Evaluation of the contribution of NTFPs gathering: to rural people’s livelihoods around two timber concessions in Gabon

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Abstract NTFP are often presented as bringing a major contribution to rural livelihoods in terms of food and cash, and this particularly for rural communities. Few data are available in Gabon to confirm this common assertion. An annual monitoring of 127 households was conducted in 14 villages around two timber concessions in the south-east and south-west regions of Gabon. Conventional socio-economic survey tools such as focus group discussions, census and semi-structured interviews of households were used in gathering data during one year. Results reveal that rural people depend on various sources of livelihoods for food and income generation, but overall, the current contributions of vegetal NTFPs are insignificant compared to other activities. Odika (Irvingiagabonensis), atanga sauvage (Dacryodes buettneri), fungus (Termiomyces spp) and “nut” (Coula edulis) represent the main forest products that are commonly harvested by rural people, primarily for subsistence purposes while the surplus is sold. Although some efforts were made to promote the NTFP sector in the country, the results of this study suggest that: (1) the main components of the decree No.137/PR/MEFP of February 4, 2009, that prohibited the logging of five multiple use tree species over a period of 25 years should be reconsidered for revision; (2) the State authorities and partners should promote projects aiming at increasing the knowledge of the NTFP sector. These projects should contribute to the census of NTFP (for food, medicine and services), characterize their uses, the market chains of target products, and the development potential of NTFP. Such projects may help Gabon and other Congo Basin countries to fix norms/standards for a sustainable natural resource management and for enhancing their contribution to the national economy. This will be particularly relevant in the light of dwindling oil revenues and the need to diversify and promote other revenue sources in the country.

Keywords NTFP · Household economy · Rural people · Livelihoods · Governance · Policy · State priority
Introduction

Over the past decade, in Central Africa the debate about non-timber forest products (NTFPs) has grown from optimism to pessimism about their potential to alleviate poverty and encourage conservation. Consequently, their role and importance in trade and self-consumption has evolved overtime from key commodities during periods of early colonial conquest to secondary or minor resources, and once again more recently back into the international spotlight (Sills et al. 2011). In this paper, ‘vegetal NTFPs’ is restricted to all non-timber resource-derived products (plants, mushrooms or small animals like snails or insects) 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 in their biotope, and 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 significantly to sustain the livelihoods of rural communities in terms of income generation, source of food, medicines, building materials, and handicrafts, etc. (Clark and Sunderland 2004; Idowu et al. 2010; Shackleton and Shackleton 2006); comprehensive data on the ground are hardly available to sustain such assertions in most countries of Central Africa.

However, despite the unavailability of such data in most countries of the Congo Basin, many governments have embarked on the promotion and valorization of the NTFP sector by formulating policies and legislations governing the harvesting, use, trade, marketing and management of these forest products, and one of these countries is Gabon.

Gabon lies at the heart of the tropics, on the equator and bordered by Equatorial Guinea and Cameroon to the north, the Republic of the Congo to the east and south, and 885 km of Atlantic Ocean coastline to the west. With a total surface area of 267 667 km², nearly 85 % of Gabon is forested, the highest percentage of any country in Africa (Catinot 1978; FAO 2003). Possible reasons for this exceptional state of Gabon’s forests are a low human population, only around 1.3 million people of whom 81 % live in urban areas, leaving large areas with few to no people (United Nations Secretariat, Population Division of the Department of Economic and social Affairs 2002). Gabon has also oriented its policy and legislative framework towards the promotion and valorization of the NTFP sector in various manners. At the regional level, the country follows the Central African Forest Commission (COMIFAC) directives and guidelines that provide a common basis for proper consideration of NTFPs in policy, legislative, fiscal and institutional set up by the countries of the Central Africa sub-region to ensure the sustainable management of forest resources. At the national level, there is the establishment of the Directorate of the Valorization of Non Timber Forest Products (NTFPs) within the Ministry of Forestry in 2011. It aims at providing a policy and regulatory framework 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 to ensure a better coordination amongst all stakeholders involved in the NTFP sector. There is also the elaboration of a new national strategy and action plan for the development of the NTFP sector in the country, which seeks, among others, to implement the guidelines of COMIFAC. This strategy may serve as a framework for the development of the NTFP sector in the country with consistent administrative and financial supports.

