Africa generally e.g., Kisangani, the prices for all products and species are much lower than on the international market. This difference is much smaller on the Kinshasa domestic markets where some products are priced very close to their market value. Some industrial forest operators in DRC could probably compete on certain inland markets, which they could not do in other cities in the Congo Basin countries. This hypothesis is not unanimously supported, e.g., Durrieu de Madron et al. (2012).

The reason for the high prices in Kinshasa lies in the high cost of reaching the trees, as shown in Table 15 which presents the sales figures, costs and profits for markets in these two cities, based on the year-long monitoring of urban sales.

Sales of chainsaw timber in the two cities totalled close to US $100 million per year with profits of over US $25 million. Trade in chainsaw timber seems to be much more profitable in Kisangani where the profit margin was over 40% – this was confirmed by Ngoy Ilunga Nimuk (2012), but the profit figure according to Serre Duhem and Belani (2012) was 12.5% in Kindu – mainly because the small producers sell the sawnwood at a lower price, although the species they sell are generally more precious than the species sold in Kinshasa. On the other hand, taxes are higher for the sellers in Kisangani. This may be connected to the PCAs that are officially allocated by the public authorities. Since small-scale chainsaw milling became a formal sector it has been more closely watched by the tax services, although many payments never reach the coffers of the State.

This sector is job-intensive in the city. The Kinshasa markets offer 2637 permanent jobs and 3868 temporary jobs and the Kisangani markets offer 220 permanent jobs and 2718 temporary jobs in timber sales and handling. In both cities the daily salary is between US $2.40 and $4.70.

The breakdown for the added value is not the same in the two cities. In Kisangani, a major share of the profits are pocketed by, *inter alia* urban wood

<table>
<thead>
<tr>
<th>City</th>
<th>Species</th>
<th>Products</th>
<th>Domestic price/market value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinshasa</td>
<td>Sapelli</td>
<td>Scantlings</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Sapelli</td>
<td>Beam <em>(madrier)</em></td>
<td>66%</td>
</tr>
<tr>
<td></td>
<td>Limba/Frake</td>
<td>Plank <em>(planche)</em></td>
<td>93%</td>
</tr>
<tr>
<td>Kisangani</td>
<td>Sipo, kosipo</td>
<td>Scantlings</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Sipo, kosipo</td>
<td>Beam <em>(madrier)</em></td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>Sipo, kosipo</td>
<td>Planks <em>(plateau)</em></td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Afrormosia</td>
<td>Scantlings</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>Afrormosia</td>
<td>Beams <em>(madrier)</em></td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Mutondo/Emien</td>
<td>Planks <em>(planche)</em></td>
<td>28%</td>
</tr>
</tbody>
</table>
vendors, civil servants and temporary workers, while a significant part of the revenue from sawnwood sales to Kinshasa traders reverts to the upstream side of the sector.

Table 15 recapitulates the unit and total costs and benefits for the chainsaw milling sector in Kinshasa and in eastern DRC on the basis of the estimates given above (Figure 14, Table 12, Table 15), and connects them to four categories of actors:

- rural populations that sell the trees, and receive wages and profits from the chainsaw milling activities in the rural areas;
- urban populations that receive wages or benefit from the rental of outlets connected to the sale of the sawnwood;
- administrations, or their representatives, that collect the formal and informal taxes;
- the private sector that sells products (consumables, sawmill products, transport) and generates a profit from urban sales of sawnwood.

The rural and urban populations, as well as the administration pay little or none of the costs, but benefit from the revenue generated by chainsaw milling. They, thus, receive a net amount. This is not the case for the private sector that has to cover operating costs before being able to sell its products. To calculate the net revenue from the private sector we adopted the hypothesis that the sector would make a 20% profit on intermediary-level sales such as the rental

Table 15. Annual estimates of sales, costs and profits for wood products on the Kinshasa and Kisangani markets (US$/yr)

<table>
<thead>
<tr>
<th>USD</th>
<th>Kisangani</th>
<th>Kinshasa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales figures</td>
<td>12 147 891</td>
<td>83 502 106</td>
</tr>
<tr>
<td>Chainsaw timber purchases</td>
<td>5 630 006</td>
<td>62 149 769</td>
</tr>
<tr>
<td>Wages for outlet managers</td>
<td>214 830</td>
<td>959 048</td>
</tr>
<tr>
<td>Wages for outlet employees</td>
<td>182 775</td>
<td>318 436</td>
</tr>
<tr>
<td>Outlet rental</td>
<td>31 440</td>
<td>101 476</td>
</tr>
<tr>
<td>NatForFd tax</td>
<td>304 625</td>
<td>179 338</td>
</tr>
<tr>
<td>Community tax</td>
<td>32 750</td>
<td>179 338</td>
</tr>
<tr>
<td>Governorate tax</td>
<td>91 388</td>
<td>179 338</td>
</tr>
<tr>
<td>DGRAD tax</td>
<td>23 580</td>
<td>179 338</td>
</tr>
<tr>
<td>DGM tax</td>
<td>15 231</td>
<td>179 338</td>
</tr>
<tr>
<td>Profit</td>
<td>5 621 266</td>
<td>19 794 038</td>
</tr>
<tr>
<td>Profit rate</td>
<td>46 %</td>
<td>24 %</td>
</tr>
</tbody>
</table>

