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## Introducing Carbon Stock Value in Public Forest Concessions: Drawing Alternative Approaches for Concession Agreements in Brazilian Amazon

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### Abstract

This study analyses the contribution of the Environmental Service Carbon Stock in the context of forest concession agreements in the Pará State, Brazilian Amazon, to understand how the valuation of Environmental Services may increase the estimated values attached to forests. In this context, the purpose of this study was to assess the economic value of the carbon stock in Amazon forests by using as study area a public forest under concession process, the Mamuru-Arapiuns region. The hypothesis is based on the assumption that the inclusion of carbon storage can be an alternative to the existing payments for logging in concession agreements. The study took an applied and quantitative approach, using documental research from selected technical reports, inventories, concession contracts and other documents related to Forest Management Unit I (FMU I), situated in Mamuru-Arapiuns. A map was produced to provide a greater precision regarding the dimensions of the forest and land use types. Two categories of vegetation were observed: lowland dense ombrophylous forest and lowland open ombrophylous forest, the predominant of the two. The map also identified logging and land use areas. The interpretation of natural vegetation was obtained through a digital processing of SPOT satellite images produced by the geo-processing department of the State Secretary for the Environment (SEMA). Through satellite imagery it was possible to estimate vegetation and forest biomass at the FMU I (45,721.30 ha), where forest formations constitute about 94% of the total area, that is 43,117.36 ha. According to the estimates, the carbon stored in this vegetation is about  $8 \times 10^{-6}$  t.C. Under these conditions, the total value of carbon storage in the study area would be about US\$ 95,000,000, an estimate derived from the value of the forests taking in consideration the carbon stock with an average price of US\$ 3.24 per t.CO<sub>2</sub> for emerging voluntarily certifying emissions reductions market. The paper concludes with a discussion on the economic and environmental importance of considering the environmental services in the concession agreements and other forms of forest management.

**Keywords:** Environmental Policy, Forest Management, Public Land , sustainable Forestry