At the legal and regulatory levels, the forestry code No. 16/01 enacted on the 31st December 2001 represents the legal framework laying down the principles for regulating access, use and sustainable management of the timber and NTFPs in the country. Besides this forest code, several regulations have also been enacted by the Gabonese government: (1) Decree No. 000692/PR/MEFEPEPN of the 24th August 2004 setting up the conditions for exercising the customary use rights in forests; (2) Decree No. 001029/PR/ MEF EPENP regulating the exploitation, processing and marketing of Products Other than Timber in 2004; (3) Decree No. 137/PR/MEFP of February 4, 2009, that forbade to log five tree species: moabi (Balilonea toxisperma), o zigio (Dacryodes butterii), afo (Poga oleosa), andok (Irvingia gabonensis), Douka (Tieghemella africana) for 25 years. Although, these regulations taken by the government can be considered as a safety precaution, welcomed by conservation organizations, these regulations have also contributed to the recognition of the importance of NTFPs for sustaining the livelihoods of local people. However, there are still
very few quantitative estimates regarding the gains and the losses related to the outcome 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 importance of vegetal NTFPs for rural livelihoods and discusses the reasons behind the poor development of the NTFP sector in Gabon. Using a case study of villages around two forest concessions, the contribution of NTFPs (consumption and sale) to the total household income were assessed. The overall objective was to answer the following questions: (1) what are the perceptions of rural households about various livelihoods activities around forest concessions, (2) what are the contributions of these livelihood activities to the income of rural households? (3) what is the contribution of NTFPs of plant origin to the income of rural households? Finally, these results are used to discuss the way forward, and the effectiveness 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 Haut Ogooué). The company is an example of good management of timber resources. It is managed according to a validated and approved forest management plan by the forest administration, and exports most of its production. The company obtained the Keurhout certification in 2002, then ISO 14001 in 2004 and 2007. In 2008 CEB-Precious Wood Gabon obtained the Forest Stewardship Council (FSC) certification (Bureau Veritas2011). The vegetation of the area has been classified as lowland, evergreen or semi-deciduous and humid tropical forest, characterized by an abundance of Aucoumea klaineana, Desbordesia glaucescens, Dacyrodes buettneri and Erismadel phusexul, but particularly by the genus Bikinia (syn. onopetal anthus) (White 2001), and with a mean annual precipitation around 1500 mm. The concession covers an area of 615,000 hectares and employs about 1460 people. The population around the timber concession is about 14,000 people (Massoukou 2007).

For a decade, CEB has implemented a social development scheme that is highlighted in the article 251 of the Forestry Code. Local people depend mostly on the collection of natural resources including NTFPs and hunting, coupled with a poor development of swidden agriculture as it is the case in most regions of the country (Massoukou 2007). Artisanal sawing led by fewer local people represents also one of the main livelihoods activities providing substantial income to people in the region (Massoukou 2007; MbaAssoumou 2012). Sampling took place around the former Industrial License 2/90, which is located in the eastern part of the concession.

The second selected site was the convention provisional planning-operations and transformation (CPAET) of Bayonne, in the southwest of Gabon. This concession is located between the provinces of Nyanga and Ngounié. The concession of Bayonne represents a forest block covering an area of 72,113 ha. In this forest concession no management plan was available at the time of this study, given the fact that forest resources inventories had just been carried out. Regarding socioeconomic structures, several villages and ethnic groups are encountered around this forest concession. The population is estimated at about 1600 people (MbaAssoumou 2012). People around the concession depend on the collection and sale of natural resources including NTFPs and the production of agricultural products to meet their livelihoods because of limited other employment opportunities.

Data collection

Data collection in both sites was based on literature review and interviews. Participatory socio-economic diagnostic methods included a questionnaire survey that was backed up by census, transect walks along villages, focus group discussions with both genders, direct-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 course of a complete
year (to encompass the two main dry and rainy seasons of the region) to assess the dynamic of resource use and rural economy of traded products at the household level. The multi-round survey was related to rural livelihoods activities such as agriculture, hunting, harvesting of NTFPs of plant origin and artisanal sawing. Sample size 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 accessed throughout the two forest concessions, 54 around CEB-Precious Woods Gabon and 73 around the Bayonne in a total of 14 villages. Most of the villages are located within a radius of 5 km around each selected forest concession. The selection of villages was based on criteria such as their spatial distribution, ethnic diversity, market access, and size, age of respondents, presence of support organizations (Fig. 1). The analyses were based on descriptive statistics using SPSS17.0 statistical package to generate tables, percentages (%) and figures on economic values of forest products gathered by households for both cash and subsistence incomes.

