

## **Socio-Economic Contributions to Research for Sustainability**

*Prof. Dr. Erik Gawel, Helmholtz Centre for Environmental Research, Leipzig, and University of Leipzig, Institute for Infrastructure and Resources Management, Germany*

Research for sustainability needs to be tackled in a framework of an integrated and systemic approach. Integration means considering simultaneously ecological, technological as well as social, cultural and economic issues. Within this framework socio-economic analysis provides three main research topics:

1. It enables a proper and comprehensive understanding of economic and societal conflicts concerning the availability of scarce resources. Especially, socio-economic research contributes to a better understanding of societal drivers of economic, ecological and technological developments and delivers theoretical insights in complex impacts of resource conflicts.
2. It provides concepts for optimal or rational solutions of resource conflicts. Economics is the science of rational tackling scarcity conflicts.
3. Thus, it finally allows for the design of appropriate governance and incentive structures in order to ensure that societal developments perform in a sustainable way.

For social scientists there are two crucial questions:

1. Why do people behave as they do when causing e. g. environmental harm?
2. What can be done to alter this behaviour in a more sustainable way?

Governance structures and institutions (such as competence allocation, attitudes and social norms, markets and prices, incentive structure, organizations) play an important role in this context.

The focal point of the problem of sustainable resource use (such as land use) is, from an economic point of view, a scarcity problem: The resource "land" is limited but at the same time subject to competing and increasing demands on and interest in its use. The resource's use for one purpose often excludes or at least restricts others: bio energy production can compete with food production, settlement with biodiversity conservation, recreation with the production of renewable resources, etc.

These conflicts are aggravated by global change processes. Global change is constituted by the driving and interacting processes of climate change, land use change, globalization and urbanization, also involving institutional change. Global change has impacts on the availability and distribution of resources as well as on the dynamics and stability properties of ecosystems and hence on ecosystem functions and services. These impacts, such as changes in climate variability or altered production patterns, are most pronounced on a regional scale. It is at the same regional scale where measures for the mitigation of or adaptation to the impacts of global change need to be considered, because they depend strongly on the specificity of regional conditions. In spite of the fact that an important share of food, energy and information are globally distributed, we still depend on our regional environment and – at the same time – shape this environment by the ways in which we use land for agricultural production, urbanization or measures of nature protection and conservation. At the same time, land use management offers a broad range of options for adapting to and mitigating global change impacts.

In order to develop land use strategies a systemic approach is needed, which can cope with the complexity of interaction of the various subsystems and land-use conflicts involved. Relevant elements of this complexity include abiotic and biotic processes, population dynamics,

demographic and economic development, land use decisions, institutional aspects etc. Several challenges for developing land use options follow from these considerations:

- (a) Consistent scenarios on a regional scale are needed for an integrated impact assessment of global change patterns.
- (b) Knowledge about the strength, functioning and effects of the feedbacks between different processes is required for assessing possible development paths as well as for the analysis of uncertainties.
- (c) The development of models, methods and tools that can inform stakeholders about both possible consequences and uncertainties is required in order to be able to elaborate desirable development paths and strategies.
- (d) Understanding of current governance structures – as a means to develop and implement innovative institutional solutions and policy instruments – is required for the purpose of transferring scientific results to stakeholders and decision makers (transdisciplinary approach) and to ensure that implementation of new governance structures can be successful and will meet with societal acceptance.

Against this background appropriate governance structures are needed to establish an integrated ecological, technological and socio-economic “change management” in order to specify a sustainable pathway meeting both global and regional challenges. This requires considering the interplay between the global, national and regional scales, taking into account ecological, socio-economic, legal and political aspects, and integrating stakeholders.

Main fields of research in this context could be, inter alia, the following:

- governance of and integrated adaptation strategies to climate change,
- land use conflicts caused by renewables, esp. bio energy,
- optimizing agro-ecosystems with respect to sustainability,
- impacts of urban dynamics on land use conflicts,
- sustainable water resources management,
- designing institutions and incentives for sustainability,
- developing integrated assessment and decision support systems
- designing participatory processes, capacity building, transfer and education.

Recommendations for enhanced sustainability oriented research and innovation cooperation between the two countries:

- Land Use Management
- Renewable Energies
- Adaptation to Climate Change
- Integrated Water Resources Management
- Urbanization
- Governance and Institutions of Sustainable Development

**Contact:**

E. Gawel

e-mail: [erik.gawel@ufz.de](mailto:erik.gawel@ufz.de)

[www.ufz.de/index.php?en=17273](http://www.ufz.de/index.php?en=17273)