Table 16. Total estimates of costs and benefits in the small-scale chainsaw milling sector in Kinshasa and eastern DRC

<table>
<thead>
<tr>
<th>Types of income</th>
<th>Beneficiary</th>
<th>Kinshasa</th>
<th>Orientale province + Nord-Kivu + Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unit cost (US$/m³ sawn)</td>
<td>Total cost (US$/yr)</td>
</tr>
<tr>
<td>Tree purchase</td>
<td>Rural populations</td>
<td>24.2</td>
<td>5 720 588</td>
</tr>
<tr>
<td>Rural wages</td>
<td>Rural populations</td>
<td>80.2</td>
<td>18 915 993</td>
</tr>
<tr>
<td>Intermediary consumption</td>
<td>Private sector</td>
<td>42.3</td>
<td>9 982 936</td>
</tr>
<tr>
<td>Rural taxes</td>
<td>Administrations</td>
<td>13.9</td>
<td>3 291 793</td>
</tr>
<tr>
<td>Transport to market</td>
<td>Private sector</td>
<td>40.6</td>
<td>9 580 933</td>
</tr>
<tr>
<td>Rural profits</td>
<td>Rural populations</td>
<td>33.4</td>
<td>7 873 003</td>
</tr>
<tr>
<td>Purchase of sawmill scrap</td>
<td>Private sector</td>
<td>260.0</td>
<td>15 951 780</td>
</tr>
<tr>
<td>Urban wages</td>
<td>Urban populations</td>
<td>5.4</td>
<td>1 277 484</td>
</tr>
<tr>
<td>Outlet rental</td>
<td>Urban populations</td>
<td>0.4</td>
<td>101 476</td>
</tr>
<tr>
<td>Urban taxes</td>
<td>Administrations</td>
<td>0.8</td>
<td>179 338</td>
</tr>
<tr>
<td>Urban profit</td>
<td>Private sector</td>
<td>83.9</td>
<td>19 794 038</td>
</tr>
</tbody>
</table>
Financially the rural populations are the main beneficiaries of small-scale chainsaw milling operations in DRC, followed closely by the private operators. The administration only collects about 10% of the net revenue generated by the industry, but without factoring in the general State taxes. Furthermore, a major part of the taxes probably never reaches the State Treasury.

In terms of job creation, about 2000 direct permanent jobs were created in the rural areas of Bas Congo and Bandundu and about 3000 in the Orientale province and in Nord-Kivu. By adding all the forest-rich provinces like Équateur, Maniema and Sud-Kivu, the number of rural jobs created by the development of small-scale chainsaw milling reaches close to 7000.

In the urban zones, about 2900 permanent jobs and 6500 temporary jobs were created by this sector in Kinshasa and Kisangani alone. The figure for the national level is probably twice as high, or higher.

Across the DRC, the small-scale chainsaw milling sector in the rural and urban zones combined generates at least 25,000 jobs. This is about three times less than the estimated 87,500 jobs reported by Gerkens et al. (1991) 20 years ago, but the pitsaw that was used at that time was far more labour-intensive.
The massive scale of small-scale chainsaw milling in DRC is well acknowledged today. But the different categories of actors do not necessarily agree on the measures needed to secure and/or formalise the sector. Consultation meetings held in 2013 and 2014 in Kinshasa, Orientale province and Nord-Kivu attest to the – openly and hidden – divergent interests of the State, the small-scale chainsaw millers, the international community, the civil society and the local populations. It is not surprising that proposals for in-depth reforms require compromises and at best would be applicable in the long term and that demonstrable short-term measures were bitterly debated.

Four lines of action were discussed as an outcome to these consultations and the study. First, all parties agreed that the Congolese regulations on small-scale chainsaw milling were incomplete and often contradictory. Amending the legal framework is necessary but not sufficient to regulate the artisanal timber production sector. As a second step we suggest ways to improve the implementation of the regulations by seeking short- and medium-term changes in the current behaviour of the actors, especially the civil servants. Third, multifacet support can be provided immediately to the chainsaw millers, whether they have a PCA or not, in order to improve their practices and their impacts on the national economy. Fourth, several angles were discussed to better capitalise legally-produced wood on the national markets.

