

# The contribution of NTFP-gathering to rural people's livelihoods around two timber concessions in Gabon

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**Abstract** NTFPs are often presented as a major contributor to livelihoods, as sources of food and cash, particularly for rural communities. There are few data available in Gabon to confirm this common assertion. This study was conducted on 127 households in 14 villages around two timber concessions in the south-eastern and south-western regions of Gabon for a period of one year. Conventional socio-economic survey tools such as focus group discussions, census and semi-structured interviews with households were used for gathering the data. Results reveal that rural

people depend on various sources of food and income for their livelihoods, but overall, the current contribution of NTFPs obtained from plant sources is insignificant compared to those from other activities. Odika (*Irvingia gabonensis*), ‘atanga sauvage’ (*Dacryodes buettneri*), fungus (*Termitomyces* spp.) and Gabon nut (*Coula edulis*) represent the main forest products commonly harvested by rural people. They are used primarily for subsistence, but the surplus is sold. The results of this study suggest that: (1) the main components of decree No. 137/PR/MEFP of February 4, 2009, that prohibits the logging of five multiple-use tree species over a period of 25 years in order to safeguard the sources of NTFPs, should be reviewed; and (2) state authorities and partners should promote projects aimed at increasing public awareness of the NTFP sector. These projects should include a census of NTFPs (for food, for medicine and for services), characterize their uses and identify the markets of target products as well as the development potential of NTFPs. Such projects could help Gabon and other Congo Basin countries to fix norms/standards for sustainable natural resource management and for enhancing the contribution of NTFPs to the national economy. This will be particularly relevant in the wake of dwindling oil revenues and the need to diversify and promote other revenue sources in the country.

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## Introduction

Over the past decade in Central Africa, discussions about non-timber forest products (NTFPs) have evolved from optimism to pessimism about their potential to alleviate poverty and encourage conservation. The role and importance of NTFPs in trade has evolved over time from their being key commodities during periods of early colonial conquest to secondary or minor resources. Recently, they have come back into the international spotlight (Sills et al. 2011). In this paper, we discuss NTFPs obtained from plants, as well as mushrooms and small animals like snails or insects that are found on trees or other plants, which are collected in forested lands by rural households, and which are intended for domestic consumption and small-scale trade (Ingram et al. 2012). The lack of knowledge on the availability of most NTFPs, especially in Central Africa, does not allow for accurate planning to ensure their sustainable management and their contribution to the fight against poverty (Awono et al. 2009). Despite the growing regional debate about the importance of NTFPs, which stresses that these forest products may contribute in significant ways to the sustenance of livelihoods in rural communities through income generation and as sources of food, medicines, building materials and raw materials for handicrafts (Clark and Sunderland 2004; Idowu et al. 2010; Shackleton and Shackleton 2006), comprehensive data adequate to support such assertions are scarce in most countries of Central Africa. However, despite the unavailability of such data, many governments have embarked on the promotion and development of the NTFP sector by formulating policies and legislation governing the harvesting, use, trade, marketing and management of these forest products. Gabon is one of them.

Gabon, with a total surface area of 267,667 km<sup>2</sup>, lies at the heart of the tropics, on the equator, and is bordered by Equatorial Guinea and Cameroon to the north, the Republic of the Congo to the east and south, and by 885 km of the Atlantic Ocean's coastline to the west. Nearly 85% of Gabon is forested, the highest percentage in Africa (Catinot 1978; FAO 2003). One of the reasons for the exceptional state of Gabon's forests is its low human population of only around 1.3 million people, 81% of whom live in urban areas. This leaves large areas with few to no people (United Nations Secretariat 2002). Gabon has oriented its

policy and legislative framework towards the promotion and development of the NTFP sector. At the regional level, the country follows the Central African Forest Commission (COMIFAC) directives and guidelines that provide a common basis for integrating NTFPs in policy, legislation and institutional frameworks. All of these measures have been put in place by the countries of the Central African sub-region to ensure the sustainable management of forest resources. At the national level, in 2011 Gabon established a Directorate for the Development of Non Timber Forest Products (NTFPs) within the Ministry of Forestry. It seeks to provide policy and regulatory frameworks for the successful development of this sector in Gabon. During the same year, the National Consultative Committee on NTFPs (CCN-PFNL) was established, with the task of ensuring better coordination among all the stakeholders involved in the NTFP sector. There is also a new national strategy and action plan for the development of the NTFP sector in the country, which seeks, among other objectives, to implement the guidelines of COMIFAC. This strategy, with consistent administrative and financial support, may serve as a framework for the development of the NTFP sector in the country.

