

Understanding proximate causes of deforestation in the Gran Chaco - soybean production versus cattle ranching

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Abstract

The Gran Chaco is the second most active deforestation front in Latin America. Panel analysis and spatial explicit correlation maps were used to explore the proximate effect of soybean production and cattle ranching on deforestation in the Gran Chaco between 2001 and 2012, and to identify certain spatial patterns of land use changes. The area under deforestation was identified by means of annual gross forest cover loss event maps based on Landsat 7 ETM+ images. Forest cover loss in the subtropical forest of the Gran Chaco was immense: 7.8 million ha were deforested between 2001 - 2012. The results suggest that cattle ranching drove deforestation in departments distributed over the entire study region whereas soybean cultivation was an important driver in departments of the Argentinean Chaco only. It could be demonstrated that the regional effect of soybean production was not only limited to fine scale proximate effects but also to time-delayed effects including the displacement of land uses, such as cattle ranching to distant places. The results further suggest that some of these effects were also evident in the Paraguayan and Bolivian Chaco where soybean cultivation initially did not seem to play a significant role in forest conversions. Macroeconomic incentives as well as climatic factors were also found to be strong driving forces of deforestation. If global trends of soybean and cattle markets as well as climate changes in favor of agricultural use continue, and no active conservation policies are applied, vast areas of the Chaco will be deforested in the coming decades.