5.1. Possible changes to the regulatory framework

Several provisions in the regulations on small-scale chainsaw milling are contradictory, unclear or missing. At some stage these shortcomings – which are often manipulated to make way for illegal practices – must be corrected. The main challenge, however, is not to add to the legal provisions but to ensure that they are in line with actual practices and with the resources available to the actors. This will mean simplifying standards for chainsaw milling and designing a permit for semi-industrial timber production.

Easy access to small-scale chainsaw milling permits

The various 'official' permits awarded to the chainsaw millers are often not valid because the officials who deliver them have exceeded their legal authority. This confusion is nurtured by the interpretation of regulations in force, which are sometimes contradictory. Ministerial Order No. 11 of 12 April 2007, for instance, which regulates the authorisations for industrial felling operations (coupe industrielle de bois d’œuvre) and for the purchase, sale and export of timber, and authorises the minister to deliver PCAs contradicts Ministerial Order No. 105 of 17 June 2009 which makes explicit reference to the jurisdiction of the Governor. It would be useful to withdraw this section of Order No. 11 since it does not fit in with the spirit of the Forest Code which seeks to bring the administration closer to the grassroots level. It is essential to reinstate Order No. 35 as the only document that regulates small-scale chainsaw milling. This would solve the conflict of jurisdiction between the national and the provincial authorities on who is to issue the permits.

Decentralised allocation of PCAs should be linked to a national permits monitoring system to avoid conflicts in land allocation, especially under the artisanal and the industrial permits.

Similarly, the provincial level, because of its size, is probably not the best level for organising the reception and processing of applications
for small-scale chainsaw permits. For the procedure to be within the grasp of the chainsaw millers, the applications should be filed at the most decentralised level (Djire 2003), i.e., the Environmental Services. This is the process being used in some parts of the Orientale province but it is limited and the administration is not timebound by deadlines (Lescuyer 2010).

Simplified management in chainsaw milling zones

The use of the PCA is often contingent on the preparation of a forest management plan. This obligation, because of its technical complexity and financial cost, is never met nor checked. Even with two 50-ha PCAs, the land area is too small to be worth extensive development. There are two possibilities: (1) introduce regulations for a simplified management plan that can be applied to larger land areas, for instance the future community forests, (2) consider replacing permits based on land area by permits authorising the production of a certain volume of wood or a per-hectare yield. The second option seeks to establish simple, understandable rules that can easily be respected and verified. This would mean withstanding pressure from the forest administration that is only favourable to detailed technical plans that cover the next three decades and pressure from the international community which often imposes conditions that are foreign to the local populations.

Basing the PCAs on exploitable volumes would, moreover, mean rallying to the current practices of the chainsaw millers who are very mobile and go to wherever they find their targeted species. The volumes-based approach has two advantages. The tree owners receive more profit since the negotiations on the price of the tree will usually be between the small-scale miller and the customary owner (Adebu and Abdala 2012) and the administration can easily check wood volumes during the removal of the timber. At present the clan or villages chiefs usually benefit most from the transaction.

To simplify the PCA process would require a possible extension of the permit beyond the initial one-year period especially if felling activities are temporarily interrupted, in which case, the permit should be renewed for a full year, once. This type of approach is already being applied in the Congo Basin and enables the permit holders to harvest plots that have not been completely exploited, beyond the year covered by the permit. More flexible regulations would help the chainsaw miller cope with the technical and commercial risks of forest operations.

Yet, there is no guarantee that one-time renewable PCAs based on exploitable volumes bears no risk for the survival of some of the most prized species. The threat is very slight for the time being, at least in the Orientale province. In present-day DRC, it may be preferable to simplify the method of timber harvesting and the administration’s control mechanisms rather than to introduce measures that ensure sustainable management but are difficult to apply.

A simplified cahier des charges

Relations between local populations and small-scale chainsaw millers often spark complaints on one side or the other (Nkoy Élela 2007, Benneker et al. 2012). Whether the felling operation is official and is based on a cahier des charges or whether it is informal with the transaction being negotiated by the artisanal operator and the single customary owner, the operator often has to cope with protests from the local populations, especially if a large volume of wood is being removed from their forests. Furthermore in the case of a permit-based operation, the chainsaw miller’s payments are turned over to the local chief (and his closest friends), in particular when the workers are not from villages around the felling area (Makana 2006, Nkoy Élela and van Puijenbroek 2012).