The Forestry Code No 16/01, enacted December 31, 2001, represents the legal framework for regulating access, use and the sustainable management of timber and NTFPs in the country. Apart from this Forest Code, several regulations have also been enacted by the Gabonese government: (i) Decree N° 000692/PR/MEFEPEPN of August 24, 2004, setting up the conditions for exercising customary use rights in forests; (ii) Decree No 001029/PR/MEFEPEPN of 2004, regulating the harvesting, processing and marketing of products other than timber; (iii) Decree No. 137 /PR /MEFP of February 4, 2009, that banned for 25 years the logging of five tree species that provide NTFPs: moabi (*Baillonella toxisperma*), 'atanga sauvage' (*Dacryodes buettnerii*), afo (*Poga oleosa*), odika (*Irvingia gabonensis*) and Douka (*Tieghemella africana*). These government regulations can be considered a safety precaution and have been welcomed by conservation organizations. They have also contributed to the recognition of the importance of NTFPs in sustaining the livelihoods of local people. However, there are still very few quantitative estimates regarding the gains and the losses related to the implementation of some of these regulatory measures.

The lack of scientific data on the value and contribution of NTFPs to the rural economy in particular and to the national economy in general has often been cited as a major reason for the poor development of the NTFP sector in the country (FAO 2012).

This paper explores and analyzes the role and the importance of NTFPs obtained from plant sources for rural livelihoods and discusses the reasons behind the poor development of the NTFP sector in Gabon. A case study of 14 villages around two forest concessions assessed the contribution of NTFPs (consumption and sale) to total household income. The overall objective was to answer the following questions: (i) what are the perceptions of rural households about various livelihood activities around forest concessions? (ii) what are the contributions of these livelihood activities to the income of rural households? and (iii) what is the contribution of NTFPs from plant sources to the income of rural households? Finally, these results are used to discuss the way forward, and review the role of policies put in place in the country to develop the NTFP sector.

## Materials and methods

### Study sites

The first site is a timber concession held by Precious Woods Gabon—Compagnie Equatoriale des Bois (CEB), located in the South-East of the country (lat: 00° 83' 360"; long: 13° 320' 68") around Okondja town, Sebe Bricolo Departement (Province of Upper Ogooué). This is a company with good timber resource management practices, which exports most of its production. The concession is managed according to an approved and validated Forest Management Plan. The company obtained the Keurhout Certification in 2002, then ISO 14001 in 2004 and 2007. In 2008 CEB-Precious Wood Gabon obtained Forest Stewardship Council (FSC) certification (Bureau Veritas, 2011). The vegetation of the area has been classified as lowland, evergreen or semi-deciduous forest with a mean annual precipitation around 1500 mm. It is characterized by an abundance of *Aucoumea klaineana*, *Desbordesia glaucescens*, *Dacryodes buettneri* and *Erismadel phusexul*, in which the genus *Bikinia* (syn. *onopetal anthus*) is dominant (White 2001). The concession covers an area of 615,000 hectares and employs about 1460 people. The population around

the timber concession is made up of about 14,000 people (Massoukou 2007).

For a decade, CEB has implemented a social development scheme that is highlighted in article 251 of the Forestry Code. Local people depend mostly on the collection of natural resources including NTFPs and hunting. According to the literature, agriculture is poorly developed, as is the case in most regions of the country (Massoukou 2007). Chainsaw milling, carried out by a few local people, is also reported to be an important livelihood activity, providing substantial income to those who are involved (Massoukou 2007; Mba Assoumou 2012). Sampling took place around the former Industrial License 2/90, which is located in the eastern part of the concession.

The second site selected was the concession of La Convention Provisoire Aménagement-Exploitation-Transformation (CPAET) of Bayonne, in the southwest of Gabon, located between the provinces of Nyanga and Ngounié. The concession of Bayonne is a forest block covering an area of about 72,113 ha. In this forest concession, no management plan was available at the time of this study, given that inventories of forest resources had just been carried out. Several villages and ethnic groups are encountered around this forest concession. The population is estimated at about 1600 people (Mba Assoumou 2012). People around the concession depend on the collection and sale of natural resources including NTFPs and on the production of agricultural products in order to meet their livelihood requirements, due to limited employment opportunities in other sectors.

