



WSSF Session on Land-Use Conflicts: The competition between food, bioenergy, biodiversity, and urbanisation

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| Description: Conflicts over competing uses of land have a long history. These include conflicts between consumptive uses (e.g. the growth of agricultural crops and the production of timber and biofuels) and non-consumptive uses (e.g. the protection of ecosystems and the provision of habitat for wildlife). Today, these conflicts have grown more intense, with competing demands ranging from the needs of growing cities to the arguments in favour of setting aside large areas as wilderness or for carbon sequestration. This panel will not only document these conflicts in quantitative terms but also examine a variety of mechanisms for resolving or managing conflicts over alternative uses of land in an era increasingly dominated by various forms of global environmental change. The session addresses land-use conflicts (urban, energy, food, and biodiversity) from a truly interdisciplinary perspective, tapping expertise from the social and natural sciences. | | | |
| Organiser: Martin Rice, ESSP | | | |
| Sponsors: Deutsche Forschungs Gemeinschaft (DFG) and the ESSP | | | |
| Convenor(s): Earth System Science Partnership (ESSP), German Global Change Committee (NKGCF) and the International Human Dimensions Programme on Global Environmental Change (IHDP). | | | |
| Chair/Moderator(s): Gernot Klepper and Rik Leemans | | | |
| Speaker Name/title | Institution | Country | Email address |
| Gernot Klepper | Kiel Institute for the World Economy | Germany | gernot.klepper@ifw-kiel.de |
| Title of presentation: | <i>Introduction and the Bioenergy perspective</i> | | |
| Karen C. Seto | Yale University | USA | karen.seto@yale.edu |
| Title of presentation: | <i>Land-use change at the peri-urban fringe: Can urbanization save land for nature?</i> | | |
| Norbert Juergens | Hamburg University | Germany | juergens@botanik.uni-hamburg.de |
| Title of presentation | <i>Biodiversity</i> | | |
| Keith Wiebe | FAO | Italy | Keith.Wiebe@fao.org |
| Title of Presentation | <i>Access to Food and Access to Land</i> | | |
| Rik Leemans | Wageningen Univ. | Netherlands | Rik.Leemans@wur.nl |
| Title of Presentation | <i>Conclusions</i> | | |

PANELIST BIOGRAPHIES

Gernot KLEPPER is an economist working at the Kiel Institute for the World Economy (<http://www.ifw-kiel.de/>). He is also Speaker of the Kiel Earth Institute (<http://www.kiel-earth-institute.de/>), Chair of the National Committee for Global Change Research in Germany (<http://www.nkgcf.org/>), and a member of the Scientific Committee of the International Human Dimensions Programme, IHDP (<http://www.ihdp.unu.edu/>).

Karen C. SETO is Associate Professor at the School of Forestry and Environmental Studies at Yale University and Co-Chair of the IHDP Project on Urbanization and Global Environmental Change. Professor Seto's research is on the human transformation of Earth's surface, with an emphasis on urbanization, and the consequences of urban land-use change for the environment.

Norbert JUERGENS is a botanist, working at the BioCenter of the University of Hamburg, he is also chair of the BIOTA AFRICA project network (<http://www.biota-africa.org>) and Co-Chair of the DIVERSITAS (international programme on biodiversity science) bioDISCOVERY core project (http://www.diversitas-international.org/?page=core_biodisc).

Keith WIEBE is Deputy Director of the Agricultural Development Economics Division of the Food and Agriculture Organization in Rome, where he coordinates economic research and policy analysis on agricultural development, resource use and food security. He also oversees preparation of FAO's annual flagship report on the *State of Food and Agriculture*.

Rik LEEMANS is the Chair of the Earth System Science Partnership (ESSP) Scientific Committee and head of the Environmental Systems Analysis group at Wageningen University in the Netherlands. Rik leads multidisciplinary projects to develop integrated assessment models for global biodiversity and local/regional ecosystem vulnerability. He co-chaired the Response Option working group of the Millennium Ecosystem Assessment and has been strongly involved in all of the assessments of the Intergovernmental Panel on Climate Change (IPCC) over the past decade.

ABSTRACTS

Introduction and bioenergy perspective

Fertile land is the natural resource that is hardest to increase, yet it is among the most important resources for humankind being a prerequisite for food production, for providing bioenergy, for using living space, and for maintaining the ecological services of nature. In the next 50 years the world population will grow from now over 6 billion people to roughly 9 billion people that need food, living space and a stable natural environment. Meeting these needs simultaneously will become one of the major challenges over the next decades.