The creation of a model for the cahier des charges, as often suggested, (Nkoy Élela 2007, Muganguzi Lubala and Benneker 2012) might be an improvement. The content of the cahier is still open to debate. Many local NGOs feel that the cahier des charges should include micro-zoning of the area allocated to the operator, specify the number of trees and the species to be felled,
identify the customary heirs, indicate the amount to be paid and the schedule of payments and indicate the breakdown of payments to community investments, the customary owner and the local management committee. The *cahier des charges* has to be signed in the presence of two trusted, independent witnesses who are not related to either party. It will also apply to millers who are native to the villages covered by this document. For the time being, the preparation of such a document is far beyond the capacity of the local communities and requires substantial assistance from the NGOs. But as we saw with the community forests in Cameroon (Ezzine de Blas *et al.* 2008), the deep involvement of NGOs in the forest decentralisation management process can delay the local communities’ uptake of these initiatives.

Another model could be designed to increase the chance of strong local involvement in the preparation and monitoring of the *cahier des charges* for the small-scale chainsaw milling operation. It would merely establish some simple rules – total volume, species, land area, royalties and their uses – that would be easy for the community to understand and check, even if they do not necessarily cover all the conditions needed to guarantee sustainable forest resource management.

Regardless of the model adopted for the *cahier des charges*, the community leaders and the small-scale operators are little inclined to standardise their arrangements, which are often bilateral. A precondition to formalising relations between the chainsaw millers and the communities is the creation of public awareness of the real importance of the revenue generated by the artisanal operations and the fair distribution of the revenue. Since the communities have no other contacts they often expect too much from the chainsaw millers (Muganguzi Lubala and Benneker 2012).

Furthermore, to limit disputes over the method for implementing chainsaw milling operations, a local management committee could be set up in each village. It could be composed of the village chief and the representatives of the ‘major families’ so that it remains simple but represents the various family clans in the community. The Committee would negotiate the *cahier des charges* with the chainsaw miller and ensure the appropriate use of revenue from the felling operations. The decision-making body in villages that have one could be assigned these new responsibilities thereby avoiding the need for more village committees. It would be wise to assign the community representatives who negotiate the *cahiers des charge* with the industrial companies to the task of regulating small-scale chainsaw milling on the village lands.

**The touchy question of the semi-industrial permit**

The Forest Code was meant to contribute to the emergence of a class of national entrepreneurs in the forestry sector. The introduction of a logging permit exclusively for Congolese citizens reflects this intention, but the structure of the PCA is not amenable to the development of an intermediary class of operators, which many professional associations of small-scale chainsaw millers wanted. Article 23 of Ministerial Order No. 35, for instance, lists the chainsaw and the pitsaw as work tools for artisanal sawyers. In the eyes of the law, lists are comprehensive, which means that operators who used equipment other than the chainsaw or the pitsaw were working under illegal conditions. But the equipment listed in the regulation is not sufficient for the production of high-quality timber and excludes all possibility of transporting the timber to semi-industrial processing units i.e., to where their productivity and commercial value can be improved.

To make the sector more profession, article 23 of Order No. 35 should be amended to authorise the use of equipment such as skidder type machinery or Lucas Mill type portable saws. This will require a simultaneous increase in the land allocation, from 50 ha to somewhere between 300 and 1000 ha. This option, which is supported by the industrial sector (Durrieu de Madron *et al.* 2012), but criticised by certain environmental NGOs (Global Witness 2012, REM 2012a) must be implemented with care. A semi-industrial permit would enable individual or collective artisanal millers to ‘progress up the ranks’, but it would also open the door to industrial companies some of which have behaved unscrupulously during the last few years in Bandundu. A permit of this type needs to be seriously discussed at the VPA
negotiations – especially with regard to the level of management required – since this category of millers exists in DRC and will be tempted to work illegally on a more or less large scale if a suitable permit is not available.

5.2. Better application of regulations

Regulations well-adapted to the small-scale chainsaw milling sector are of little use if they are seldom or poorly applied. Forest governance in DRC is roundly criticised (Baker et al. 2003, Debroux et al. 2007, Trefon 2008, Klaver 2009) and requires a series of complementary approaches (Jacquemot 2010) that, because of the country’s size and the logistical handicaps, (Trefon 2006) must be kept simple. With this in mind, there are two medium- and long-term improvements that would contribute to the formalisation and efficiency of small-scale chainsaw milling: the simplification of the tax system and the introduction of financial incentives to ‘go legal’.