### Data collection

Data collection in both sites was based on literature review and on interviews. Participatory socio-economic diagnostic methods included a questionnaire survey that was backed up by a census, transect walks around the villages, focus group discussions with both women and men and interviews with local leaders, dignitaries and other key persons. These methods were complemented by a quarterly socio-economic monitoring survey (multi-round survey) over the period of a complete year to encompass the two seasons, the dry and the rainy season. This was to assess the dynamics of resource use and the rural economy of traded products at the household level. The multi-round

survey addressed rural livelihood activities such as agriculture, hunting, harvesting of NTFPs of plant origin and chainsaw milling. The sample represented 20% of randomly selected households in each of the surveyed villages. Data gathered were mainly directed at quantifying the forest resources collected and sold, for both home consumption and income generation. In total, one hundred and twenty-seven household heads were assessed in a total of 14 villages throughout the two forest concessions: 54 around CEB-Precious Woods Gabon and 73 around Bayonne. Most of the villages are located within a radius of 5 km around each selected forest concession. The selection of villages and of respondents was based on criteria such as their spatial distribution, ethnic diversity, market access and size, age of respondent and presence of support organizations (Fig. 1). The analyses were based on descriptive statistics. SPSS17.0 was used to generate tables, percentages (%) and figures on the economic values of the forest products gathered by households for both cash and food.

## Results

### Rural households' perceptions of contributions to their livelihoods

The perceptions of household heads around CEB Precious Woods Gabon and Bayonne forest concessions on the importance of various livelihood activities were documented through two focus group discussions organized in each village. Participants considered themselves farmers, agriculture being their most important livelihood activity. Local people also perceived hunting as one of their important sources of income and of food. The game obtained from hunting is both consumed and sold for income. Other important sources of income include wages, remittances, and petty-trade activities around the villages. Few people (1%) are involved in chainsaw milling as a source of income, which occurs especially around the CEB villages (Fig. 2).

### Contributions of various activities to livelihoods of rural households

Figures 4 and 5 show the average subsistence values and the incomes generated from various livelihood

activities carried out by rural households in villages around the two forest concessions. Chainsaw milling, initially perceived as of little importance (based on the number of people involved), is actually one of the most important sources of income for rural people around the CEB Precious Wood forest concession, yielding an average of 1,000,000 FCFA/1941/USD/household/year. However, very few people are actually involved in and benefit from these activities (Fig. 3). Apart from chainsaw milling, households obtain most of their income and subsistence from agriculture and hunting around both forest concessions (Fig. 3). Rural people's income from NTFPs other than game was estimated at 9298 FCFA/18 USD/household/year around Bayonne and 20,725 FCFA/41 USD/household/year around CEB while their consumption values were calculated as 72,630 FCFA/145 USD/household/year around Bayonne and 44,356 FCFA/89 USD/household/year around CEB, relatively low amounts. In comparison, income from hunting/game was estimated at 102,816 FCFA/200 USD/household/year around Bayonne concession and 343,029 FCFA/666 USD/year around CEB while the respective consumption values were 209,274 FCFA/406 USD/year around Bayonne and 542,708 FCFA/1054 USD/year around CEB (Fig. 3).

