

The Swiss Transdisciplinarity Award

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including papers by the top three recipients of the Swiss Transdisciplinarity Award 2000

5.1 Introduction: Goals and Criteria of the Award

by Heidi Diggelmann, President of the Swiss National Science Foundation, Berne; Gertrude Hirsch Hadorn, ETH, Zurich; Ruth Kaufmann-Hayoz, IKAÖ, University of Berne; Johannes R. Randegger, Novartis Services Ltd, Basel; Christian Smoliner, Federal Ministry of Science and Transport, Vienna, Austria

Abstract

Members of the Jury of the Swiss Transdisciplinarity Award explain the award's purpose, the selection procedure, and final decisions, supplemented by information about the Gebert RUF Foundation, which financially supports the Award.

The Swiss Transdisciplinarity Award is an important incentive for transdisciplinary research. Conferred for the first time at the International Transdisciplinarity Conference, it was supported by a generous gift of 50,000 Swiss francs from the Gebert RUF Foundation.

Three Challenges of Transdisciplinarity

Transdisciplinary research must tackle several quite different issues, which together are crucial for success:

- produce knowledge that is scientifically reliable
- address important issues in society to produce knowledge that is relevant for the future development of society and nature
- involve actors and stakeholders in society in stimulating the mutual learning process between science and society that is necessary to producing knowledge that is effectively used.

These different components are of equal importance and present equal challenges. The three components can be symbolized as the different parts of a pigeon (Fig. 1).

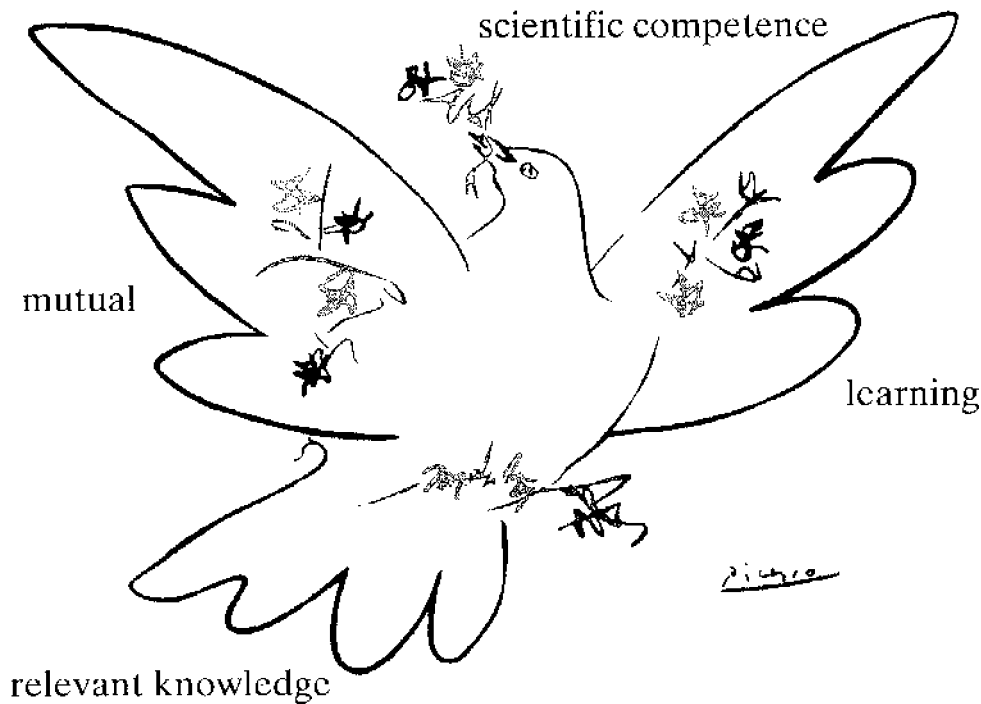


Figure 1
The Challenges of Transdisciplinarity Research are Symbolized as Three Different Parts of a Pigeon (Pablo Picasso, pigeon with varied flowers; © ProLitteris, 2000, 8033 Zürich)

The head represents scientific competence to produce reliable knowledge. The tail symbolizes issues in society that require relevant knowledge. The wings stand for the process of mutual learning by which knowledge is effectively used. All three components are necessary in order for the bird to fly.