Taxation vs parafiscal measures

Article 121 of the Forest Code describes the taxes and fees to be paid by the forest operators, namely, the fee on allocated land, the felling tax, the export taxes, and the deforestation/reforestation taxes. The small-scale operators – like the industrial operators (Durrieu de Madron et al. 2012) – pay a variety of taxes. Most of them are illegal (Polepole 2008, Chishweka 2012, Nkoy Elela and van Puijenbroek 2012). No receipts are issued for some of the taxes that seem to be legal which brings up the question of their final destination (Photo 7). This scenario unfortunately affects all productive professions (Jacquemot 2010), not only the forestry sector. Altogether for domestic exploitation and commercialisation of wood in the Kinshasa region and Orientale province, we have assessed ‘fiscal’ levies at about 10 million US dollars a year, not including the export taxes.

Several complementary approaches are needed to control the illegal component of this fiscal system and at the same time increase the effectiveness of the legal levies. First, it is essential to pay the State agents regularly and sufficiently to curtail their temptation to impose unwarranted payments on productive activities. This problem is not specific to the forest sector and must be tackled at the national level, inter alia by advocating to the members of parliament that the government agents must be paid regularly, to say the least.

However, the regular payment of acceptable salaries will not suffice to convince the State agents to apply the law. It is equally important to simplify and clarify the fiscal system applied to the small-scale forestry operations. Several measures could be considered. First, the number of checkpoints on the transportation routes could be limited, geographically identified, and run by State agents who are assigned to them for a specific period of time. The aim is to reduce the number of checkpoints by combining administrations. Instead of having a large number of random checkpoints where each passage is ‘negotiated’, tax payments would be secure and easy to control. Besides the permanent controls, mobile brigades, working with the Environmental Services, could make random checks across the area.

Second, the tax system should be clear and not open to change for a certain period of time, e.g., a calendar year. The tax scale should be published and widely circulated. A pamphlet explaining the taxes and fees might be given to each chainsaw miller who receives a PCA. The reorganisation of the legal taxation system will probably not
automatically eliminate the parafiscal system, but the creation of a clear taxation system is essential in the fight against embezzlement. On the one hand, the chainsaw millers will be given receipts of payment that they can show when extra-legal payments are demanded and, on the other, the preparation of a comprehensive list of legal taxes will make it easier to identify attempted fraud and eventually report it to the authorities.

Third, charges for taxes and fees must be reasonable, otherwise legality will not be an attractive financial option for the small operators. If the legal taxes are higher than the current parafiscal levies, not many of the small-scale chainsaw millers will be tempted to formalise their forestry activities. It would be advisable to change the tax base, especially in Kisangani where the profit rate from urban sales of sawn timber greatly exceeds profit rates in the rural areas. At present 80% of the transactions subjected to legal and paralegal taxes are in the rural areas (Table 16) while the profit rates are lower than those earned from commercial operations in the cities (Figures 12 and 13, Table 15). Another wise move would be to shift more taxes downstream in the sector. A special study should be carried out on this subject. Further, lowering taxes on logging and transportation could serve as a lever to break the financial dependency of certain small operators on their 'patrons'. Lastly, it would be relatively easy for urban traders to make a single tax payment at the banks. This would significantly reduce the risk of having State agents at decentralised locations misappropriate public funds.

**Incentives for the correct application of regulations**

In general, the State forest administration does not control the forest operations effectively enough (Durrieu de Madron et al. 2012). Many of the State agents in decentralised posts closely monitor changes in the informal milling sector, but not to the benefit of the State. In some cases, the civil servants run quasi-systematic rackets by collecting charges on informal timber flows without ever issuing receipts. This money becomes private income for the State agents, and amounts to tacit acceptance of an informal sector by the very people whose job is to prevent it. Were artisanal operations legalised in DRC, what could be done to convince these State agents to stop unlawful practices that are very profitable for themselves and their immediate bosses and, instead, to apply regulations that are first and foremost in the interest of the State?

Stricter control of State agents and real punishment for embezzlement is the solution most often proposed. This approach is undeniably worth promoting but, considering the amounts received through the parafiscal system, may not be enough, or may even be counterproductive since part of the hierarchy is pocketing part of the levies (Cerutti et al. 2013). This repressive approach probably should be combined with an incentive approach. An efficient compensation mechanism based on the performance of administrative services in promoting and applying the regulations might be the answer. It could, for instance, compensate agents who report a low rate of illegal small operators on their territory at the end of the year. The ultimate aim is to replace private revenue from the informal sector by an official bonus for forest operations carried out legally. The provincial office of the Ministry of Environment would unquestionably be in the best position to establish a system of incentives based on forest taxes – in particular the funds collected by the FFN – that would benefit these decentralised services, assuming that the agents are efficiently controlled. Provisions of this sort are difficult to implement because they can easily be abused. But for significant improvements to be made to forest sector governance, there seems to be no choice.