### Contribution of agriculture and NTFPs to the livelihoods of rural households

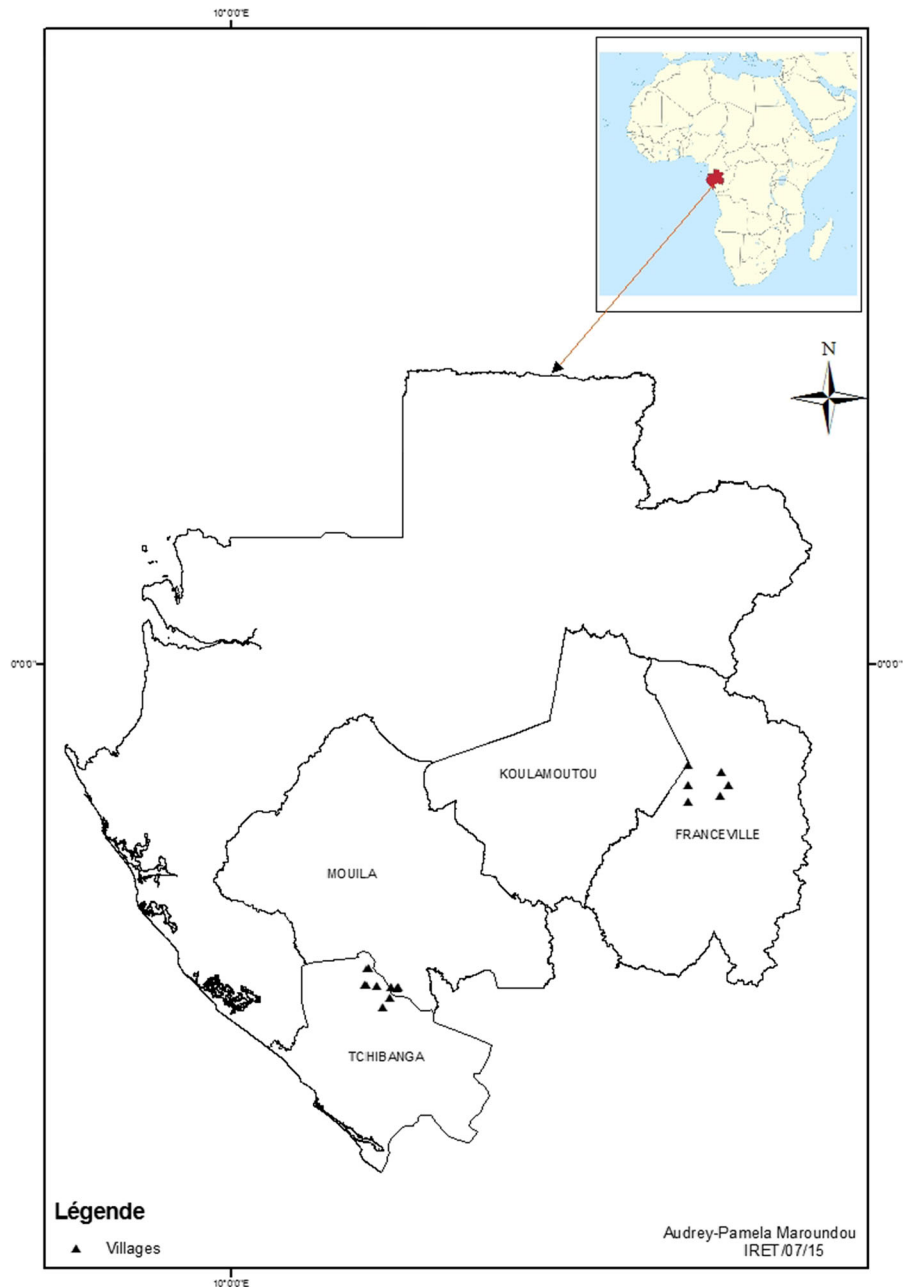
Figure 5 shows that agriculture is more important than NTFPs of plant origin to local peoples' livelihoods in terms of average income and consumption. However, other forest products contribute nearly as much, or even more, around CEB, where income from chainsaw milling is higher and income from hunting is significant. Although several crops are cultivated either for cash or food in agro-forestry systems, the quantities sold and consumed tend to depend on the crop species and on the location of the households. The study also revealed that crops such as pineapple (*Ananas comosus*), ground nut (*Arachis hypogae* L.), plantain (*Musa* spp.), sugar cane (*Sachharum* spp.), cassava (*Manihot esculenta*), garden egg (*Solanum melongena* L.), atanga (*Dacryodes edulis*), cocoa (*Theobroma cacao*) and coffee (*Coffea* spp.) are the main food and cash crops for rural households around the CEB Precious Woods and Bayonne forest concessions.

The most important NTFPs of plant origin for livelihoods of rural households

Figures 6 and 7 show that species of plant origin such as odika (*Irvingia gabonensis*), “asparagus” (*Asparagus* spp.), ‘atanga sauvage’ (*Dacryodes buettnerii*), fungus (*Termitomyces* spp.), moabi (*Baillonella toxisperma*), Gabon nut (*Coula edulis*), rattan spp. and

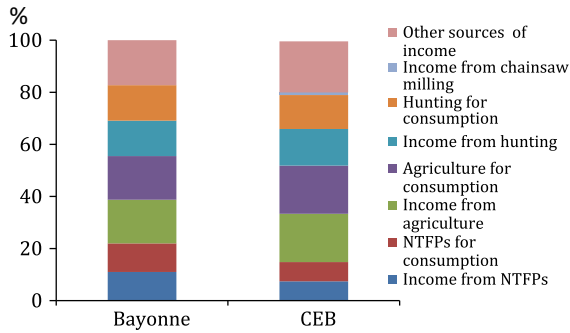
palm wine (*Elaeis guineensis*), Maranthacée (*Maranthaceae* spp.), abam (*Gambeya lacourtiana*) and nkumu (*Gnetum africanum*) are the main NTFPs harvested by local people in both regions. However, odika (*Irvingia gabonensis*), ‘atanga sauvage’ (*Dacryodes buettnerii*), fungus (*Termitomyces* spp.) and Gabon nut (*Coula edulis*) represent the main forest products that are commonly harvested by rural people around these two

**Fig. 1** Location of the study villages



forest concessions, primarily for subsistence although the surplus is sold to generate income. Communities around these forest concessions (although distant from each other) tend to have similar cultural behaviors,

especially with regards to food consumption. However *Gnetum* spp. and *Gambeya lacourtiana* are only consumed in villages around the CEB Precious Woods forest concession.



