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Assessing Ecosystem Services for the Integrated Management of Sakabansi Dam in Northern Benin

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Abstract

Agro!pastoral dams in Benin provide various provisioning, cultural and regulating ecosystem services to local communities. In water scarce localities such as Sakabansi village in northern Benin, the local dam contributes significantly to communities' livelihood and plays a key role in the preservation of species diversity including the red listed African Crocodile. However, its management has been increasingly challenged over the last decade by a tremendous increase of farmlands over natural ecosystems and a huge pressure put on the dam buffer zone.

Framed by the ecosystem services cascade model, this paper attempted to assess, quantify and value the total economic value (TEV) of ecosystem services provided by such complex system (dam and buffer zone) and the contribution of such small buffer zone to local communities' livelihood. The quantification approach was based mainly on specific indicators and potential of the buffer zone to provide a given service. Valuation techniques including market pricing, income factor and avoided damage cost were used to express the importance of ecosystem services in monetary terms.

Overall, five ecosystem services (food, fresh water, raw materials, maintaining soil fertility and erosion prevention) have been quantified and valued based on nine benefits local communities derived from these services. Based on this valuation, the total economic value (TEV) of the dam and surrounding buffer zone has been computed to 149,380 € among which 37,389 € from Sakabansi dam and 111,991 € from the buffer zone.

Opportunities for implementing a payment for ecosystem services (PES) scheme to sustain the integrated management of the dam shows a willingness to pay (WTP) ranged from 0.31€ to 7.69 € with more than 53 % of respondents agreeing on 1.54 € per year. However, respondents were against the compensation of riparian farmers due to the local land ownership system and were in favour to pay for a bundle of services considered as a minimum well-being packageänd which include fresh water, pasture and forage, and tree shed. This constitutes an opportunity for the integrated and participatory management of the agro-pastoral dam-buffer zone system.

Keywords: Agro-pastoral dam, buffer zone, ecosystem services, ecosystem services cascade model, PES, TEV, WTP

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