The improvement of forest controls also depends on the resources available. One common complaint emphasise lack of governmental staff and equipment. Pending substantial increases in the resources allocated by the State to the forest administration, there are several ways to optimise the interaction with the other actors working in these territories, namely the private operators, the communities and the civil society (Forests Monitor 2007). These actors could be assigned the official role of launching the alert for certain operations or for certain specific zones, e.g., in rural concession development zones, they could ensure respect of *cahiers des charges* or respect for rules on felling.
trees with a diameter under the legal standards (Global Witness 2013). These three categories of people could also be involved at a higher level, at least as observers, in provincial interministerial commissions responsible for following through on disputes.

The involvement of non-state actors in verifying legality also opens new prospects for actions that would be complementary to the dissuasion/repression role of the administrations. Advocacy, for instance, would be an alternative tool for fighting illegal, but unpunished, activities carried out by certain political-military elites and even by some senior civil servants. The civil society organisations are unquestionably the best equipped to use this tool.

5.3. Upholding common interests of small-scale chainsaw millers

Small-scale chainsaw milling is essentially part of the informal sector, a sector whose politics and economics are little understood (Gerkens et al. 1991). Public policy does not reflect the opinions of the chainsaw millers whose reputation suffers from the negative image caused by the fraudulent use of PCAs by industrial companies in the western part of the country. The creation of unions and millers’ associations that participate in the consultation platforms (Klaver 2009) is often encouraged to compensate for their lack of visibility and voice in the public debate. Since they form official groups, they are recognised as trustworthy interlocutors for the administration and the partners, which means that they are in a better position to defend the small operators’ rights (Chevallier and du Preez 2012).

Yet all too often the formation of millers groups seems to be the only way to make their business legal and more professional (Gerkens et al. 1991, Chishweka 2012, Belesi et al. 2013). Several programmes predicate access to permits, training and credit on membership in a formal professional association. This probably stems from an idealised image of the functioning of professional organisations in present-day DRC and a distorted opinion of how the chainsaw millers operate. Groupings of millers in the rural zone, when they exist at all, function poorly or with difficulty (Djire 2003, Assumani et al. 2012, Muwanguzi Lubala et Benneker 2012). All the surveys show that artisanal logging is an individual activity and that the loggers very seldom combine forces in forest operations or to fill a purchase order. It is highly unlikely that the creation of professional unions will change the essentially competitive relationship between these micro-entrepreneurs any time soon.

The professional associations can only function properly if their aims are clearly defined. Schmitt and Belani (2012) recommend the creation of cooperatives for independent entrepreneurs who would defend the common interests of all the loggers through: termination of permit suspension in Bas Congo, simplification of procedures, clarification of tax levies, etc. If these formal groups were eligible for the commercial, technical and fiscal facilities granted by the State they would appeal more to the chainsaw millers. These groupings, however, must not be the only threshold to legality or the only access to the tools of professionalisation. The law, and field observations, recognize chainsaw milling as an individual profession whose functioning, to be legal, must not be contingent on membership in a professional association.

5.4. A domestic market more hospitable to legal products

Urban demand for chainsaw timber of legal origin would give the small-scale chainsaw millers the strongest incentive to seek legality. Nobody knows if that type of a commercial niche exists; after a decade or more of informality and continuous harassment from the public administration, the small-scale chainsaw millers are not very interested in the problem of the ‘legal origin’ of the wood, especially if the related costs are going up. This probably also holds true for final buyers who are looking for low cost sawn timber, even if the quality is less good.

7 The studies by Nkubiri (2012) in Mambasa territory show the members’ opinion of the head of their local millers’ association. To the question ‘What do you think of the head of the group?’ 56% said that they thought he drank too much and 50% said that he was too authoritarian. To the question ‘What do you think about your meetings’ most of the members said they were improvised, unproductive and irregular.
There are at least two major obstacles to the development of urban demand and legally-produced timber supply. On the demand side, in the present situation there is no way to distinguish between chainsaw timber covered by a valid permit and chainsaw timber from the informal sector. One solution would be to create ‘timber clusters’, groups of entrepreneurs who commit to respecting regulations and hence are eligible for services that provide assistance for legal, high-quality production (Schmitt and Belani 2012).

If there is no private demand for chainsaw timber of legal origin, the State and the international organisations could instil new momentum by making it mandatory for public contracts to reject offers of timber that are not of legal origin (Forests Monitor 2007). Considering the volume required for public contracts, the challenge is to launch a sector that is specialised in legally-produced wood and could meet the requirements of the top and middle social classes that would be willing to pay a slightly higher price for good quality wood produced legally.

