



Global forestry emission projections and abatement costs

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In this paper we present forestry emission projections and associated Marginal Abatement Cost Curves (MACCs) for individual countries, based on economic, social and policy drivers. The activities cover deforestation, afforestation, and forestry management. The global model tools G4M and GLOBIOM, developed at IIASA, are applied. GLOBIOM uses global scenarios of population, diet, GDP and energy demand to inform G4M about future land and commodity prices and demand for bioenergy and timber. G4M projects emissions from afforestation, deforestation and management of existing forests. Mitigation measures are simulated by introducing a carbon tax. Mitigation activities like reducing deforestation or enhancing afforestation are not independent of each other. In contrast to existing forestry mitigation cost curves the presented MACCs are not developed for individual activities but total forest land management which makes the estimated potentials more realistic.

In the assumed baseline gross deforestation drops globally from about 12 Mha in 2005 to below 10 Mha after 2015 and reach 0.5 Mha in 2050. Afforestation rates remain fairly constant at about 7 Mha annually. Although we observe a net area increase of global forest area after 2015 net emissions from deforestation and afforestation are positive until 2045 as the newly afforested areas accumulate carbon rather slowly. About 200 Mt CO₂ per year in 2030 in Annex1 countries could be mitigated at a carbon price of 50 USD. The potential for forest management improvement is very similar. Above 200 USD the potential is clearly constrained for both options. In Non-Annex1 countries avoided deforestation can achieve about 1200 Mt CO₂ per year at a price of 50 USD. The potential is less constrained compared to the potential in Annex1 countries, achieving a potential of 1800 Mt CO₂ annually in 2030 at a price of 1000 USD. The potential from additional afforestation is rather limited due to high baseline afforestation rates assumed.

In addition we present results of several sensitivity analyses that were run to understand better model uncertainties and the mechanisms of drivers such as agricultural productivity, GDP, wood demand and national corruption rates.