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# Managing the Interface

From Knowledge to Action  
in Global Change and Sustainability Science



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## Executive Summary

Ours is an age of worldwide upheaval in societies, transpiring against the background of global change. Globalisation of both commodity flows and ecological hazards demands answers from science and research – and a pace in developing those answers that is no less dynamic than the global change we face. Sustainability science plays a special role in this context since it takes these phenomena as its subject. Transdisciplinary sustainability science in particular will have to delimit itself from the practices of predominantly “classical” research projects in terms of its objectives, its approach, its methods, the parameters for its pursuit and – one hopes – in terms of its results and their effects. We are witnessing a fascinating process of change and development in science. This process is still young. Pioneers are embarking on new territory. Moreover, they have to struggle with parameters which have not yet been adapted to match the peculiarities of these new fields of activities, parameters which sometimes impede their development.

*New kinds of research are emerging*

A systems-based, holistic understanding of the underlying social, economic, political and/or cultural global problems – and their interdependencies – is becoming ever more important. In this context, the focus is no longer just and only on “objective” generation of knowledge. Instead, the capability to find and elaborate solutions in the battle against hunger and disease, environmental degradation and a loss of future are becoming primary. Broad-based cooperation between actors in research and actors in implementation is essential to coping with such challenges. Both groups are dependent on each other in their efforts to solve these complex and growing problems.

*Developing solutions jointly with practitioners*

This has far-reaching consequences for the way in which science dealing with these topics is conducted. In no way does that imply that science and research can act *only* in this manner. There will continue to be a need for basic research, applied research and science organised along the lines of the classical disciplines. None of the current efforts to achieve interdisciplinary and transdisciplinary approaches will cast doubt upon the fundamentals of science rooted in the individual disciplines. These “traditional” forms of science will continue to be needed – probably even more so in future than at present. But whenever we deal with topics centring on global change and sustainable development, science workers will have to deal with the parameters imposed by the necessity to see problems within their contexts and by aims for wider society, expedience and serviceability – all in reference to predefined objectives. Beyond this, however, there is the further challenge of readying it for translation into concrete action and the corresponding process of change. As such, it must make a contribution to action. These additional demands and new parameters make implementation and target-oriented science a “post-normal science”. Here science and research become active partners, actors taking part in the formulation of the global solutions now required.

*Context orientation, utility, sense and service-ability of knowledge*

*Post-normal science as an active partner*

## Current impediments

The process within which this new field of research is developing is – despite initial successes – protracted. This is largely due to the strong “implementation orientation” requirement in place in these areas. Current hindrances to developing a stronger implementation orientation can be seen in the following factors:

- The linkage of this type of research to international conventions and research activities is still **not transparent enough** for many researchers.
- The **parameters for research grants** (contracts, validity periods, reviews, interfaces for implementation, adequate funding for ancillary tasks etc.) are not properly tailored to a far-reaching implementation orientation and often provide conflicting incentives.
- There is a lack of **practical tools** and know-how for steering complex interdisciplinary and transdisciplinary research projects. Suitable instruments are underdeveloped while existing approaches – particularly those developed in international research within the last five to ten years – are too little known. The required skills are imparted only inadequately in current programmes of training for scientists.
- Implementation orientation in sustainability science imposes far higher requirements on **integrative project concepts and research designs**. Only inter- and transdisciplinary project designs make it possible to filter out solutions-oriented results during the run of a project and particularly at its conclusion. As a result, they can be communicated to stakeholders – from the world of business, for instance – who are open to new ideas and approaches.
- The contradiction between research activities – which assume a broad scientific background and extensive project experience (in stakeholder management, for example) – and the fact that many projects have an important function in **training next-generation scientists** (doctoral candidates carry out large amounts of the work) has not as yet been resolved.
- Scientists are often overtaxed in their work by the reference to application and implementation. Required over and above this are **additional players coming from practice relevant to implementation** in post-normal science. These should, for their part, be integrated by moderators or facilitators who have the competence required to manage the interfaces between science and practice.
- The parameters prevailing in science often set incentives that are contrary to implementation orientation. In particular, the activities associated with science communication and with project and stakeholder management are at odds with the purely scientific work carried out by the up-and-coming scientists – work so important for the furtherance of their own careers. Only the **development of differentiated evaluation criteria** for scientific achievements in implementation-oriented research would open up realistic opportunities for dedicated young researchers – and could help to establish the reputation of this field of research.

