1st TERRABITES Symposium
Hamburg, Germany, 9-11 February 2010
TERRABITES-95

Analysing land use processes in the Earth system: the accounting framework "human appropriation of net primary production

K. Erb
Institute of Social Ecology, Vienna Klagenfurt University Schottenfeldgasse 29, 1070 Vienna, Austria

Land use is a pervasive factor in the Earth system. By using the land, human societies intervene in ecological energy flows, altering patterns and processes of ecosystems, including biodiversity, energy flows within food webs, biogeochemical cycles, regional climate patterns, hydrological processes, landscape dynamics, the provision of ecosystem services, and thereby affect the life-sustaining ability of the biosphere. Improving our understanding of the intricate interplay of natural and socioeconomic factors in generating patterns and dynamics of the Earth system is essential for sustainability. The development of models and frameworks capable of consistently integrating socio-economic and ecological processes plays a central role in this context. This presentation will elaborate on such an integrated framework, the "human appropriation of net primary production" (HANPP). HANPP indicates land-use intensity by measuring the human impact on trophic energy flows in ecosystems. Globally, HANPP in terrestrial ecosystems amounted to approximately 24% of the NPP of potential vegetation in 2000. As NPP is a central parameter of ecosystem functioning, and HANPP can be unambiguously attributed to specific societal activities, HANPP is a useful framework for linking socio-economic and ecological dimensions of global and regional environmental change. The presentation will apply the HANPP framework for empirical analyses of key global land use processes. Special attention will be paid to the role of data availability and data integration within the HANPP framework. The systematic and consistent integration of a wide range of data families from different scientific disciplines, ranging from ecological data to data related to socioeconomic processes is a prerequisite of HANPP accounts. Data integration, however, is intricate by the large discrepancy between the scales on which ecological and socioeconomic processes occur, and hampered by the fact that the datasets contain related but still different variables, e.g. on land cover and on land use. Furthermore, for some socioeconomic and ecological processes no or only insufficient data exist. The presentation will elaborate on the potential of HANPP assessments in analyzing the role of land use in the Earth system, linking socioeconomic drivers and ecological impacts, and exploring feedbacks, trade-offs, and synergies. It will present insights gained from previous HANPP assessments and will discuss shortcomings, data requirements, and the potential of remote sensing data for improving spatially explicit HANPP assessments.