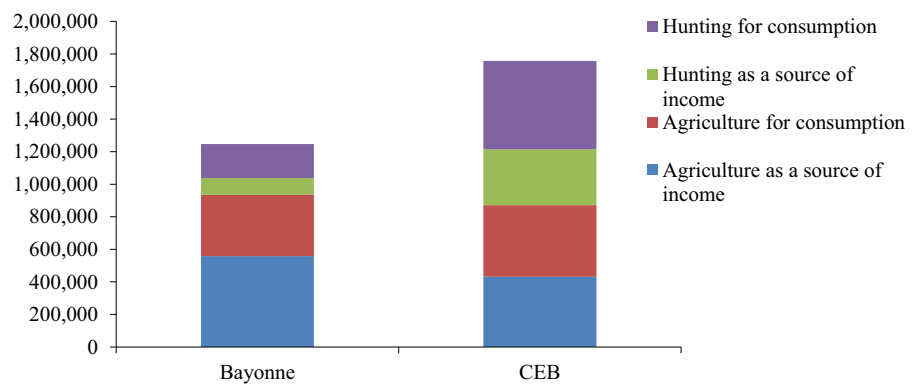
**Fig. 2** Household heads’ perceptions on the importance of various livelihood sources around the two forest concessions (n = 652, with n being total numbers of answers based on the questions asked)

**Discussion**

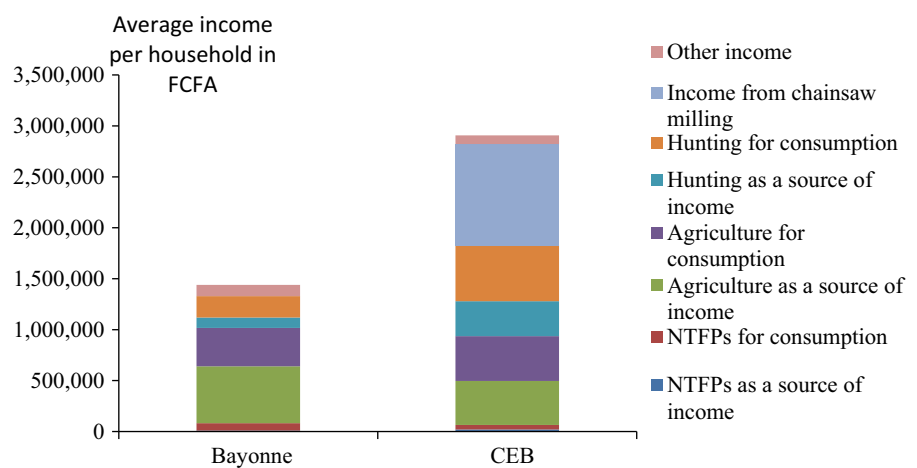
The perceptions of rural households on livelihood activities

According to the available literature, rural people have various reasons to engage in NTFP-gathering. These include: (i) economic efficiency and social effectiveness (Mikolo Yobo and Ito 2015), (ii) food production sufficiency and income (Levang et al. 2015; Mikolo Yobo and Ito 2015), and (iii) food security, socio-cultural customs and obligations and leisure (Awono et al. 2009; Noubbissi 2013).

**Fig. 3** Average consumption and income from hunting/game and from agricultural products in the two forest concessions (n = 127, with n being the total number of households sampled) in FCFA

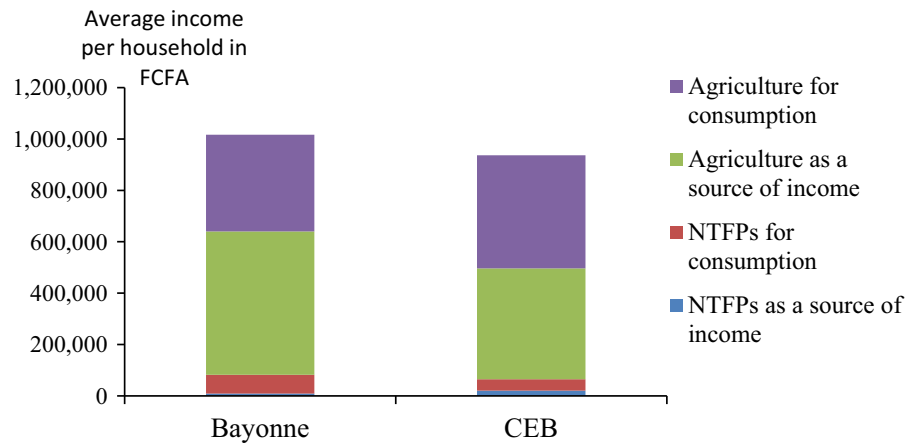


**Fig. 4** Average consumption and income generated from various livelihood activities around the two forest concessions (n =127, with n being the total number of households)