Selection Procedure

The jury for the Award, comprised of the authors of this Introduction, are individuals from academia, science policy, and society. The jury decided to split the award into three parts, allotting 15,000 Swiss francs for each of three major components of transdisciplinary research (indicated below). The most risky and innovative of the final three winning projects was to receive 5,000 Swiss francs as a bonus. In addition, awards were to be conferred on the entire project team, not just the individual presenting the contribution at the conference.



Figure 2
Heidi Diggelmann, President of the Swiss National Science Foundation, with the Award Winners Egon Becker, Bernhard Truffer, and Robert Lukesch (from left to right) (photograph: keystone)

All submissions accepted for Mutual Learning Sessions, Dialogue Sessions and the Idea Market were eligible, with the exception of submissions by members of the Conference Board. Approximately 250 submissions sent for publication in the two pre-conference Workbooks were screened by members of the Conference Board, following defined criteria. For candidates to be considered, a written comment was required. The award committee classified the resulting pool of roughly 50 projects into the three categories of components. Subsequently, each contribution was assessed a second time in an independent evaluation by two members of the award jury. In a final meeting, the jury selected the top ten, then narrowed the field to three final winners.

Summaries of Winning Projects

The top three contributions received the Swiss Transdisciplinarity Award (Fig. 2).

- The award for achievements in the first category – theoretical issues – went to “Sustainability: A Cross-Disciplinary Concept for Social-Ecological Transformations,” by Egon Becker, Thomas Jahn, Diana Hummel, Immanuel Stiess and Peter Wehling (*Chapter 5.2.1*). In a clear, profound, and paradigmatic way, this contribution addresses conceptual and methodological issues involved in the integration of analytical, normative and strategic knowledge.
- The award for the second category – issues important for the future of society and nature – went to “Ökostrom: The Social Construction of Green Electricity Standards,” by Bernhard Truffer, Christine Bratrach, Jochen Markard and Bernhard Wehrli (*Chapter 5.2.2*). This project is an instructive example of how to address a political hot spot with scientific professionalism and political responsibility.
- The award for the third category – addressing participation of actors in society for mutual learning – went to “Research in Public – Suburbanization in Rural Areas,” by Robert Lukesch, Wolfgang Punz, Helmut Hiess, Gerhard Kollmann, Franz Kern, Sepp Wallenberger, Bernhard Morawetz and Helmut Waldert (*Chapter 5.2.3*). An innovative and courageous approach to using media to involve stakeholders in transdisciplinary research, it also received a bonus of 5000 Swiss francs for risk.

Seven remaining contributions were in the final top ten

- “Vertisols and Ecohealth,” presented by Mohammad A. Jabbar, M. A. Mohamed Saleem and Hugo Li-Pun (*Chapter 5.3.1*), effectively integrates scientific and indigenous knowledge as well as local conditions in resource management.
- “Search for Ecojumps,” presented by J. Leo A. Jansen, Geert van Grootveld, Egbert van Spiegel, Philip J. Vergragt, Wilma Aarts and Conny Bakker (*Chapter 5.3.2*) offers a convincing concept for achieving sustainable technology research and development by backcasting from needs to products and from the future to the present.
- “Complex Systems Research,” presented by Paul Jeffrey, Peter Allen, Roger Seaton, and Aileen Thomson (*Chapter 5.3.3*) is a paradigm for applying systems analysis to structure the complexity of cross-disciplinary knowledge in product design in the aerospace industry.
- “A Modest Success Story,” presented by Pirkko Kasanen (*Chapter 5.3.4*) clearly delineates crucial elements for successful transdisciplinary research, especially participatory definition of goals and questions.

