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# Spatial modelling the social perception of ecosystem services. The case of a socio-ecological system in a mexican peri-urban highland temperate forest.

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## Abstract

Despite ongoing academic debates related to the instability on the concepts of ecosystem services, ecosystem functions and ecological processes, and to their relationships with landscapes or ecosystems, the links between them should be a tool for social-ecological systems planning and management.

The highland temperate forests located on the outskirts of Mexico City (“Bosque de Agua”) are a priority area for ecosystem conservation due to the high level of endemic species and the ecosystem services provided to the people of the central valley of Mexico. The Bosque de Agua is affected by human pressures, particularly urban sprawl but also mining, agricultural expansion and illegal logging. These human pressures are causing forest fragmentation and connectivity loss between natural ecosystems.

Recent research on social perception of ecosystem services have been focused on social preferences of services through the analysis of socio-demographic and socio-economic proxies. However, few studies are considering how the different landscapes and their spatial distribution affect social preferences. This study analyzes the relationships between social preferences of service in 12 peri-urban communities of the Bosque de Agua (846 respondents).

The results show the differences of social perception according to the spatial scale and the type of landscape. At the regional level, the perceived values of ecosystem services are very high. However, the analysis by landscape types reveals important variations between landscapes. Three groups are identified according to the social value of the ecosystem services: (i) Landscapes dominated by forest and wetlands with the higher value (4 or 5), (ii) Landscapes with human settlements with lower value (0 or 1) and (iii) Agricultural and grassland landscapes with heterogeneous values around intermediate values (3 or 4).

Socio-demographic proxies explain quite well the differences of perception, but the concept of

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scarcity used in economics can be also related to the perceived values. On the contrary, the feeling of attachment to a landscape reveals a weak association with social value of ecosystem services. A spatial probabilistic model applied allows then to spatialize the preferences revealed of ecosystem services by type of landscape.

**Keywords:** Ecosystem services, socio, ecological systems, highland temperate forests, social perception, spatial modeling, Mexico.