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Managing forest resources to secure wood energy supply for urban centers: the case of Kinshasa, Democratic Republic of Congo

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Summary

The management of wood energy has become a major concern for the international community and is the focus of debates in Central Africa. The Makala Project, funded by the EU, fits within this context with the objective of securing the supply of wood energy to urban centers. Over the past three years, various forest resources management techniques have been designed and an assessment of the wood energy sector has been conducted in Kinshasa. Various technical itineraries have been proposed for the management of areas dedicated to the

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supply of wood energy at various levels, from the farming plot to the village land, and from the individual approach to the collective approach. This article provides a snapshot of the activities developed by the Makala Project to improve the management of periurban forest ecosystems and to secure the supply in wood energy.

Introduction

Forests in general and periurban forests in particular, play a vital role in supplying wood energy (Marien J.N., 2009). The demand in wood energy in the capital city was estimated at 490,000 tons of charcoal, approximately 4.8 million m³ of wood in 2010 (Schure J. *et al.*, 2011). The reliance of urban households on wood energy leads to the overexploitation of the remaining forest areas.

Forests remain a provider of goods and services indispensable for improving the living conditions of rural populations. However, these periurban areas which are characterized by overcrowding and a lack of management and development of economic activities, lead to the degradation and deforestation of natural forest ecosystems in the region (Vermeulen C. *et al.*, 2010).

What are the actions needed to improve the management of these ecosystems and to secure the supply in wood energy for the cities? This study suggests technical solutions varying from individual afforestation to the reconstitution of depleted natural forest areas through the development of Simple Management Plans (SMPs) for the production of wood energy.

The wood energy sector in Kinshasa The area supplying wood energy in Kinshasa spreads from the south-west to the north-east over a distance of about 102 km for fuelwood, and 135 km for charcoal (Figure 1). About two-third of the wood energy produced originates from slash-and-burn agriculture, the remaining third comes from degraded forests.



Photo 1 : Transportation of charcoal to Kinshasa (DRC) (Photo: R. Peltier, 2011)

The increase in the demand for wood energy in cities has exacerbated the pressure on forest resources in the region. This is of particular concern in view of the lack of incentives for the restoration or sustainable management of these resources. However, it ensures the livelihood of a large number of households. It was estimated that the total value of the wood energy market was worth 143 million dollars in 2010 (Schure J. *et al.*, 2011), 3.1 times the value of national roundwood exports of 46 million dollars in 2010 (FAO, 2011). Over 300,000 people are involved in this informal sector (Schure J. *et al.*, 2011), representing 20 times the number of persons (i.e. 15,000) working in the **formal forest sector in the country** (Eba'a Atyi R. and Bayol N., 2009). Most cash-generating opportunities exist at the level of production (the share of income generated varies from 47% for fuelwood harvesters to 75% for charcoal producers). Wood energy related incomes largely complete the average income of households. These incomes generated by wood energy contribute to their basic needs and provide households with an investment capital (mainly in agriculture and, to a lesser extent, in small-scale activities such as cattle rearing and fishing). Urban households rely heavily on woodfuel (87% in Kinshasa). Many businesses such as bakeries, breweries, restaurants, and brick and aluminum factories also rely on wood energy for their daily operations.

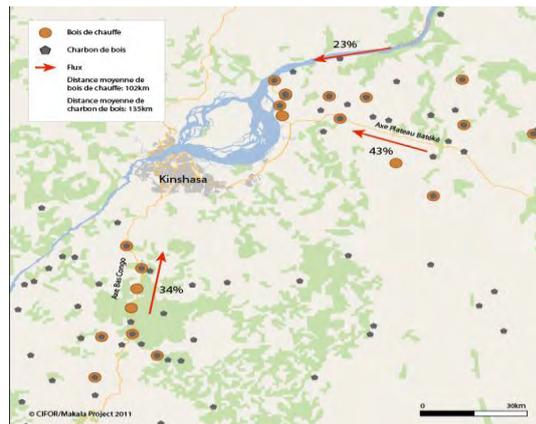


Figure 1: Movement of wood energy in Kinshasa (Schure *et al.*, 2011)

Managing periurban forest ecosystems

The management of tree resources was tackled around three main activities: the development of Simple Management Plans (SMPs), the dissemination of Assisted Natural Regeneration (ANR) techniques, and the reintroduction of trees in the cultural system.