- “Innovative Urban Planning and Management,” presented by Paulius Kulikauskas, Niels Andersen, Freddy Avnby, Lykke Leonardsen, Ole Damsgaard and Andreas Schubert (*Chapter 5.3.5*), is a lucid analysis of stakeholder participation and ways of overcoming obstacles in cross-sectoral urban planning.
- “Political Role of Participatory Technology Assessment,” by Michael Nentwich and Danielle Bütschi (*Chapter 5.3.6*), provides illuminating answers to a crucial question. To what ends do we enter into participatory forms of research with the public, and what factors are important for success?
- “Urban Environmental Management,” presented by Kaspar Wyss, N. Yémadji, A. Nodjadjim, Mamadou N’Diaye and Enda Graf (*Chapter 5.3.7*) demonstrates how to strengthen community initiatives in a participatory action-research approach, illustrated by a North-South research partnership for managing urban environmental issues in Africa.

Further information on the Swiss Transdisciplinarity Award is available at <transdisciplinarity@snf.ch> or at <<http://www.transdisciplinarity.ch>>.

• GEBERT RÜF STIFTUNG •

The Gebert Rüt Foundation
Philipp Egger, General Manager

Although the Gebert Rüt Foundation was founded as a private organization only two years ago, it has been involved in developing innovative ideas from the very start. This commitment is evident in its rapid acceptance by Swiss institutions of higher education. With an annual budget of 10 million Swiss francs, the Foundation can accomplish a great deal. It welcomes even large projects, which may otherwise have difficulty obtaining adequate financing. Its organizational structures are flexible, allowing it to make decisions about inquiries and applications efficiently and clearly. The structure of the management board and its members are a mark of the Foundation’s professionalism. It is not only able to finance high-profile projects but is also closely involved with them every step of the way to ensure their effectiveness and success.

The Foundation regards transdisciplinarity as the most important criterion for developing innovative ideas. It is central to new teaching concepts and research methods, especially at the frontiers of formal science and specialized scientific institutions, and among everyone who uses a common learning process. Yet, “interdisciplinarity” and “transdisciplinarity,” have become buzzwords. The Foundation conceived the idea of and endowed the Swiss Transdisciplinarity Award in order to confer greater prestige on the concept of transdisciplinarity and to promote substantive work in this area.

The award is intended to counteract powerful disincentives that discourage many exceptional people from daring to tread on the slippery surfaces of transdisciplinarity. The younger generation is especially at risk. Finding themselves labeled as “non-scientific,” a label that damages their reputations, is a significant part of the problem. Academicians of all generations must relinquish the stance of splendid isolation within their own scientific worlds. They must also become involved with group processes that develop dynamically in ways that cannot be foreseen.

The Award also acknowledges the work of the Swiss Priority Program Environment (SPPE) of the Swiss National Science Foundation. Since 1992, the SPPE has fostered pioneering work in interdisciplinary organizations and research programs, especially in the debate about environmental resources and sustainability. The Transdisciplinarity Award represents a watershed in this history. For the first time in Switzerland there is an incentive to develop transdisciplinarity and for it to be understood by the international scientific community. This award can stimulate wider propagation of the idea of transdisciplinarity and its synergistic capacity. Hopefully, it can be made on a regular basis and will be a major contributing factor to influencing environmental sciences.

More information about the Gebert Rüt Foundation is available at <<http://www.grstiftung.ch>>.

5.2 Final Awards

The contributions of the top three recipients of the award are introduced by the formal statements of recognition the jury made when conferring the actual awards.

5.2.1 Sustainability: A Cross-disciplinary Concept for Social-Ecological Transformations

by Egon Becker, Thomas Jahn, Diana Hummel, Immanuel Stiess and Peter Wehling, Institute for Social-Ecological Research (ISOE), Frankfurt am Main, Germany

Recognition

The project "Sustainability" was chosen for its analytically sound and comprehensive design of transdisciplinary research on sustainability, which resulted from a participatory process involving scholars from North and South.

