

3rd ESP Africa Conference (7-10 December 2021, Musanze, Rwanda)

Ecosystem services for the future: Delivering value for Nature, Livelihoods and Economic Investment

Session B3: Ecosystem services from African tropical forests

Supply, use and sustainability of ecosystem services in tropical forests: insights from the Dja region in southeastern Cameroon

Simon LHOEST^{1,2}, Cédric VERMEULEN¹, Marc DUFRÊNE¹, Patrick MEYFROIDT^{3,4}, Johan OSZWALD⁵, Pierre JAMAR¹, Samuel HETTE¹, Arielle NKODO¹, Adeline FAYOLLE¹

¹ University of Liège, Gembloux Agro-Bio Tech, Gembloux, Belgium

² Arizona State University, Center for Biodiversity Outcomes, Tempe, Arizona, USA

³ Université Catholique de Louvain, Earth and Life Institute, Louvain-la-Neuve, Belgium

⁴ F.R.S.-FNRS, Belgium

⁵ University of Rennes, UFR Social Sciences, Rennes, France

Tropical forests provide numerous ecosystem services (ES) to human populations, but human-induced deforestation, degradation and defaunation are major threats to the structure, diversity and functioning of these ecosystems. In central Africa, tens of millions of people depend on the forest ecosystems for their daily livelihoods. In the specific context of extremely high poverty, the growing human population and their needs for forest products increase the threats on forest ecosystems. An integrated assessment of ES is needed in order to improve the sustainability of their use and to design adaptive management strategies. Here, we assessed the supply and use of ES by local populations in three contrasted forest management types in southeastern Cameroon: a protected area, a Forest Stewardship Council (FSC)-certified logging concession, and three community forests.

First, we evaluated the perceptions of ES significance and abundance, based on 225 individual interviews of forest stakeholders. The ES most frequently reported and thus considered as the most important for the people were provisioning (93% of respondents) and cultural services (68%). In contrast, regulating services were less mentioned (16%) and thus considered less important.

Second, we quantified the use and sustainability of ES provided by tropical forests to local populations, through interviews and field surveys with 133 households in three villages. Sustainability was evaluated in terms of how consumption volumes correspond to the resource natural regeneration rate. We focused on three provisioning services (bushmeat, firewood, and timber), and five cultural services (cultural heritage, inspiration, spiritual experience, recreation, and education). Our data showed that local populations consumed a mean of 56 kg of bushmeat/person/year (hunting zones covering on average 213 km²), 1.17 m³ of firewood/person/year (collection zones covering on average 4 km²), and 0.03 m³ of timber/person/year. A majority of 59% of respondents also recognized the importance of forest cultural services, notably by identifying culturally important sites and cultural rites.

The results of such ES assessments deserve to be integrated in adaptive ecosystem management for identifying and resolving conflicts among stakeholders, raising awareness, making decisions, and evaluating the effectiveness of conservation measures. In the Dja social-ecological system, firewood and timber have been shown to be used sustainably by local populations, whereas bushmeat hunting and consumption have exceeded sustainability thresholds despite a still insufficient supply of this very important ES. The high demand and

low supply of bushmeat point the major challenge of reconciling wildlife conservation and sustainable hunting. Efficient management systems of village hunting are still to be invented...