Results

Rural households’ perceptions on various livelihoods activities around both forest concessions

The perceptions of household heads on the importance of various livelihood activities for villages around CEB precious Woods Gabon and Bayonne forest concessions were obtained through two focus groups discussions organized in each village. Participants considered themselves as farmers, agriculture being their most important livelihood activity. Local people also perceived hunting as one of the important sources of income and food. Hunting activities are equally directed towards home consumption and generation of cash income. Other important sources of livelihood for monetary income included wages, remittances, and petty trade activities around villages. The importance of the incomes gained from others sources of livelihoods are consequently non-negligible (17–20%) in sustaining the lives of rural poor people. However, few people (1%) are involved in artisanal logging activities as source of cash income, especially around CEB villages (Fig. 2).

Various livelihoods’ contributions to rural households around both forest concessions

The Figs. 3 and 4 represent average subsistence values and cash incomes generated from various livelihood activities carried out by rural households from villages around both forest concessions. Artisanal sawing based livelihoods, initially perceived as of little importance (base on the ratio of the number of people involved), is actually one of the most important sources of cash income (1000 000 FCFA) for rural people around CEB Precious Wood forest concession only. However, it is important to mention that, just few people tend to be involved in such livelihood activities and benefit from it (Fig. 3). Besides artisanal sawing, local people tend to depend highly on agriculture and hunting as sources of cash income and subsistence in both forest concessions (Fig. 3). Rural people’s dependence on NTFPs as sources of cash income (9 298 FCFA around Bayonne and 20 725 FCFA in CEB) and consumption (72 630FCFA around Bayonne and 44 356 FCFA in CEB) is relatively low.

Contributions of agricultural and NTFP activities to the livelihoods of rural households around both forest concessions

Figure 4 shows that agriculture (compared to NTFPs) is the main contributor to local peoples’ livelihoods around the two forest concession in terms of average cash incomes and consumption derived from agricultural. Although, several crops are cultivated in agroforestry systems for either cash income or food, the amounts sold and consumed tend to depend on the crop species and the location of people. The study also reveals that crops such as pineapple (*Ananas comosus*), groundnut (*Arachis hypogae L*.), plantain (*Musa spp.*), sugar cane (*Sachharum spp.*), cassava (*Manihot esculenta*), aubergine (*Solanum melongena L.*), atanga (*Dacryodes edulis*), cocoa (*Theobroma cacao*) and coffee (*Coffea spp.*) represent the main crops produced that are used as sources of food and cash income by rural people around CEB Precious Woods and Bayonne’s forest concessions.
The main vegetal NTFPs used for livelihoods’ of rural households around both forest concessions

The Figs. 5 and 6 show that species such as odika (Irvingia gabonensis), “asparagus” (Asparagus spp.), atanga sauvage (Dacryodes buettnerii), fungus (Termitomyces spp.), moabi (Baillonella toxisperma), noisette (Coula edulis), rattan spp and palm wine (Elaeis guineensis), Maranthacée (Maranthacea spp.), abam (Gambeya lacourtiana) and nkumu (Gnetum africanum) are the main NTFPs harvested by local people in both regions. However, breaking down the list of these forest products, it can be stressed that odika (Irvingia gabonensis), atanga sauvage (Dacryodes buettneri), fungus (Termitomyces spp.) and “noisette” (Coula edulis) represent the main forest products that are commonly harvested by rural people around these two forest concessions for subsistence primarily, while the surplus
Fig. 2 Household heads’ perceptions on the importance of various livelihoods sources around both forest concessions ($n = 652$, with $n =$ total numbers of answers, base on the question asked)

Fig. 3 Average of monetary and consumptive incomes generated from various livelihoods around both forest concessions ($N = 127$, with $N =$ total number of households)

Fig. 4 Average cash incomes and consumption from NTFP and Agricultures products in both forest concessions ($N = 127$, with $N =$ total number of households sampled)
is sold to generate income. This implies that communities around these forest concessions (although distant to each other) tend to have a similar cultural behavior, especially with regards to food consumption. It is also worthwhile to mention that *Gnetum spp.* and *Gambeya lacourtiana*, are only consumed in villages around CEB Precious Woods forest concession.

**Discussion**

Rural households’ perceptions on various livelihoods activities around both forest concessions

According to the available literature, rural people have various reasons to engage themselves in NTFPs gathering, these include: (1) economic efficiency and social effectiveness (MikoloYobo and Ito 2015), (2) food production sufficiency and cash income (Levang et al. 2015; MikoloYobo and Ito 2015), and (3) food security, socio-cultural customs and obligations, leisure (Awono et al. 2009; Noumbissi 2013).