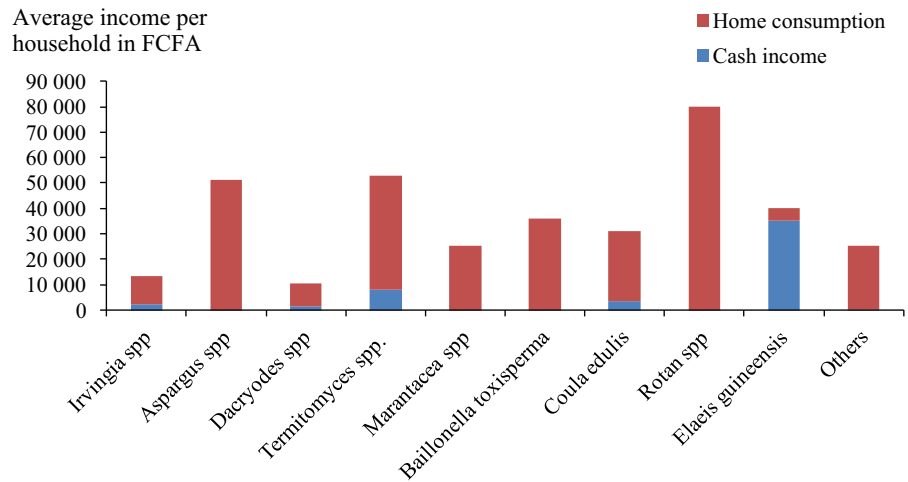




**Fig. 5** Average consumption and income from NTFPs (excluding game), and from agricultural products in the two forest concessions (n = 127, with n being the total number of households sampled)



**Fig. 6** The main NTFPs (not including game) consumed and sold by households around the Bayonne forest concession



This study shows that households in the sample population considered themselves as farmers, and that they depended more on agricultural products than on the collection and sale of NTFPs of plant origin. Local people also perceived hunting as one of the most important sources of income and food. Hunting activities are equally directed towards consumption and income generation (Schenck et al. 2006). According to the Forest Code, hunting operations are restricted to specific periods of the year. Outside these periods, hunting is prohibited. Hunting also requires the use of “modern” hunting techniques or tools such as shotguns, which are prohibited. Although many different species are hunted locally, for biodiversity conservation purposes a list of totally and partially protected wild species has been endorsed by the forest administration. Their hunting, capture, detention,

trade and transportation are strictly regulated by law, but the implementation of the law on the ground is sometimes complicated. Other important sources of income include wages, remittances, and petty-trade activities around the villages.

Livelihood activities of rural households around the two forest concessions

Chainsaw milling, initially perceived by local people as being of little importance, is actually one of the most important sources of income for rural people around CEB Precious Wood forest concession. However, just a few people tend to be involved and benefit from this livelihood activity. This activity also requires equipment that most people cannot afford, which is probably why chainsaw milling is controlled

by a few elite members of the community. A similar pattern was found in Cameroon (Levang et al. 2015). Apart from chainsaw milling, agriculture and hunting still seem to be the major sources of income and consumption for local communities around both forest concessions. The high dependence of rural people on these two livelihood activities might be a result of a lack of job opportunities and of the recent spread of poverty in the country, which has rendered the rural people unable to import foodstuffs. Studies have shown that it's generally the poorest populations that depend on forest resources, while relatively wealthier actors obtain additional income from these sources (Vedeld et al. 2007; Tieguhong et al. 2009).