There is currently little knowledge about the potential land resources that can be brought into intensive productive use for food and bioenergy production without compromising the ecosystem services that many unmanaged or only extensively used areas provide. This supply of services from land resources needs to be quantified and contrasted with the demand for land services which are most strongly increasing with respect to food production. At the same time, biomass is one of the renewable resources that can meet the increasing demand for climate neutral energy. It is claimed that the support for modern bioenergy production by many governments has been responsible for the recent increase in food prices and will be an obstacle to the eradication of hunger in the world.

Kiel Institute of World Economics (IFW)
Düsternbrooker Weg 120
24105 Kiel, Germany
Email: gernot.klepper@ifw-kiel.de
Tel: +49 431 881 485

Land-use change at the peri-urban fringe: Can urbanization save land for nature?

Global manufacturing, industrial estates, and real estate developers are seeking a home, and they have found it on the outskirts of city centers, where attractive policies, cheap labor, and abundant land make peri-urban areas economical and appealing locations for development. These same areas are often a mosaic of agricultural land, biologically diverse ecosystems, wildlife habitats, open space, and rural livelihoods that contribute to the ecological and human well-being of these regions. As urban areas expand and envelop the surrounding landscape, they transform everything from lifestyles to landforms, and increase the competition for natural and land resources. The environmental effects of urban development are well documented and include declines in water quality, fragmentation of habitat, higher urban temperatures, a loss of ecosystem services, alteration of hydrological cycles, and increased air pollution. Yet urbanization can also be an integral part of sustainability, with efficient use of land and natural resources, and expeditious delivery of health and educational services. The question then is in spite of the conversion of land to urban at local scales, can urbanization save land, at the regional and even global scales, for nature and increase ecosystem services?

Karen C. Seto
Associate Professor
Yale University
School of Forestry and Environmental Studies
Co-Chair, IHDP Urbanization and Global Environmental Change Project
Email: karen.seto@yale.edu
Tel: +1 203 432 9784
Fax: +1 203 432 5556

Biodiversity

Human land use is ever-increasing and expanding, to the disadvantage of natural ecosystems and their biodiversity. The transformation from natural systems to used systems alters the ecosystem functions in the Earth system and the services which human societies use for their wellbeing. The spontaneous evolution driven by needs and opportunities easily leads to drastic reduction of ecosystem services and subsequent degradation of the land use system.

A full cycle from natural forests to land use to degradation to collapse and establishment of a new system is described by using the history of the mid-European heathlands. The highly degraded land use system was not actively improved by the land users but destroyed by early globalisation and replaced by technological progress. This historical example raises the question: how can knowledge-based planning replace spontaneous evolution driven by necessity or opportunity?

In addition, the problem of scale is important as can be shown by a brief analysis of the modern relationship between activities in industrialised countries and the developing world using examples from Africa.

Both examples allow to discuss the question whether there is a realistic chance for a novel era of science-based decision making. Improved integration of social and natural sciences views is essential for this task.

Norbert Juergens
Professor, University of Hamburg
BioCenter, Herbarium & Botanical Garden
Email: juergens@botanik.uni-hamburg.de
Tel: +49 40 4281 6260
Fax: +49 40 4281 6261

Access to food and access to land

Recent increases in food prices brought the number of hungry people in the world to nearly 1 billion, and the current economic crisis adds to the immediate challenge. Over the longer term, global demand for food, feed and fibre will nearly double by the middle of this century, while crops may also be used increasingly for bioenergy. This will raise pressure on already scarce agricultural resources—even while agriculture will need to compete for land and water with expanding urban settlements, adapt to and help mitigate climate change, and help preserve natural habitats and biodiversity.

Ensuring food security for the world's poor poses additional challenges. Food security requires not only the availability of sufficient food at global, national and local scales, but also secure access to sufficient food by households and individuals. Most of the world's poor depend at least in part on agriculture for their livelihoods, and their access to food depends critically on access to land and other resources. Improving their food security—while maintaining other ecosystem services—thus requires careful investment in policies and institutions as well as improved infrastructure, technologies and resource management practices.

Keith Wiebe
Deputy Director, Agricultural Development Economics Division
Food and Agriculture Organization of the United Nations
Email: keith.wiebe@fao.org
Tel: +39 06 5705 6624
Fax: +39 06 5705 5522