This study shows that the households in the sample population considered themselves as farmers, and that they depended more on agricultural products than on collection and sale of NTFPs. Local people also perceived hunting as one of the most important sources of income and food. Hunting activities are equally directed towards self-consumption and income generation (Schenck et al. 2006). According to the forest code, hunting operations are restricted to specific periods of the year. Outside this period, hunting activities are legally prohibited. Carrying out
hunting activities requires also the use of “modern” hunting techniques or tools by local people 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. This means that 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 monetary income include wages, remittances, and petty trade activities around villages.

Various livelihoods’ contributions to rural households around both forest concessions

Artisanal sawing based livelihoods, initially perceived as of little importance for local people, is actually one of the most important sources of cash income for rural people around CEB Precious Wood forest concession. However, just a few people tend to be involved in such livelihood activities and benefit from it. This activity also requires some equipment that most people cannot afford, and that is probably why artisanal sawing is controlled by a few elite members of the community, a similar pattern was found in Cameroun (Levang et al. 2015). Besides artisanal sawing, agriculture and hunting still appear as 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 caused by a lack of job opportunities and the recent spread of poverty in the country, that result on the inability of rural people to afford paying for imported foods. Studies have found that, it is generally the poorest populations who depend on forest resources, while the additional cash incomes are generated for the benefit of relatively wealthier actors (Vedeld et al. 2007; Tieguhong et al. 2009).

NTFPs of plant origin currently represent the least important source of cash income and food for livelihoods of rural people. These results fall in line with the fact that NTFPs are often termed as “minor” forest products due to their seasonal nature (Avocéou-Ayisso et al. 2009) compared to other forms of livelihoods. The income obtained through the NTFP trade varies considerably depending on the markets, products and their seasonal character. At the regional level, income from NTFPs could 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 countries with very small NTFP household income contribution but with great potentials generating higher and diversified incomes for households and the national economy, especially as revenue from the non-renewable oil sector dwindles. However, it has been cautioned by some authors that the economic potential of most of the NTFPs is rather small (Belcher 2003; Belcher et al. 2005; Levang et al. 2015), and that from a monetary angle, NTFPs do not guarantee high or regular income for forest people (de Beer and McDermott 1989; Ndoye 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 regulation and management of these products sometimes difficult. Due to the lack of monitoring and appropriate statistics on NTFPs, the government tax revenue for the NTFP sector are not optimized and do not give policy makers a true picture of the real economic and social impact of the sector, as a result of a limited contribution to the national income accounting system (de Beer and McDermott 1989, 1996; Edwards 1996; Ingram et al. 2012; Jensen 2009).

In the case of this study, although, the gathering of NTFPs of plant origin currently plays a minor role as a coping strategy for local people, it acts as a complementary source of livelihoods along with agriculture and hunting (Ingram 2009; Lesuyer 2010). Therefore, to see the real value of the NTFP sector, and to capitalize all 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 revisited and implemented. Otherwise, it will be just a waste of time and resources for the State, which has already oriented his policies towards the development of industrial agriculture.

The main vegetal NTFPs used by local communities, and their implication for policy orientation

The results also reveal that odika (*Irvingia gabonensis*), atanga sauvage (*Dacryodes buettneri*), fungus (*Termitomyces spp.*) and noisette (*Coula edulis*)
represent the main forest products that are commonly harvested by rural people around these two forest concessions primarily for subsistence while the surplus is sold to generate cash income. This implies that communities around these forest concessions (although distant to each other) tend to have a similar cultural behavior, especially with regards to food consumption. Cultural exchanges that have resulted from past historical migrations of Bantu people throughout all the country may explain such similarities in terms of consumption behavior, and specially for people in the south of the country (Oslisly and Peyrot 1992).

On the contrary, vegetal NTFPs such as abam (*Gambeya lacourtiana*) and nkumu (*Gnetum spp.*) are only harvested by rural people around CEB Precious Woods forest concession as sources of foods and income generation. Therefore, market opportunities may shape the behavior of these rural people (Ingram et al. 2012). It is worth mentioning that at the household level the current contribution of NTFPs of plant origin to households’ food consumption is relatively insignificant compared to other household income portfolios but holds great potentials for the future giving the huge forest resources of the country. The findings of this study are in line with the previous assertion that highlights that the current contribution of NTFPs to rural households’ cash income is relatively small (Lescuyer 2010; Levang et al. 2015). In addition, agricultural products generally tend to make much greater contributions to the total cash income of households than do NTFPs sold to generate cash (MbaAssoumou 2012). This is not surprising, because poverty (lack of cash income) represents one of the driving factors of such change of lifestyle. As a result, poor households are more dependent on NTFPs harvest for both food and income generation while richer households tend to rely on non-NTFPs based livelihoods (Kar and Jacobson 2012). Richer households will therefore capture the resources for their own benefits at the expense of poor households. Avoiding such resource capture often calls for pro-poor policy interventions (Vedeld et al. 2007).

