



Multi-gas assessment of environmental policies on agricultural greenhouse gas and ammonia emissions in Europe

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One of the major challenges in developing a European greenhouse gas inventory on the basis of national UNFCCC inventories is the fact that numbers, calculated with different and sometimes not easily comparable methodologies, have to be summed up. With the drawback of being able to reflect national circumstances, which are fully considered in some national GHG inventories, only up to a certain degree, a European-wide model of agricultural emissions offers a large range of advantages. The multi-commodity agricultural model "CAPRI" is used to calculate GHG emissions induced by agricultural activities by introducing IPCC methodologies (Tier 2 and in some cases Tier 1). The resulting model, GHG CAPRI (i) allows a consistent estimation of greenhouse gas emissions across all European countries and on the basis of official agricultural statistics from EUROSTAT, (ii) calculates endogenously regional nutrient and energy flows in agriculture, by linking livestock and crop production systems and allowing a multi-gas assessment (NH₃, CH₄, N₂O, CO₂), (iii) serves as a tool for assessing the impact of environmental policies, mitigation instruments and land use decisions on emissions as well as on farmer's income. For the latter, tradable permits for abatement of GHG emissions at a sectoral level are implemented in the model. In this paper specific environmental policies targeted at GHG mitigation (bio-energy crops) or water protection (manure policy) are evaluated. Moreover, other policy measures linked to the current CAP (e.g., milk quota) have an effect on land use, overall GHGs and ammonia emissions. Results are analysed on national and regional scale. Planned improvements of the model include a better representation of local conditions for gas and nutrient flows, linkages with process-oriented models for calculating soil emissions, and implementation of a variety of technical mitigation measures.