

Inter- and transdisciplinarity in sustainable land management

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Adequate research programmes and results are necessary preconditions for solving complex problems in land management. Currently in Germany a new research funding measure 'Sustainable Land Management' funded by the Federal Ministry of Education and Research (BMBF) starts. The programme will support the development of innovative theoretical, methodological and conceptual approaches of spatial governance towards sustainability. Inter- and transdisciplinarity is seen as an adequate methodological translation to face the applicability of the results. With implementing specific coordination projects the realisation process of the programme will be supported and various conceptual approaches compared and valuated. The following article describes the research programme in detail and illustrates the relevance of inter- and transdisciplinary acting to realize transferable solutions concerning sustainable land management into praxis.

1. Relevance of inter- and transdisciplinarity for sustainable land management

Searching for effective and efficient solutions of problems and conflicts in land use and development is an ongoing activity in applied sciences and practice. Human societies have to deal with a rising variety of environmental questions like climate change, health, agriculture, forestry management, renewable/non-renewable energy, housing, poverty, demographic development or urban planning. Land use and sustainability are characterized by diversity, complexity, conflicts, and uncertainties. Because of different integrated forms of land use, its management is determined by multiple factors, drivers, and, in consequence, diverse approaches. That demands an analysis by interdisciplinary approaches. There also exists a high variety of participating actors with diverse kinds of problems and perceptions which involves the danger of conflicts and troubles in land use.

The relevance of scientific knowledge for all social spheres of activity becomes more important, whereas solutions are not only produced by science but also by other social

actors. Land use and land management as an everyday practice in different professional fields demands now and then scientific based solutions from more than one discipline or public scope. In consequence useful, sustainable solutions cannot be achieved with isolated disciplinary accesses but can potentially be realised by inter- and transdisciplinary approaches. Solving complex problems implies a process of mutual learning and understanding (HIRSCH HADORN, 2008) for development and implementation of applicable solutions (HÖCHTL/LEHRINGER/KONOLD, 2006). One major aspect is to involve all participating disciplines in a way that forces them to cross subject boundaries (TRESS / TRESS / FRY, 2006).

Interdisciplinarity is added by transdisciplinary research as a new way of looking at the relationship between knowledge, science and society. Transdisciplinarity implies intercommunicative action as well as effective, close, and continuous collaboration and cooperation between scientists, policy makers, professionals, interest groups, and public.

It is helpful for 'life-world' problems to bridge the gap between research knowledge and social decision-making processes (LAWRENCE / DESPRÉS, 2004). In consequence, cooperation with non-academic partners realise synergy effects between research and participated stakeholders. Thus the quality, acceptance, and sustainability of solutions increase (HIRSCH HADORN, 2008).

Transdisciplinarity has an immense potential to respond to new demands and challenges because research originates from and is contextualized in 'real-world' problems (RUSSELL / WICKSON / CAREW, 2008).

2. Funding measure 'Sustainable Land Management'

Considering these challenges adequate research programmes and results are preconditions for generating applicable analytical tools and problem solving concepts. In October 2008 a new German funding measure 'Sustainable Land Management', funded by the Federal Ministry of Education and Research (BMBF), has been started with a call for joint research projects and scientific coordination projects.

"The funding measure aims to generate the basic knowledge which is needed for sustainable land management decisions and to provide relevant strategies for action as well as suitable technologies and system solutions" (BMBF, 2008).

The research programme is split up in two main modules (A and B) which reflect differing topics and will be supported by two scientific coordination projects. Module A, mainly at

international and European level, is called „Interaction between land management, climate change and ecosystem services“. The scientific coordination is realized by Helmholtz Centre for Environmental Research (UFZ) Leipzig. Module B „Innovative system solutions for sustainable land management“, mainly with an European and national focus, is coordinated by Leibniz Centre for Agricultural Landscape Research (ZALF) Müncheberg.

“Funding of research in Module B is aimed at contributing to sustainable land management by generating innovative system solutions for regional value creation networks and by promoting the integrated management of energy and material flows” (BMBF, 2008). More than a dozen of joint research projects with different themes, concepts and strategies are already respectively near to be granted within this module.

The term “sustainable land management”, although often used in the programme, is only defined vaguely. The call describes that “land management therefore means far more than traditional agriculture and forestry. It is a highly complex field of action which affects all areas of human life and includes such aspects as water, soil and biodiversity management, regional value creation, the relationship between urban and rural regions, quality of life, etc.” (BMBF, 2008). Currently the term is mainly used in a different meaning as a normative approach in land use of developing countries. Organisations like the United Nations or World Bank use the term to discuss problems and solutions of soil protection and degradations or more in general for land use aspects (participation, ownership, and re-forestation) in developing countries (HURNI, 1997; THE WORLD BANK, 2006). Only in Australia and New Zealand sustainable land management is an official topic of national environmental policy, but strongly connected to solve problems in relation to climate change.

