

Agriculture and Land Surface Functions in the Soyang Lake Watershed

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Problem Statement:

The conversion of forest to agricultural land, which has rapidly occurred in highland areas of Korea that have a cool climate suitable for summer vegetable production, has modified landscape carbon, water and nutrient balances, and strongly reduced water quality in major reservoirs due to sediment and nutrient exports during the summer monsoon. Field studies and robust models are required that can provide an integrated description of this change in relation to both land use and climate drivers of landscape response. The modeling tools may then be used in scenario studies to support better planning for sustainable delivery of ecosystem services.

Overall Goals:

The goals of the agriculture and land surface function project cluster are to:

- Quantify the surface exchanges of CO₂, H₂O and trace gases as influenced by land use
- Describe processes regulating crop growth and yield in relation to climate and management
- Parameterize models for land surface exchange and crop production
- Link land surface exchange and crop production to remote sensing indices
- Quantify land surface exchange and production at landscape and regional scale
- Relate land surface dynamics in water and nutrient use to ecosystem exports at different scales
- Consider Best Management Practices that will aid sustainable delivery of ecosystem services

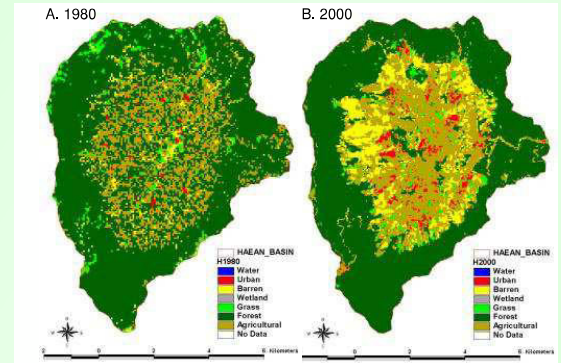
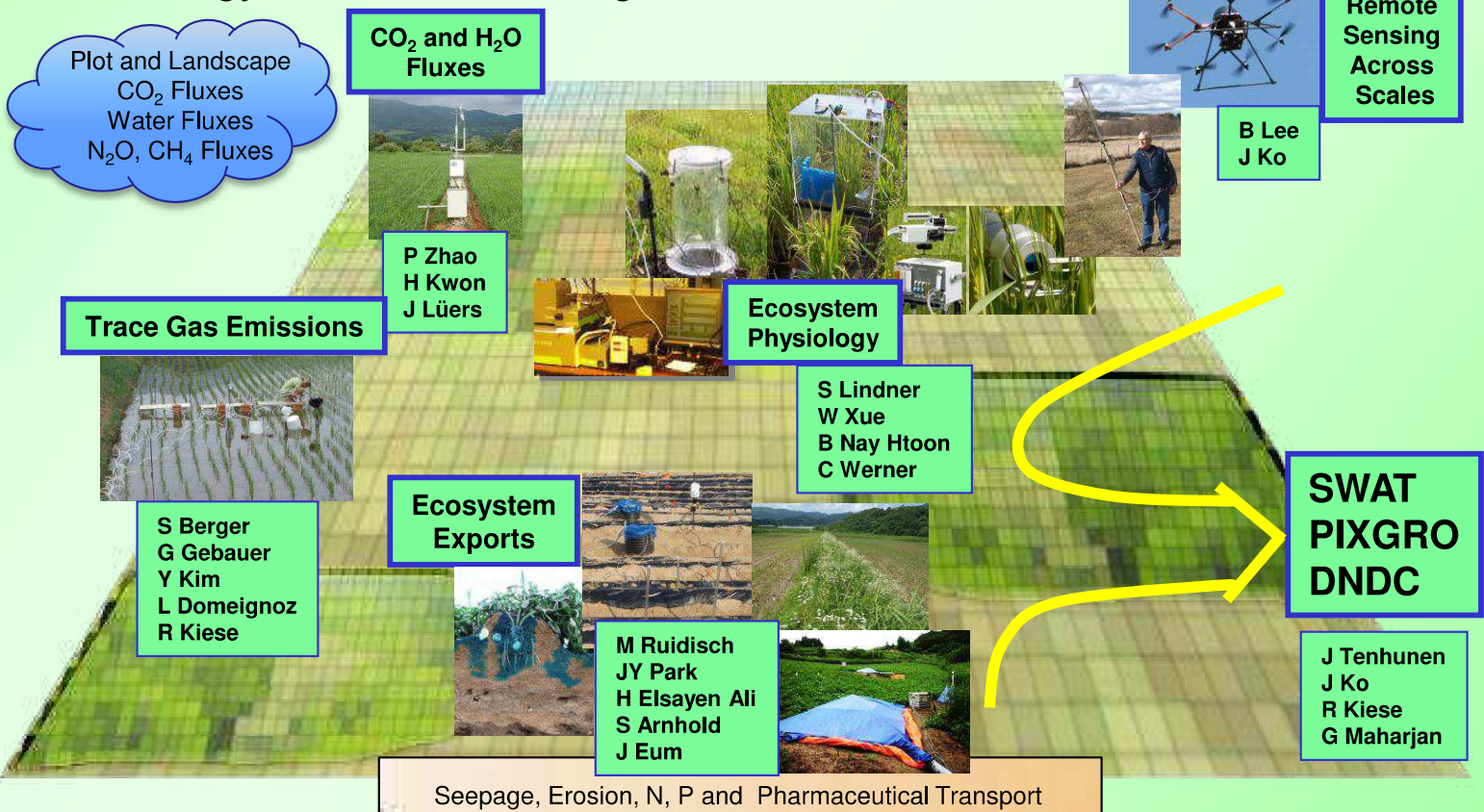
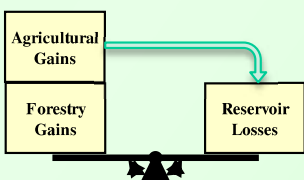


Fig. 1. Land use change at the TERRECO agricultural study site in Hae-an Catchment

Methodology and Research Organization:



Project Links:



Projects of the Agriculture and Land Surface Function cluster contribute together with research in the Forest Diversity and Land Surface Function cluster to the assessment of positive terrestrial ecosystem services, providing information on landscape and regional crop yields. These are evaluated with the ENVI-ECON methodology in terms of environmental and economic efficiencies. Linked with this of course is the negative side of services due to the export of nutrients and sediments. Depending on the scale of application, the balance in gains and losses will be examined for individual farm fields of different types, for „hot-spots“ with intensive agriculture such as Hae-an Catchment, or in the context of Soyang Watershed with the models DNDC, PIXGRO and SWAT.