The implication for policy orientation and governance

The government of Gabon has introduced many reforms in order to improve its legal and regulatory framework to better take into account the needs of local communities in recovery and sustainable use of NTFP management, since 2011. One example is the creation of the new administration in charge of NTFP. However, livelihoods of local community in rural areas seem to be still dominated by agricultural products rather than NTFPs as shown by the results of this study. According to decree No.137/PR/MEFP of February 4, 2009, the logging of trees such as moabi (*Baillonella toxicotherma*), ozigo (*Dacryodes buettneri*), afo (*Poga oleosa*), andok (*Irvingia gabonensis*), douka (*Tieghemella africana*) is prohibited and classified unusable and unmarketable and that for 25 years. It is forbidden to saw, transport or sell the wood of these species. However, in the context of the exercise of the rights of customary use of village communities, this statutory provision does not prevent the harvest of fruits, bark or latex resin according to decree No.692/PR/MEFEPPEPN.

Although, these measures contribute to the recognition of the importance of NTFPs (access, use, trade, and marketing) for sustaining the livelihoods of local people in various ways, and show also the good will of the government to promote the use of NTFPs by local people as well as for conservation purposes, local people in our study do not highly depend on the designated NTFP products. This could be due to the lack of knowledge on 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 valorized for their medicinal uses (Betti et al. 2013a, b) even on international markets such as *Prunus africana* in Cameroon and Democratic Republic of Congo and which can contribute to the national revenues (Awono et al. 2009).

On the other hand, poor data availability to back up some of these legislations or to show the extent to which local people depend on such selected forest resources is still lacking. Then, to the best of our knowledge no available data was found, but our results show that odika (*Irvingia gabonensis*), atanga sauvage (*Dacryodes buettneri*), fungus (*Termitomyces spp*) and noisette (*Coula edulis*) represent the only forest products that are commonly harvested by rural people around our study areas, and barely used, primarily for subsistence while the surplus is sold to generate income. Therefore, a critical analysis of the main
components of the 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 in the economy of rural households may significantly help policymakers in drawing appropriate policy interventions. In Cameroon for example, the study of Ingram and Tieguhong (2013) has contributed to stress the direct consequences of the lack of quantitative and qualitative data on the development of the bamboo value chain in terms of: (1) the security of local people’s livelihoods, (2) the survival of customary and future uses, and (3) the impact of uncontrolled trade on the sustainability of resources. As a result, gathering such data is critical not only to inform policymakers and practitioners on the importance of forest resources for 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 and contribution of NTFPs to the rural economy in particular and 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 but represents one of the least important in terms of food and income generating activities carried out by rural people around the two forest concessions. The values of agricultural products used for subsistence and the generation of cash income are much higher than those from NTFPs of plant origin around the forest concessions. Consequently, NTFPs based livelihood activities are mostly considered as complementary activities that are mainly carried out by rural people to back up agriculture based livelihoods. The commonly harvested NTFP products by rural communities are barely used for subsistence in both sites, and their role is negligible compared to other activities. However, among the commonly used NTFP only Odika (*Irvingia gabonensis*) and atanga sauvage (*Dacryodes buettneri*) have been mentioned by the decree No.137/PR/MEFP of February 4, 2009, that prohibited its logging and classified unusable and forbidden to sell five tree species for 25 years. A critical analysis of the main components of this decree should be considered and proposed for revision, because none of the selected trees species are highly used by local communities, if this was the perceived reason behind the decree. Despite policy and institutional improvements in Gabon, without data on the value and contribution of NTFPs to the economies of rural households the State’s priority and partners who have developed good agricultural programs, should also put in place programs to increase the knowledge of the NTFP sector. These programs should emphasize the challenges related to the census of NTFPs (food plants, medicinal plants, service plants), the characterization of the uses, the market chains of target products, and the potential in the forests regarding NTFPs. This might help the Congo Basin countries to fix norms/standards for sustaining natural resources and for enhancing their contribution to the national economy.

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