- One major hazard to integrative, implementation-oriented research, one which is going to make itself felt particularly in the coming years, is to be found in times of ever-scarcer government research funds. As a consequence, and more than in the past, activities associated with project management, science communication, stakeholder integration and transfer and implementation of the results have come to **compete** with the “real” research tasks. These “real” research activities tend to be defined *not* by experts in science communications, transfer and stakeholder integration but rather by scientists trained in classical disciplines.

With this present work we wish to make a contribution to breaking down these impediments. Our starting point is a question: How can scientific endeavour be aligned so as to support the **steps from knowledge to action**, i.e. into political, societal and cultural implementation? We see a need for reform in the world of science and research chiefly at two levels.

- **Research projects level** (Part II):  
Improving internal project management, science communications and stakeholder management.
- **Parameters level** (Part III):  
Changing the quality criteria for implementation-oriented research, in the science system and in research funding, and installing additional institutional measures to support transfer processes.

Such measures should be embedded in a continuous development process for implementation-oriented sustainability science, a process involving all the actors participating in the effort.

## On the objectives and nature of this book

Current development around the world is anything but sustainable. Climate change, desertification and soil erosion are proceeding apace. Large segments of the world's population are faced with declining availability of potable water. The critical significance of biological diversity and natural resources as the basis for sustaining human life and livelihoods in rural – and other – regions is growing. All in all, the conditions for economic survival are becoming much harsher in times of globalisation and urbanisation. National and international governments and organisations are beginning – particularly since the 1992 UNCED Conference on Environment and Development – to respond more vigorously. Declarations and publications occasioned by the UN Millennium Goals and in Kofi Annan's "Global Compact" point out the political and social contexts for the subject of global change. A call for countermeasures has been put forward. This has an effect on the orientation of both national and international research policies. But above all, the problems cited here will themselves, in all probability, unfold dynamics that will confront science and research with hitherto unimagined challenges. Especially for research into sustainable and future-proof development, those dynamics bring with them a new function, that of a science which is to devise and prepare for solutions.

It is against this background that this book addresses chiefly two groups of actors who we feel to be essential to the development of implementation-oriented sustainability science:

- Actors in science and
- Actors in research funding.

These actors have manifold influences on the further development process: in research projects at universities and other institutes, in the steering and administration of those projects, in their evaluation and assessment, in the development of research programmes and calls for proposals, as project sponsors etc. We hope to support these activities as they turn toward implementation-oriented sustainability science. Our central question is thus:

### *What has to be done?*

More precisely: What can the actors in the two target groups do to further advance the development process described above?

To find answers to this question, we first evaluated the experiences of people now at work in sustainability science projects and in governmental funding agencies. This evaluation produced an overview of the critical problems in today's research and funding practices. This was not done with completeness as the goal. Instead, our intention was to analyse current bottlenecks in the development of implementa-

tion-oriented sustainability science. Our research in this direction produced answers to the question:

### *What hinders the process?*

But the same answers also provided initial indicators of how one might approach solutions to these problems. We found other indicators in our international research – on the Internet, in the literature, in personal discussions and in interviews. We assessed above all the experiences of people in practice, asking about their tools and strategies. In some instances we departed from the field of implementation-oriented research and even from science itself. Some of these excursions led us into the worlds of business, planning or politics. Our *leitmotiv* in the research was:

### *Whose experiences we can learn from?*

Here we were interested above all in the experiences garnered in concrete research praxis. Any evaluation of theoretical studies on the associated topics in science was only secondary, this in compliance with the book's focus on practice. Even in the new territory of sustainability science it is not necessary to re-invent the wheel – at least not entirely. In order to make apparent the variety and breadth of the useful experiences and approaches which are already available, i.e. “how it might be done”, we have selected and described concrete examples. The present book is thus a work which grew out of praxis and is intended for practice, i.e. it emanates from existing research practices and evaluates them for practical implementation in other research fields.