Development of Simple Management Plans

An operational approach through the characterization of local landscapes toponymy was used to develop Simple Management Plans (SMPs). This process was built around five steps. The first involves the identification of endogenous groups to manage the area. The second aims at defining the area managed on a customary basis. The third aims at describing Landscape Units (LU) perceived by the communities in relation with the local spatial typology. Following the division of the area under study, management measures are identified in conjunction with the landscape units. The last step allows for the definition of future management modalities (rules, sanctions, profit sharing, type of contract) (Dubiez E. *et al.*, 2011). Various social communication tools were used in the participatory approach in order to maximize ownership (interactive model, participatory mapping, field trip, etc. see Larzillière A. *et al.*, 2011).



Photo 2 : Reproduction of Landscape Units using interactive models in the Kinduala village (Province of Bas Congo, DRC) (Photo : A. Larzillière, 2011)



Photo 3 : Assisted Natural Regeneration applied by a farmer in a farm located on the Batéké Plateau (Province of Kinshasa, RDC) (Photo : E. Dubiez, 2009)

Assisted Natural Regeneration (ANR) to enrich depleted fallow lands

The ANR technique was tested in the last shreds of gallery forests on the Batéké Plateau area. The technique is implemented in two phases. While clearing the underwood, the wood potential of the plot to be cleared is assessed by the farmer. He then selects the most interesting species based on their relevance (soil fertilization, charcoal production, caterpillar host plant, etc.). The species are preserved so as not to hinder crop growth with excessive shade and are protected from fire during the burning of the plot. The trees preserved are a source of seeds required for the reproduction and conservation of the most interesting species.

The second phase is conducted during the weeding of crops. The farmer chooses stump shoots based on their relevance. After the harvest, the preserved and spontaneous plants will grow during the fallow cycle (5-12 years in the area concerned). The farmer

will use this space for plucking, beekeeping, etc. The ANR method enables to put in place an agroforestry system inspired by traditional shifting agriculture practices.

Reintroducing trees in the agricultural system

The development of *Acacia auriculiformis* farms contributes to (1) restoring soil fertility, and (2) providing wood energy after a period of 7-8 years. After cutting the wood and producing charcoal, the plot is reclaimed before being reforested again through natural seeding or farming. This technique was tested on a 8,000 ha block by the Mampu Project (Bisiaux F., Peltier R., Muliele J. C., 2010) and is currently disseminated in a large number of villages, in smaller plots scattered over the rural area. Coaching the farmers during the entire production cycle (from the nursery to the farm) empowers them for the implementation. Special attention should be given to securing land tenure, maintaining and protecting the farm against fire.



Photo 4 : *Acacia auriculiformis* nursery in one of the Project EU Makala villages (Photo: F. Bisiaux, 2010)

Discussion and conclusion

Interventions in the sector should take into account the reliance of a great number of people on wood energy production, its contribution to the energy security of urban populations, and the importance of trade as a profitable activity. Activities developed have led to technical itineraries that meet the challenges of managing wood energy. The activities should be timely monitored to observe the social appropriation of the suggested techniques (ANR, reforestation, agroforestry, simple management plan).

The management of village lands can not in itself account for the management of tree resources in the supply basin of Kinshasa. This approach should henceforth be integrated in the decentralization process, granting decentralized land entities (DLE) the necessary autonomy to manage their economic, human, financial and technical resources. Complementarity with the Congolese Law should also be discussed to secure village farms and incite producers to cultivate.

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