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“Filling gaps and removing traps
for sustainable resource management”

Complex Ecosystem Service Supply and Delivery in a Mountain Mosaic Landscape in Chiapas, Mexico

ALAN HEINZE¹, THOM KUYPER², FRANS BONGERS¹, LUIS GARCÍA BARRIOS³, NEPTALÍ RAMÍREZ
MARCIAL⁴

¹Wageningen University and Research, Forest Ecology and Forest Manag., The Netherlands

²Wageningen University and Research, Soil Quality, The Netherlands

³El Colegio de la Frontera Sur, Depto. de Agricultura Sociedad y Ambiente, Mexico

⁴El Colegio de la Frontera Sur, Depto. Conservación de la Biodiversidad, Mexico

Abstract

Farming is the mainstay of a mountain community situated in the buffer zone of La Sepultura Biosphere Reserve in southern Mexico. Farmers depend on multiple ecosystem services, especially provisioning services like water, firewood, and ranching resources supplied by paddocks with a heterogeneous tree cover and terrain. Other local actors, especially conservation- and development-oriented stakeholders working in the reserve, are additionally interested in biodiversity, forest protection and carbon storage. Generally, they promote sustainable intensification of productive activities as part of a broader land-sparing approach. Support is upcoming for forest-based activities that seem successful in meeting both local livelihood aspirations and conservation goals.

We assessed ecosystem services through a social-ecological systems approach. To better understand ecosystem services supply, we conducted an integrated forest inventory in a selected rangeland area to compare ecosystem services among land cover types, viz. closed and open forests, agricultural lands and riparian corridors. We then focused on a forest-based provisioning service, pine resin, by using an ecosystem service mediating mechanism and factor framework.

Each land cover type provides a particular set of ecosystem services with synergies and trade-offs that farmers acknowledge. Ecosystem service supply and delivery do not match well, however. In the case of pine resin, actual production is variable and below potential production based on available resources. We identified different mechanisms, e.g. the management of paddocks, labour and technical skill, capital-labour relations, and an increasing appreciation of trees, that mediate the co-production of this ecosystem service and eventually how it contributes to farmer and community well-being. Additionally, there are contextual factors that influence these mechanisms, including access to tools, rules and values among group members, and support from outside institutions. With the resulting framework, we seek to contribute to landscape approaches, sustainable intensification and/or land use zoning, not just to safeguard biodiversity and enhance farmer production, but to support entire social-ecological systems for an adaptive provision of ecosystem services.

Keywords: Ecosystem services, Mexico, pine resin, production gap, social-ecological systems