The survey we have thus prepared is neither complete nor particularly detailed. To accomplish that, this book would have to be many times its present size. Neither are the examples presented here hard-and-fast prescriptions for action. They are intended to encourage, to invite browsing, to offer suggestions for your own work. The extensive appendix points to sources which go into the subject in greater depth and makes it possible to contact the appropriate individuals directly. This book cannot, and does not intend to, supplant the direct sharing of experiences among people, the personal learning process or joint development work by the actors involved in implementation-oriented sustainability science. In order to give those who wish to set out on this path some orientation, going beyond heightened awareness of the problems and showing possible solution approaches, we finally ask:

### *What are the next steps?*

Using assessments of the analyses and research findings, we develop initial suggestions for action. These include checklists for work in sustainability science projects, a catalogue of changes needed in the system of science and research funding procedures and a blueprint for two new institutions to be created. The book does not

presume to undertake a scientific analysis of the factors and themes which are at the root of the current problems. It is more a matter of gaining a strategic view of the situation and to identify a pragmatic way in which to arrive at feasible suggestions for solution.

This objective results in a somewhat unusual blend of textbook and user's manual. This is due to the combination of problem descriptions, examples and reference to sources – along with action proposals and checklists. On the one hand we did not want to stop with the analysis of the problem but instead to also point out options for action. On the other hand, the necessity for action at certain points can, in our opinion, not be recognised without being aware of the impediments inherent to the process. Moreover this blend will appeal hopefully to a broader readership. It is intended to encourage pioneers and offer concrete assistance and options for contacts. Those new to sustainability science will be able to make an initial foray into the problems involved while references to other sources of information permit study in greater depth.

The organisation of the book is to a large extent aligned with the central questions and the two major target groups. After a general introduction to the new field of research and a review of the status of the development process in Part I, three chapters on the project level follow in Part II. Each of these chapters is subdivided once again into the analysis of the problem, the results of our research and the next specific steps at this level. The book's third section takes a look at the parameters for sustainability science. The three parts are written so that they can be read independent one of the other. Which occasionally results in slight overlaps, necessary to clarify the context of a particular problem area. Cross-references make the connections to other chapters in which the subject at hand is discussed in greater detail.

As far as content goes, we have concentrated – within the extensive complex of problems associated with implementation-oriented research – primarily on the question:

*How can we move from knowledge to action?*

Thus the focus of this publication is directed toward **the design of the interface between theory and practice** – between research and implementation. And the approach is twofold. Firstly, the analyses of the problems, examples and action proposals address the issues of the resources available to actors in research to support implementing their research output and which consequences that has for the parameters prevailing in the science system and research funding programmes. Secondly, we ourselves want to provide action incentives in the way we have written this book.

This volume is a view from the outside, a view cast on an ongoing process by neutral third parties. It is based on our experiences as science consultants and project and process managers over the past fifteen years. It is further based on studies we carried out between September 2004 and May 2005 at the behest of the German Federal

Ministry of Education and Research. During that period – and in Germany, UK, Namibia, South Africa, Ethiopia, Belgium, the Netherlands and France – interviews were conducted with a total of 70 experts: scientists and representatives of the political arena, public administration, non-government organisations, business and the civil society.<sup>1</sup>

A clearly recognisable European, and in some cases German, focus results from this history. The problems described and many of the approaches to solutions and suggestions for action have to do with the special circumstances of implementation-oriented sustainability science, however, and make reference to their development in international and global research contexts.

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<sup>1</sup> Additional information in this regard will be found in the sources and links given in the Appendix.

## About the authors

### Peter Moll

Peter (\*1960), is a specialist in “bridging the gap” issues between science and polity / private enterprise. This covers questions concerning inter- and transdisciplinarity and knowledge transfer into politics and the broader society. He works as an independent science consultant and for science projects on a contract basis. His academic education is in the humanities and social sciences whereas his Ph.D. is in environmental sciences. He has worked for more than ten years in executive positions in two consultancy and urban development companies. Besides his advisory work (for the BMBF, the European Commission and others) he is currently preparing for “habilitation” at the University of Bremen, focussing on sustainability science and comparing the state of the art in Europe in regard to integrative research on global change.



### Ute Zander

Ute (\*1963), is a specialist in the theory and practice of learning processes and communication for sustainable development. She holds a degree in architecture and has worked as a PR officer in industry, in a planning institute and as an independent consultant. Together with Peter she has for nine years now worked on knowledge transfer for sustainable development at the interface between science, politics and the private sphere. At present she advises the German Federal Ministry of Education and Research and works on a contract basis in research projects dealing with new techniques and tools for (life-long) learning and training.



The authors share an interest in sustainability issues and their concern for implementation of “real life” steps towards sustainable development.