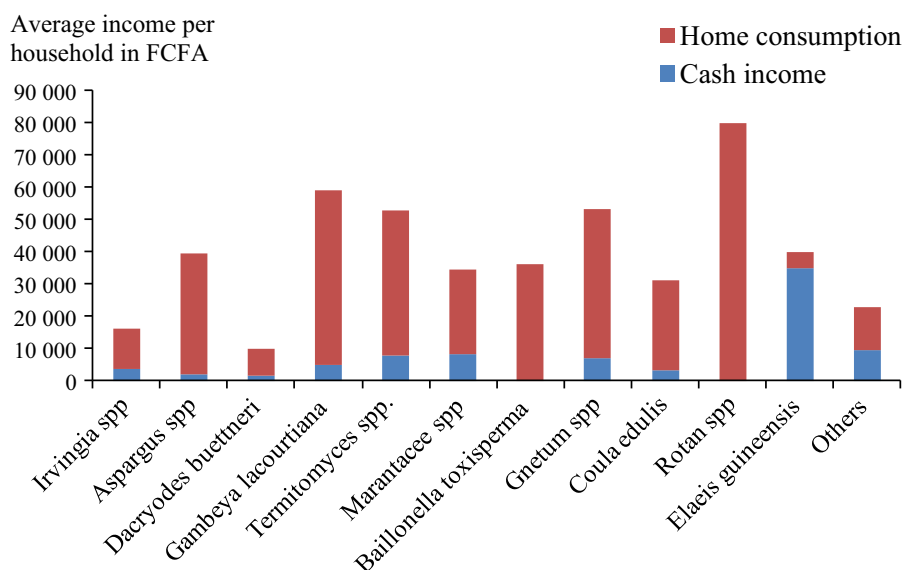
NTFPs of plant origin currently represent the least important source of income and of food for the rural households. These results are consistent with use of the term “minor forest products” to describe NTFPs, (Avocèvou-Ayisso et al. 2009), when compared to other sources of income and food. Income obtained from the NTFP trade varies depending on the markets, the products and the season. At the regional level, income from NTFPs can represent either a very small share, or up to about 80% of annual household income for some countries such as Cameroon (Ingram 2009). Based on our results, Gabon currently falls under the category of countries with a very small contribution of NTFPs to household income, if game is excluded. Nonetheless, these could represent great potential for

generating higher and diversified incomes for households and the national economy, especially as revenue from the non-renewable oil sector dwindles. However, some authors have cautioned that the economic potential of most NTFPs is rather small (Belcher 2003; Belcher et al. 2005; Levang et al. 2015), and that from a monetary perspective, NTFPs do not guarantee high or regular income for forest people (de Beer and McDermott 1989; Ndoeye et al. 1998).

Despite the use of NTFPs by local communities, very little information on their ecological and socio-economic value is available in the country, making it difficult to design effective and efficient regulations and management guidelines. Due to the lack of monitoring and appropriate statistics on NTFPs, they make a limited contribution to the national income accounting system and government tax revenue, so policy makers don't have a clear picture of the real economic and social impact of the sector (de Beer and McDermott 1989, 1996; Edwards 1996; Jensen 2009; Ingram et al. 2012).

This study, carried out in 14 villages around two concessions, found that NTFPs of plant origin played a minor role as a coping strategy for local people. However, they act as a complementary source of livelihoods, along with agriculture and hunting (Ingram 2009; Lescuyer 2010). It is also important to note that many of the most important game animals, notably duikers, also depend for food on the fruits of

**Fig. 7** The main NTFPs (not including game) consumed and sold by households in villages around the CEB Precious Woods forest concession





forest trees. To understand the real value of the NTFP sector, and to capitalize on the effort made by the government for the past few years, the rules, decision-making processes, institutional arrangements and measures that govern access to resources and markets should be reviewed.

#### The most important NTFPs used by local communities

The results of this study reveal that odika (*Irvingia gabonensis*), ‘atanga sauvage’ (*Dacryodes buettneri*), fungus (*Termitomyces* spp.) and Gabon nut (*Coula edulis*) represent the main forest products commonly harvested by rural people around these two forest concessions. Cultural exchanges that have resulted from past historical migrations of the Bantu people throughout the country may explain such similarities in terms of consumption behavior, especially for people in the south of the country (Oslisly and Peyrot 1992). However, NTFPs such as abam (*Gambeya lacourtiana*) and nkumu (*Gnetum* spp.) are only harvested by rural people around the CEB Precious Woods forest concession. This may imply that market opportunities shape the behavior of these rural people (Ingram et al. 2012).

The findings of this study are in line with the previous assertion that the current contribution of NTFPs of plant origin to rural households’ income is relatively small (Lescuyer 2010; Levang et al. 2015). The current contribution of NTFPs of plant origin to food consumption at the household level is relatively insignificant when compared to other sources. Agricultural products tend to make much greater contributions to the total income of households than the NTFPs that are sold in order to generate cash (Mba Assoumou 2012). This does not mean, however, that these products lack potential at the national level, particularly in light of the extensive forest resources of the country. Poor households are more dependent on NTFPs for both food and income generation while richer households tend to rely on livelihoods based on other kinds of resources (Kar and Jacobson 2012). The richer households tend to capture these resources (for example, wood) for their own benefit at the expense of the poorer households. Avoiding such resource-capture often calls for pro-poor policy interventions (Vedeld et al. 2007).