On the offer side, the main obstacle is money, since sawnwood is sold on the domestic market at prices that are lower than the international prices, a situation that does not attract industrial operators to the domestic market. One suggestion commonly expressed by the forest administration concerns the regulation of prices on the domestic market, as is done, in theory, for the wood products for export. Not only is the economic value of this strategy doubtful but the idea of controlling commercial practices is unrealistic because, on the one hand, there are too few agents to check the contents of the commercial transactions and, on the other hand, the operators (both producers and traders) are just as flexible and mobile as their counterparts in the small-scale chainsaw milling sector and will quickly move to areas that are not under State supervision.

The situation in Kinshasa, where prices for chainsaw timber on the domestic markets are only 20% below standard international prices, may be ripe for an alternative approach. Reducing certain taxes on industrial timber – dropping the VAT to 0% for instance – would probably eliminate a major part of this price difference and encourage formal enterprises to sell on the domestic markets, without lowering their profit margins.
Small-scale chainsaw milling has become a permanent activity in the Congolese society. For the last dozen years, gradual political normalisation has led to major changes in this sector, especially thanks to the growing demand from the local and regional markets, road improvements, easier access to chainsaws and the readiness of economic actors to invest in this sector (Debroux et al. 2007, Benneker et al. 2012). These factors have led to a substantial increase in small-scale timber production in DRC during the last 15 years especially since the 2002 Forest Law endorsed the profession. The annual DRC production now exceeds a million cubic metres of chainsaw timber of which 85% is for the domestic market. The volume is 10 times that of industrial timber and scrap sold on the Kinshasa market. The domestic markets in areas that we monitored generated sales of over 100 million $ (USD) per year and profits estimated at US$25 million per year, without reckoning the profits from indirect activities.

The local populations benefit most from this small-scale sector. Through tree sales, wages, profits and payments connected to the cahier des charges they receive about 50 million US dollars per annum. In all the provinces in the study, chainsaw milling is profitable especially for the individual loggers: the average profit rate fluctuates between 15-33 US$/m³, and the global operating costs are between 150 and 200 US$/m³. Small-scale chainsaw milling is far more profitable for the sawyers and the rural populations in Bas Congo and Bandundu than in Orientale province, largely because of the commercial system. Costs and benefits are higher in the Kinshasa region partly because of the distance to forest resources but also because of the relatively higher prices of chainsaw timber on the Kinshasa markets.

A more detailed analysis shows that chainsaw millers who fill purchase orders make the highest profits by capitalising their knowledge of the market systems. Conversely, in the Orientale province, chainsaw millers who have felling permits are finding it difficult to earn money because of the high price of the permits and because of their interminable debt to their ‘patrons’. In Bandundu and Équateur, the PCAs are used very differently and have been obtained by large numbers of enterprises that are not eligible for this type of permit.

Small-scale chainsaw milling generates numerous jobs. Our survey shows that about 2000 direct permanent jobs were created in Bas Congo and Bandundu and about 3000 in the Orientale province and in Nord-Kivu. This is close to the estimate made by Debroux et al. (2007) and Durrieu de Madron et al. (2012) at the national level. The jobs created in connection to timber sales on the domestic market have to be added to the jobs created upstream. About 2900 permanent jobs and 6500 temporary jobs were created by this sector in Kinshasa and Kisangani alone.

Because of its physical and economic importance, small-scale chainsaw milling is central to DRC’s efforts to ensure the sustainable management and legal exploitation of its forestry resources, and at the same time contribute to the economic development of the rural areas. Furthermore, this sector has been included in the VPA now being negotiated.

On the basis of the results we presented and the discussions at the partners’ consultation workshops, several options can be considered to try to better regulate and ensure the permanency of small-scale chainsaw milling in DRC. These options fall into two categories: technical options to improve methods in the field in the short term and, political options which require substantial changes e.g., in governance and behaviour at...
the national level. We have classified the options according to their practicality and reliability, and have given preference to actions that can be implemented rapidly and can be effective in the short- or medium-term future rather than basic reforms that often embrace more than the forestry sector and require more time. Considering the present situation in DRC, we preferred focusing our recommendations on the improvement of current practices, with a view to identifying and then testing good practices that could thereupon be used in revising both the law and public policy.