Starting in 2010, joint research projects supported by the scientific coordination work on different issues of sustainable land management by means of case studies situated in Germany. The projects focus on:

- development of cultural landscape, settlement, commercial areas, and infrastructure
- connection between energy prices and land use
- application of ecosystem services
- construction of production chains
- energy management and supply chain management
- zero-emission concepts
- use of bio-energy

Every project is located in a specific region of Germany. Metropolitan areas are included as well as peri-urban or rural regions. It is of main importance, that the projects comprise different types of land use, landscapes, actor networks and institutional settings.

Dealing with inter- and transdisciplinarity is necessary according to “real-world” problems (see Chapter 1). The BMBF already has past experiences with inter- and transdisciplinary research accesses which is one basic foundation of the funding measure: “Previously separate research branches of the natural sciences and technology are combined with the economic and social sciences with the aim of studying the different aspects of global and regional change - environment/climate, business/technology, society/culture – in a broader context. The research area "Land management" thus integrates different but related topics in a cross-disciplinary approach. The success of the funding measure mainly depends on action-based research and thus on the generation of knowledge which can be used directly by people in the regions. Usability requires a transdisciplinary approach and is ultimately decided at the level of decision-makers and stakeholders involved in the research process” (BMBF, 2008).

3. Scientific coordination and support

Within the research programme the various projects as well as the scientific coordination will realize the translation of challenges of sustainable land use into research practice.

The scientific coordination of Module B, in responsibility of the authors, will focus on the meta-analysis and development of successful tools for sustainable land management in Germany and Europe. Moreover the analysis and valuation of inter- and transdisciplinary approaches will be a central aspect of the accompanying research (KLEIN et al., 2001). Both “Sustainable land management” and “inter- and transdisciplinarity” will be realised at three different levels:

- scientific support of the joint research projects through coordination and networking
- synthesis and meta-analysis of project-based results
- support of scientific and problem-oriented dialogue, qualification, transfer and deliberation processes.

Main function of synthesis and meta-analysis is to analyse, differentiate and compare:

- conceptual models of interaction in land use and changes of land use (e.g. energy flows, urban-rural networks)
- types of synergies and conflicts in land use

- types of existing and potential governance
- inter- and transdisciplinary research approaches.

In a second step, together with joint projects and stakeholders analytical concepts, styles and modes of governance as well as research approaches will be valued.

Results will be compared by using internet-based internal and external information platforms as well as by carrying out workshops with scientists from the joint project. One important question is what the reasons are for using specific analytical or conceptual approaches. In addition workshops will be realised for integrating international discussions, e.g. to compare discussions driven by UN or World Bank policies and to learn from successful examples. Further on different groups of stakeholders (e.g. land owners, representatives of companies, civil society groups) will be involved in a systematic dialogue to include and reflect interests and resources in decisions about land use. In connection to this, modes of learning and knowledge transfer will be discussed and concepts for learning are to be developed. This bundle of analytical and conceptual activities is planned to handle complexity and to generate successful ways towards sustainability in land use.

In a mid-term perspective the scientific coordination project will establish an organisational structure, which will institutionalize communicative networks between research and regional stakeholders to support learning and innovation processes also on a strategic level.

Handling with inter- and transdisciplinarity is once realised by the joint projects which have to deal therewith in research practice. That contains the integration of engineer, natural and social science on different levels (coordination, manager, and joint project level). Companies are seen as starting point, nucleus, and development partners for implementation of sustainable solutions in land management. Networking realise Public-Private-Partnerships between public or private enterprises, households, and municipalities. Regional urban and rural actors get added by transregional resources like knowledge, technologies, or capital. Policy and planning actors shall illustrate political discussion processes.

Transdisciplinarity involves participation whose processes have many benefits to offer. The scientific coordination implement a systematic documentation and valuation of inter- and transdisciplinary research approaches. That will answer the question, what are adequate methodological ways for dealing with complex problems in land management. In conclusion, recommendations are possible for qualifying ongoing and future management of research processes. Synergy effects and cross-cutting issues between joint projects get identified as

well as bottlenecks in implementation. The exchange and cooperation between joint projects will create an additional value.

First results of the projects including the scientific coordination are to be expected in 2011/2012. In conferences, which are planned in 2010 and 2013/2014, the varying examples and solutions will be presented and discussed. One major aim is to get continuously in touch with practitioners of innovative solutions in sustainable land management. Contacts and network shall support the development and diffusion of solutions referring to sustainable land management.

4. Outlook

Central aspect of the scientific coordination project is to discuss and improve the benefit and implementation of inter- and transdisciplinary research and practice. Due to varying perceptions, emotions, or perspectives of involved actors, conflicts probably occur so that fast solutions are not expectable (HANSCHITZ/SCHMIDT/SCHWARZ, 2009). How can risks and uncertainties be handled in that regard? Is it possible to connect different modules to coherent and complex solutions supporting sustainability in land use by avoiding simple reconfiguration of existing knowledge? Will it be probable to realize and implement actor-supported long-running sustainable solutions together with joint projects? Is inter- and transdisciplinarity in research an adequate approach to guarantee applicable solutions for complex problems in land management? Which forms and fields of innovation and interaction are preferred? Which structural parameters are used for evaluation of solution creation?

First steps towards answering these questions are made by analysing granted joint projects concerning analytical and conceptual approaches, participation, innovation, and inter- and transdisciplinary approaches.

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