

Integrated analysis of emission reduction over regions, sectors, sources and greenhouse gases

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Context / Social problem

Second to energy-related CO₂ emissions only, the net greenhouse gas emissions from Land-Use, Land-Use Change and Forestry (LULUCF) activities are the most important contributor to global climate change. By contrast, typical emission reduction strategies pay little or no attention to the LULUCF options. Among others because relatively little is known about their exact origin and causes at the detailed process level. Nonetheless, on the basis of tentative top-down analysis it is shown that including LULUCF on the menu of integrated strategies can add decisively to reaching ambitious reduction targets at lower costs than the energy sector alone. In addition, land-based mitigation options like bio-energy, carbon plantations, forest management and reducing emissions from deforestation are receiving increasing attention in the climate policy arenas.

What do we know/not know?

At the more aggregate level many LULUCF related sources of GHG emissions are estimated at some level of accuracy, but more detail by sector, region, activity and key process is extremely uncertain and poorly understood. A complicating factor is that multi-scale connectivity play an important role: besides growth in agricultural output to feed more and increasingly affluent people, changes in EU agricultural policies and global trade policies (e.g. WTO) shape the volume and composition of agricultural output in the EU and the Netherlands. And by implication the baseline GHG emission profiles and mitigation potential and – cost.

What is being studied?

Main thrust is to improve and extend modelling of land-

use, associated emissions and mitigation potential at the global scale, with more detailed zoom-in on EU member states. The stylized representation of LU processes and their emissions is confronted with more detailed databases and models at EU and Dutch scales to investigate if and to what extent the cross-scale approaches hold up to consistency requirements. The model framework will be used to explore and test multi-scale scenario applications.

What are the results, and who are they for?

Ultimate goal is to establish, starting from integral global climate strategies, what could be the contribution of Dutch land-using sectors in reaching that goal. In order to cover the entire spectrum, a variety of subsidiary results is foreseen in the fields of process models, spatial allocation schemes, LULUCF scenarios associated with future consumption patterns, production systems and trade flows as well as databases and decision tools for mitigation actions.

On the one hand results can help to inform national and international policy making in assessing the potential role for the LULUCF options in overall climate strategies. On the other hand, representatives from agriculture, forestry and nature conservation can evaluate their position and contributions relative to other sectors and regions with respect to their contribution to the climate problem as well as to reducing climate risks.