**Technical options**

1. Develop channels of information in rural areas on the state of the domestic markets for chainsaw timber.
2. Offer technical, commercial and financial training adapted to the needs of the (1) existing professional associations and/or (2) chainsaw millers who would like to work as individual operators, especially young people in the rural areas.
3. Facilitate access to credit for small-scale chainsaw millers, especially in the Orientale province.
4. Facilitate access to sawing equipment and consumables for chainsaw millers.
5. File applications for PCAs with the most decentralised State environment service.
6. In each village in the sector, enrol the support of the formal (local committee) or the informal (clan chief, etc.) community institutions as contacts for the chainsaw millers, but remain accountable to the community and government levels. If the village does not have this type of institution, create a local management committee with the same attributions.
7. Draw up and then popularise a model for the preparation of simplified social provisions for the small-scale chainsaw millers.
8. Convince the government forestry services to keep official records of the volumes of timber sold on the national markets.
9. Introduce a national monitoring system for the PCAs issued in the provinces.

**Political options**

1. Strictly apply the current regulations on the PCAs and stop issuing them to industrial enterprises.
2. Guarantee that the public contracts and contracts connected to funding from international sources are supplied with chainsaw timber that has been sawn, transported and processed according to legal standards.
3. Promote professional associations for chainsaw millers and thereby better protect their common interests. Professional structures should help the individual chainsaw millers regularise their situation and facilitate their access to training and credit, but not condition such access.
4. Encourage industry to sell its products on the Kinshasa market, especially in the niche market that is not covered by the chainsaw millers.
5. Harmonise, consolidate and popularise the fiscal system that is applicable to the small-scale timber operations. A clear explanation of the taxation system should lead to lower financial costs for issuing permits which are prohibitively expensive and keep the ‘legal’ chainsaw millers in an escalating spiral of debt.
6. Amend the legislation on small-scale chainsaw milling:
   a. Specify which authority is empowered to issue the PCAs by amending Order No. 11 of 12 April 2007 and reinstating authority established in Order No. 35 of 5 October 2006;
   b. Prepare *cahiers des charges* and simplified procedures to regulate relations between the rural populations and the chainsaw millers;
   c. Authorise a one-time 1-year extension of the PCAs;
   d. Draw up simple rules for sustainable management of the areas given to small-scale logging, in particular by using the exploitable volume of timber rather than land area as the basis for the PCA.
7. Consider creating a semi-industrial logging title that includes a mandatory sustainable resource management clause (connected to the partial lifting of the moratorium on the concessions).
8. Increase control of the legality of chainsaw millers’ practices through the following five measures combined: (1) pay an appropriate salary to the government employees in the field; (2) mete out effective sanctions for misdemeanours and offences committed by representatives of the decentralised State offices; (3) simplify and broadly publicise the applicable regulations and tax information; (4) introduce a performance bonus for State agents, linked to the application of the principles of legality; (5) delegate certain specific control obligations to external actors such as chiefdoms (chefferies), NGOs and forestry enterprises.

9. Ensure complementarity between national regulations and provincial regulations from the angle of subsidiarity and decentralisation.


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The domestic market for small-scale chainsaw milling in the Democratic Republic of Congo


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Besides the business enterprises in Bandundu province that use small-scale logging permits (PCAs) illegally, there is a national artisanal sector composed of individual chainsaw millers who supply the domestic market and certain neighbouring countries. This sector is still essentially informal.

Our year-long monitoring of markets and transiting points for chainsaw timber brought out the substantial development of this activity over the last 15 years. At present more than a million cubic meters of chainsaw timber are produced in DRC every year, of which 85% is to meet the national demand. The production in Roundwood Equivalents of chainsaw timber – estimated at 3.4 million cubic metres per annum – is 13 times higher than the total formal production of wood products in DRC.

The domestic markets of Kinshasa and eastern DRC generate sales of over 100 millions US dollars per year and yield profits estimated at 25 million dollars. The local populations benefit most from chainsaw milling and receive close to 50 million US dollars per year. As for job creation, the rural and urban artisanal timber production sectors combined offered at least 25 000 direct jobs in the country.

Small-scale chainsaw milling focuses on five species – but different ones in different provinces – and on large diameter trees. The small number of species exploited by each chainsaw miller probably does not endanger the forest, although it can contribute to decreasing the economic value of the massif by degrading the forestland and making the scarce noble species even more scarce.

Because of its physical and economic scope, the small-scale chainsaw milling sector is essential, if DRC forest resources are to be sustainably managed and legally exploited. There are four lines of action to improve and secure the functioning of this sector: (1) in the short term, improve the implementation of the regulations by first of all changing the behaviour of the actors; (2) propose multifacet support for the small-scale operators working legally; (3) optimise the timber of legal origin on the national markets; (4) amend the legal and regulatory framework. These four strategic lines of action are broken down into technical and political options.