

CARBON TRADING SCHEME AS AN INCENTIVE FOR PRECIOUS HARDWOODS CONSERVATION AND SUSTAINABLE FOREST MANAGEMENT IN MADAGASCAR

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ABSTRACT

Nowadays, forests cover nearly 4 billion hectares of the world's total land area and ensure the subsistence of over 1.6 billion people (Population Action International, 2011). However, forests are being lost or transformed at a rate of 6 million hectares a year through deforestation or selective logging. Moreover, forest loss occurs mostly in primary and tropical forests (FAO, 2005). Depending on the region, this deforestation issue is mainly driven by ranching and pasture and/or subsistence agriculture (FAO, 2010). On the other hand, illegal logging has also become one of the most prominent forest policy issues not only because of its scale, but also because of its wide-ranging environmental, social and economic consequences (Lopez-Casero and Scheyvens, 2010). This issue has drawn the attention of scientists, communities, organizations and policy-makers at a global level because of its extensive impacts.

Madagascar, well-known as biodiversity hotspot, has an endemism rate of 80% in terms of fauna and flora. The majority of its endemic plants and vertebrates are found in forest habitats. However, lately, illegal logging has also become an important driver of deforestation and forest degradation threatening the survival of a number of species. This illegal logging is targeting specific species such as Malagasy rosewood species (*Dalbergia Baronii* and *Dalbergia Louvelii*) in protected areas. The traffic of these rosewood species has been influenced by the absence of competent authority due to the political crisis, on one hand; and the increasing global demand, on the other hand. It is also stated that poor governance and a lack of clarity in forest regulation have

contributed to timber trafficking and undermined judicial control (Randriamalala and Liu, 2010). However, those rosewood species are considered as endemic species (unique to the country). Therefore, their extraction, exploitation, trade and export are prohibited in Madagascar by laws and regulations. Additionally, the extraction and exploitation of any species inside protected areas are also prohibited. These illegal logging activities result to the degradation of protected areas, the depletion of endemic species, habitat disturbance and environmental degradation. Indeed, it was estimated that five other ordinary trees were cut down for extracting and transporting one rosewood tree (Randriamalala and Liu, 2010). Beyond these negative environmental impacts, the traffic of precious hardwoods species also negatively affects the economy and social aspect of the country as this only benefited a few groups of people (EIA, 2010). Another important issue is the involvement of poor local communities in these illegal activities. Therefore, it is essential to develop a financial mechanism adapted to the local situation that will not only incentivize these communities in conserving their natural resources, but will also improve their livelihoods.

Understanding the factors influencing illegal logging is very important in order to address the problem. In this regard, previous studies have focused on the trade's process of Malagasy precious woods species from local to global level, the impacts of political events on the dynamics of Madagascar's forests and the dramatic escalation of illegal timber extraction (EIA, 2010; Wilmé et al., 2009; Randriamalala and Liu, 2010). However, the focus on the local communities who play an important role in illegal logging is lacking so as to develop the adequate measures that could ensure the safeguard of the remaining forests and prevent future illegal timber extraction. More precisely, few are the studies assessing the potential of carbon trading scheme with a focus on the local communities to address illegal logging.

In this perspective, this study seeks to examine the potential of developing a carbon trading scheme to reduce illegal logging of precious woods by local communities. It is assumed that the local communities who have been involved in illegal logging of precious woods are most likely motivated by a gap in their livelihoods. By participating in forest conservation activities (reforestation, patrol, and reporting illegal activities), those local communities can benefit from the carbon credits generated. This carbon trading can be considered through REDD+ (Reducing Emissions from Deforestation and Forest Degradation) mechanism that can increase the market value of forests and incentivize the government to enhance controls.

This research used a combination of both quantitative and geospatial analysis. Original data were collected from in-depth face-to-face interviews with heads of households and stakeholders involved in the REDD+ mechanism implementation. The interview of households aimed to (i) collect socio-economic data so as to determine the income level, (ii) provide information about their forest-dependence behavior as well as the level of their environmental awareness, and (iii) identify the level of their willingness to accept as compensation for changing behavior. Regarding the stakeholders involved in REDD+ mechanism, the interview aimed to (i) identify the main barriers and the key factors of success of developing a carbon trading and (ii) the potential management structure in the REDD+ implementation in Madagascar.

On the other hand, the data used for the geospatial analysis include Landsat images acquired from the United States Geological Survey website. The satellite images analysis aimed to show the extent of deforestation and forest degradation occurring in the study area from 1990 to 2011 to support the carbon trading scheme through REDD+ mechanism. In addition, secondary data from the literature review were used to assess the potential of carbon credits.

The socio-economic analysis demonstrated the interconnection of the poverty of the local communities and their involvement in the illegal practice. The majority of the villagers earn less

than USD 730 a year, or less than USD 2 a day, which is below the poverty line as stated by the World Bank. The interview also revealed that illegal logging practice was driven by the lean period and the influence of outsiders. This leads the local communities to find options to support their livelihoods and to satisfy their needs. In that sense, the carbon trading is seen as a potential mechanism to reduce the illegal logging of precious woods. It can fulfill the shortfall in the local communities' livelihoods and to satisfy their needs. A payment through a community association is recommended to promote the cohesion of the local communities in reporting the illegal activities. Since the local communities depend mostly on the agricultural products for their livelihoods, the funds from the carbon trading can be used to build small infrastructures such as irrigation canal and to buy materials and equipments for the common use by all members for their agricultural activities. The empowerment and the interaction of all stakeholders are fundamental for the implementation of this carbon trading scheme. Furthermore, the reform of Madagascar's forest management policy is also needed to address effectively the environmental problems.

This study demonstrated that forest conservation activities are more beneficial to the local communities than illegal logging practice. Indeed, the revenue from illegal logging remains ephemeral; however, forest degradation caused by this illegal logging will have long-term impact on their livelihoods. Further empirical research on the decision-making process among stakeholders is suggested to enhance good governance and to ensure effective political system and law enforcement. More studies on the carbon offset's projections, the monitoring, verification and reporting system in this study area will be also required to move forward with REDD+.

Key words: Carbon trading, Dalbergia Baronii and Louvelii , Financial mechanism, REDD+