#### Policy and governance

Since 2011, the government of Gabon has introduced many reforms in order to improve its legal and regulatory frameworks to pay more attention to the needs of local communities, notably with regards to the harvesting and sustainable management of NTFPs. One example is the creation of a new administrative unit in charge of NTFPs. However, it seems from this study that the livelihoods of local communities are dependent primarily on agricultural production rather than plant-derived NTFPs. According to decree No.137 /PR /MEFP of February 4, 2009, the logging of moabi (*Baillonella toxisperma*), ‘atanga sauvage’ (*Dacryodes buettneri*), afo (*Poga oleosa*), odika (*Irvingia gabonensis*) and douka (*Tieghemella africana*) is prohibited. Timber from these trees is classified as unusable and unmarketable for a 25-year period. It is forbidden to saw, transport or sell wood from these species. However, village communities may continue to exercise their customary rights of use; this statute does not prevent the harvesting of fruits, bark, latex or resin, according to decree No.692 /PR /MEFEPEPN.

Although these measures contribute to highlighting the importance of NTFPs (access, use, trade, and marketing) in sustaining the livelihoods of local people and also show the good will of the government in promoting the use of NTFPs by local people, as well as conservation, the local people in our study did not have a high degree of dependence on these NTFPs. This could be due to the lack of knowledge about NTFPs in the country. Numerous NTFPs found in Gabon’s forests are not yet known and used by local people (Mikolo Yobo and Ito 2015). Many of them could be valued for their medicinal uses (Betti et al. 2013a, b), even in international markets. An example is *Prunus Africana*, which in Cameroon and the Democratic Republic of Congo, contributes to national revenues (Awono et al. 2009).

However, data to back up some of these regulations or to show the extent to which local people depend on selected forest resources are still lacking. No data was found in our literature reviews, but our results show that odika (*Irvingia gabonensis*), ‘atanga sauvage’ (*Dacryodes buettneri*), fungus (*Termitomyces* spp) and Gabon nut (*Coula edulis*) represent the only forest products that are commonly harvested by rural people around our study areas and are primarily used for

subsistence while the surplus is sold in order to generate income. Of the five species which are protected, only two, odika and ‘atanga sauvage’ were found to be important to local people in the villages we studied. Therefore, a critical review of the main components of decree No. 137 /PR /MEFP of February 4, 2009 should be considered.

If NTFPs can provide a foundation for the development of the livelihoods of forest-dependent communities, then accurate data on the value and contribution of these forest products to rural households may significantly help policy makers to design appropriate policy interventions. In Cameroon, for example, the study of Ingram and Tieguhong (2013) stressed the direct consequences of the lack of quantitative and qualitative data on the development of the bamboo value chain in terms of: (i) the security of local people’s livelihoods, (ii) the survival of customary and future uses, and (iii) the impact of uncontrolled trade on the sustainability of resources. Gathering such data is critical not only to inform policymakers and practitioners on the importance of forest resources in local people’s livelihoods and the survival of cultural values and practices but also to guide proper conservation and development interventions (Ingram and Tieguhong 2013). The lack of scientific data on the value of NTFPs and their contribution to the rural economy in particular and the national economy in general has often been cited as the main reasons for the poor development of the NTFP sector in the country (FAO 2012).

## Conclusion

The gathering of NTFPs of plant origin is done by almost everyone in the community, yet this represents one of the least important activities in terms of food and income generation for rural people around the two forest concessions. Even around the forest concessions, the value of agricultural products for subsistence and income generation is much higher than that of NTFPs of plant origin. NTFP-based livelihood activities are mostly considered complementary activities to agriculture-based livelihoods. However, among the commonly used NTFPs we found in this study, only odika (*Irvingia gabonensis*) and ‘atanga sauvage’ (*Dacryodes buettneri*) have been mentioned in decree No. 137 /PR /MEFP of February 4, 2009.

Their logging is prohibited for the next 25 years. Further study and analysis of NTFP use and the impact of this decree should be considered. Despite policy and institutional improvements in Gabon, there is a lack of data on the value and contribution of NTFPs to the economies of rural households. The State and its partners, which have developed good agricultural programs, should also put in place programs geared towards increasing public awareness of the NTFP sector. These programs should seek to address the census of NTFPs (food plants, medicinal plants, and ornamental plants), the characterization of their uses, the markets for these products, and their potential for NTFP production in Gabon’s forests. This would help the Congo Basin countries to fix appropriate norms/standards on sustaining natural resources and on enhancing their contribution to the national economy.

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## Erratum to: The contribution of NTFP-gathering to rural people's livelihoods around two timber concessions in Gabon

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The original publication of the article contains errors in grammar, punctuation and sentence structure. The original article was revised and corrected version was published.

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