



Promoting Multiple-use Forest Management: Which trade-offs in the timber concessions of Central Africa?



Guillaume Lescuyer^{a,b,*}, Mikhail Nelson Mvongo-Nkene^{c,d}, Guillaume Monville^{b,e},
Marcien Boris Elanga-Voundi^{b,d}, Tito Kakundika^f

^a CIRAD, Regional office of Central Africa, BP 2572 Yaounde, Cameroon

^b CIFOR, Central Africa hub, Yaounde, Cameroon

^c GIZ, Yaounde, Cameroon

^d University of Dschang, Dschang, Cameroon

^e University of Clermont I, Clermont-Ferrand, France

^f University of Kisangani, Kisangani, The Democratic Republic of Congo

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ABSTRACT

Despite its inclusion in the forest laws and the support of the international community, Multiple-use Forest Management (MFM) remains poorly implemented in tropical forests. Two specific barriers limit the effectiveness of this approach in the timber concessions of Central Africa. On one hand, formal attempts at MFM are poorly conceived either because they promote forest uses, such as ecological functions or tourism, that have little relevance to direct stakeholders, or because they rely on the legal definition of local users' rights, which is disconnected to customary rules and practices. The article develops an alternative approach for six timber concessions in Cameroon, Gabon and the Democratic Republic of Congo, in which the foremost purpose of MFM is to solve or reduce actual conflicts of uses, notably regarding agriculture, hunting, chainsaw milling and firewood collection. On the other hand, the costs of implementing MFM measures are rarely estimated and assigned to concerned actors. The costs of resolving conflicts of use were evaluated in the same concessions, based on consensual solutions elaborated by the logging companies, the forestry and agriculture administrations and the local people. In half of these concessions, the cost of MFM equals or exceeds 1.5 million dollars in the next fifteen years. Several trade-offs are possible between these stakeholders, combining tax relief, technical and financial support to local development, and reduction of some illegal practices.

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1. Introduction

Designing forest management on the basis of a broad spectrum of resources is an old approach to forestry. Although the Faustmann rule focused on the optimal harvesting of timber (Peyron and Maheut, 1999), this model has been adapted especially by Hartman (1976) to include amenity and non-timber services in estimating the optimal duration of the felling cycle. For twenty years, the economics of natural resources has considered forest management without it being necessarily oriented towards timber production (Guariguata et al., 2012; Panayatou and Ashton, 1992). The theoretical development of forestry and natural

resources economics is reflected in the changing discourses and perceptions of forest management over the past decades. The 1970s endorsed the necessity for social forestry, where the needs and aspirations of rural people are better taken into account, as a way to improve their livelihoods where forestry operations take place (Cernea, 1986; Wiersum, 1999). The 1990s established the paradigm of sustainable forest management (SFM), which may be defined as the production of continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment (D'Silva and Appanah, 1993; Toman and Ashton, 1996). This conventional conception of SFM continues to be influenced by the objective of sustained yield of forest resources, especially timber (Karsenty and Gourlet-Fleury, 2006; Luckert and Williamson, 2005). Its primary goal is to transmit to future generations a natural capital that is not less than its present level, while optimizing its present use.

* Corresponding author at: CIFOR, Jalan CIFOR, Situ Gede, Bogor barat 16115, Indonesia. Tel.: +62 (0)812 1263 7840, +237 996 71 05 12.

E-mail addresses: g.lescuyer@cgiar.org (G. Lescuyer), mikhail.mvongo@giz.de (M.N. Mvongo-Nkene), guillaume.monville@etu.udamail.fr (G. Monville), borislanga@yahoo.fr (M.B. Elanga-Voundi), titokakundika@yahoo.fr (T. Kakundika).

Multiple-use forest management (MFM) offers a complementary approach to the definition of SFM by putting more emphasis on intra-generational equity in the use of forest resources: it aims at a more equitable and balanced use of resources between current users, as well as an increase in the economic value of forests related to the joint exercise of multiple uses (Wang and Wilson, 2007). From a MFM angle, the long-term maintenance of natural capital remains an objective but it becomes secondary to the goals of increasing the present benefits of forest uses and sharing them in a more equitable manner among the different user groups (Garcia-Fernández et al., 2008; Sabogal et al., 2013).

