

# **The role of different aspects of governance and agricultural expansion in tropical South America: Jevons paradox or sustainable intensification?**

M. Graziano Ceddia<sup>1</sup>, Sabine Sedlacek<sup>1</sup>, Nicholas Bardsley<sup>2</sup>, Sergio Gomez-y-Paloma<sup>3</sup>

<sup>1</sup> MODUL University Vienna, Austria, [graziano.ceddia@modul.ac.at](mailto:graziano.ceddia@modul.ac.at), <sup>2</sup> University of Reading, UK, <sup>3</sup> EC Joint Research Centre, Seville, Spain

The process of global deforestation calls for urgent attention. The main direct cause of tropical deforestation remains agricultural expansion followed by wood extraction, while the main indirect causes include economic growth, population growth and technological change. As world population is expected to reach 9 billion by 2050, emphasis is being placed on agricultural intensification to address the food security issue without further impacting on forests.

In this article we build on previous research and address two important questions: how does the interaction between the quality of governance and agricultural intensification impact on spatial expansion of agriculture? Which aspects of governance are more likely to ensure that agricultural intensification allows sparing land for nature? We complement the use of traditional governance indicators provided by the World Bank, with a proxy of environmental governance based on the proportion of terrestrial area under environmental protection. Addressing these questions is important in order to determine whether agricultural intensification will reduce pressures on deforestation or whether it may actually strengthen the incentives to further convert land to agriculture, signalling the existence of a Jevons paradox.

We combine data from the FAO, the World Bank, the World Database on Protected Areas and the Yale Centre for Environmental Law and Policy for 6 Southern American countries (Bolivia, Brazil, Colombia, Paraguay, Peru and Venezuela) to construct panel data, and study the major determinants of agricultural land expansion over the period 1970-2006.

Previous results indicated that the effect of agricultural intensification on agricultural expansion is conditional on the “quality” of public governance. In particular, agricultural intensification would lead to an expansion of agricultural area for high values of the traditional governance indicators. Good traditional governance may reduce the “fixed costs” associated with land conversion to agriculture and lead to agricultural expansion, indicating the existence of a Jevons paradox. However, when using proxies for the quality of environmental governance, the results are markedly different. When the environmental governance indicator is high, intensification leads to a spatial contraction of agriculture, signalling a sustainable intensification process. Additional results include the effect of service on external debt, population and per-capita GDP, all of which are ultimately positively correlated with agricultural expansion.