

Exploring land sparing vs sharing strategies in the Chaco region

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Abstract

Conciliating the increasing food demand with biodiversity conservation and the maintenance of ecosystem services is one of the main challenges in applied ecology, with important consequences for the livelihoods of rural people. The Gran Chaco is a region of more than 1.2 mill. Km² which extends over Argentina, Bolivia, Paraguay and Brazil. It is estimated that in the last 30 years, 85% of undisturbed Chaco forest has been converted to pastures and agricultural lands or is undergoing secondary succession. This process is the result of two land use contrasting strategies taking place in the region: land sparing vs. sharing. Land sparing, or the intensification of an export-oriented agriculture while sparing land for nature conservation, is the dominant land use strategy for the Chaco region. This region is suffering high rates of land use change mainly from forests to soybean plantation fields and to unproductive shrub lands. The land sparing strategy predicts recovery of degraded forests due to rural-urban migration, a process that accompanies agricultural intensification. Land sparing contrasts with existing practices of land sharing consisting on low intensity farming associated with traditional *puestos* that are currently scattered throughout the region. Low intensity farming results in the degradation of primary forest, thereby hindering the survival of some flag species, such as the jaguar or the chacoan peccary. Supporters of the land sharing strategy maintain that a matrix of degraded forest is more suitable than a mosaic of intensive agricultural fields and nature reserves for both the maintenance of ecosystem services and social wellbeing (including issues of food sovereignty and social justice that are not always incorporated in land sparing analyses). To identify the driving factors of this rapid land use change we need to understand the spatial process of land use change and the interaction of the socio-economic and ecological variables involved. This will enable modeling of future scenarios under land sparing or sharing support politics, which may be used as a basis for future research hypotheses and as planning tools for policy makers. Based on the Argentinean province of Santiago del Estero, we show a historical analysis of land use in the region along with the empirical modeling of the process. The results show annual conversion rates of primary forests of 14%, mainly in the eastern side of the province. About 63% of primary forest transitioned to agriculture and pasture, and 30% of

primary forest became degraded. Distance to agriculture and pastures and distance to roads were the variables that best predicted land cover change. Distance to villages was associated with the conversion of primary forest but not of degraded forest. The model predicts a loss of 58% of forest cover for 2050 based on historical changes. These preliminary analyses do not support a process of Land Sparing going on in the Province.