MFM has been integrated in the revision of forestry laws of the Congo Basin countries from the mid-1990s. It is mainly through the management of timber concessions that formal MFM is to be widely implemented in Central Africa, for two main reasons. On the one hand, timber concessions constitute the main formal land use of forested areas in Central Africa (Bayol et al., 2014). On the other hand, they are increasingly exploited according to forest management plans (Blaser et al., 2011) that aim at optimizing timber harvesting for long term sustainability with consideration given to the uses of other goods and services (Nasi and Frost, 2009). The performance of timber concessions to apply SFM, designed as the long term maintenance of natural capital, is extensively debated (Edwards et al., 2014; Gourlet-Fleury et al., 2013; Putz et al., 2012; Zimmerman and Kormos, 2012). On the opposite, there is limited evidence on the implementation of multi-purpose forestry and on the promotion of intra-generational equity in the timber concessions of Central Africa. Poor design and lack of incentives appear as major constraints to enforce MFM in the Congo basin countries (Lescuyer and Essoungou, 2013; Nasi et al., 2012).

The first limitation concerns the design of MFM: this approach is frequently considered to better integrate the production of international public goods – like carbon or biodiversity – in the design of the optimal management of forest resources (Barbier and Burgess, 1997; Pearce et al., 2003) rather than viewed as a means to coordinate and valorize the benefits of local users (Rametsteiner and Whiteman, 2014; Rist et al., 2012). However, to be accepted by stakeholders, MFM must be built from uses that are of interest to them and to their scale of action, even leaving out some important economic benefits produced by forests but for which they cannot derive any financial, political or symbolic advantage.

The design of MFM in Central Africa is also flawed because it usually relies on forestry laws that impose a particular vision of community use rights of forest resources. This perception is conveyed by a micro-zoning inside the concession to delineate the areas for timber exploitation, for protection and for use by local populations (Fargeot et al., 2004). At least 75% of the total size of the concessions is dedicated to timber production, 10% is usually reserved for protected areas, and the size of agroforestry areas varies depending mainly on the human population density. As shown in Table 1, the uses of forest resources by local populations are regulated according to their location in these three types of specialized areas.

However, this official regulation of local uses of forest resources is deeply dissociated from communities' practices and perceptions which are guided by customary rules and tenure system (Diaw, 1997; Le Roy et al., 1996; Mbatu, 2009). Therefore, attempts to promote MFM based on these legal requirements have still not prevented the continuation of various conflicts between concessionaires and communities (Counsell et al., 2007; Eisen et al., 2014).

Rather than building an MFM that aims at integrating ecological functions or that relies on a problematic definition of customary rights, the article develops an MFM elaboration process that starts from an analysis of the actual conflicts of use. The first hypothesis

Table 1

Legal uses by local population in the specialized zones within the logging concessions in Central Africa.

Micro-zones of the concession	Local uses of natural resources			
	Gathering	Hunting	Fuelwood & lumber	Agriculture
Production areas	Authorized but for self-consumption only	Authorized but for self-consumption only and with traditional techniques	Authorized but for self-consumption	Prohibited
Protection areas			Prohibited	
Agroforestry areas			Authorized but for self-consumption	Authorized

of this paper is that such a diagnosis provides a basis for stakeholders' discussion to develop consensus on common and formal uses of forest resources.

The second obstacle to formal MFM in forest concessions in the Congo Basin is the lack of financial incentive for its implementation. MFM imposes additional costs to the logging companies, which reduces their motivation to implement this new approach, especially in comparison of conventional logging that focuses on short-term profits (Cassagne et al., 2004; Garcia-Fernández et al., 2008). MFM may also generate new costs to the State and to the communities, especially to comply with judicial laws. There is a lack of information on MFM operational and opportunity costs as well as on the allocation of these costs among stakeholders. Most publications mention trade-offs between competing or complementary activities, but there are very few quantitative estimates of gains and losses related to the passage of conventional logging to MFM. Some recent examples come from South America (Menton et al., 2009; Sist et al., 2014), but no similar studies exist in Central Africa. The article attempts to fill this gap and assumes that the financial evaluation of the benefits and costs related to conflicts' resolution clarifies the trade-offs to be made by each stakeholder to support formal MFM in timber concessions.

The description of the forest uses and the financial evaluation of the solving-conflicts activities are carried out in six logging concessions in Central Africa, whose main features are presented below. The investigation and analysis methods used for this research are then introduced. Results are provided to test the two assumptions and feed the discussion. The conclusion suggests reforming the perception of the logging concession model.

2. Methodology

2.1. Study sites

A timber concession is a natural forest area, usually of large size – between 50,000 ha and 300,000 ha – that belongs to the private domain of the State but that is granted to a company in order to harvest timber according to a Forest Management Plan (FMP). This forest management model emphasizes the industrial exploitation of timber resources, other ecosystem's goods and services being considered as secondary. In Central Africa, timber harvesting is highly selective and only a small number of trees (0.7–2) from a small number of timber species are extracted per hectare (Ruiz Pérez et al., 2005).

Six logging concessions were selected to test the article's assumptions. One pair of timber concessions was chosen each in Cameroon, Gabon and Democratic Republic of Congo (DRC) (Fig. 1).

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