Drivers of Deforestation in the Brazilian Amazon: Understanding reference levels of climate negotiations
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More than twenty percent of continuing global deforestation occurs in the Brazilian Amazon. Efforts to reduce emissions from deforestation and forest degradation (REDD) requires an understanding of the drivers of deforestation to design policy interventions. Further, predictions of future deforestation in a business-as-usual scenario are needed as benchmarks to calculate the real emissions reductions and ensure additionality. These are needed both to assess the effectiveness of policy interventions, and to reward countries or sub-national units for achieved emissions reductions in a performance based REDD system.

Land use modeling identifies the drivers of deforestation, and allows for the prediction of future scenarios. In this paper we estimate models of deforestation for the Brazilian Amazon incorporating biophysical, climatic, socio-economic and policy variables to explain land use change over time. While building on the existing literature, we also include socio-economic and policy variables in our model, which has not been done in previous studies at such large regional scales. This expansion of drivers analyzed should both give more precise predictions, and also broaden the set of recommendations for policy makers on how to decrease deforestation. The policy variables of interest in our model are road density and protected areas. These are major policy interventions that have direct and very significant impact on forest cover.

We use public data from various Brazilian sources (e.g. IBGE, IPEA, INPE, IBAMA) as well as data from Imazon at the municipality level to explain land use change between 2000 and 2006. We pool the dataset and estimate OLS and clustered OLS models, as well as fixed effects models. Our results show that road density increases deforestation, while protected areas decrease it. Good soil quality is a major cause of deforestation, while as GDP per capita increases, deforestation decreases. Our conclusion is that there is significant room for policy interventions to reduce deforestation, also in the form of broad interventions that do not necessarily create a system of performance based payment down to the individual forest owners and users.