The Problem

Since the 1992 Earth Summit in Rio, sustainability has become an internationally accepted keyword for a political discourse committed to quality of life, conservation of natural resources and a sense of obligation to future generations. Rather than being a well-defined concept, sustainability might best be characterized as a contested discursive field that allows for articulating political and economic differences between North and South, as well as a concern for social justice and political participation within environmental issues. Moreover, in a broader sense, the worldwide discourse on sustainability can be envisaged as a rallying point of public debate, knowledge-building practices and political strategies for coping with a series of unprecedented global and regional problems.

With growing public awareness, sustainability discourse has also become a "generator" of a new and innovative type of research issue

and is closely linked with economic and political problems. At the cutting edge of sustainability-related research and scholarship, innovative approaches have emerged. They constitute a new transdisciplinary field, with characteristic problems. Yet, both social and environmental-oriented natural sciences are poorly equipped to cope with this new set of problems that cut across existing disciplinary boundaries. Theoretical concepts and analytical tools are developed mainly within given disciplinary matrices. Despite considerable attempts by both the social science and the natural science communities, an analytical framework for cross-disciplinary research oriented to social actors and social-ecological transformations is still missing. Social science approaches, especially, have not been incorporated seriously into the mainstream of environmental research. And vice versa: to a large degree environmental considerations are excluded from the mainstream of social science. Moreover, there is a deep gap cutting across social sciences themselves.

The Project

In response to this situation, an international project on "Sustainability as a Concept for the Social Sciences," was launched by UNESCO within its intergovernmental research and policy program, MOST (Management of Social Transformations). From the very beginning, the project was designed and organized by the Frankfurt Institute for Social-Ecological research (ISOE) on a very low budget.

At an *organizational* level, the task was to build a viable international network of scholars from the North and the South who represented the full range of social science disciplines. In the end, a gender-mixed group of about 15 competent scholars from different branches of social sciences, and with various regional and cultural backgrounds, was established. The study group assessed the current state of the debate on sustainability and its future prospects in their respective fields.

At a *cognitive* level, the aim was to explore conceptual and methodological implications of sustainability for the social sciences and to outline a framework for cross-disciplinary sustainability research. Additionally, in the course of this project, participants came together at a conference held at Frankfurt am Main in November 1996. The conference produced numerous papers (Becker and Jahn 1999), and a first synthesis of the results was published as a MOST-Policy-Paper (Becker et al. 1997).

The Outcome

The project was a kind of academic adventure. Looking back, its success was the result of two procedural assumptions. At the organizational level, we worked strictly with a participatory round-table model, together with strong conceptual inputs and common evaluation of outcomes. At the cognitive level we tried to avoid the “fallacy of misplaced concreteness,” to quote the philosopher Alfred North Whitehead. The study group devoted a lot of energy to generalizing and clarifying the different conceptual approaches introduced by members of the group.

Integration of Actors, Technologies and Knowledge

To overcome the weakness of discipline-oriented research at the core of sustainability work, the study group identified and tackled a twofold challenge of integration:

- The first challenge results from the hybrid character of the sustainability concept itself. It is simultaneously a political model for change with a strong normative content and a concept for scientific analysis. Therefore, in sustainability research different academic and non-academic actors with heterogeneous interests and knowledge interact with one other, creating a need for coordination and *social integration* within a common frame of action.
- The second challenge results from the differentiation of scientific and technological knowledge across a broad spectrum of disciplines and practical applications. Within the field of sustainability research, the well-known problem of interdisciplinarity is increased by the deep gap between social and natural sciences. Therefore we need a kind of *cognitive integration* to bridge this gap.

Distinctions within the Discourse on Sustainability

Integration demands differentiation. Hence, we distinguished three levels within the discourse on sustainability: normative, operational and analytical.

First, the idea of sustainability introduces a new set of *normative* commitments into the long discussed problematic of development or modernization, as well as the environmental debate. A call for justice is being

made on behalf of future generations. Societal development should on no account lead to irreversible constraints on the chances of future generations meeting their needs. In addition, international justice between North and South, social justice within societies, equity in gender relations and democratic participation in decision-making processes are widely discussed normative aspects of sustainability. How, though, can we attempt a kind of international and intercultural agreement on those ambitious normative commitments?

The most grating controversies occurred on the normative level. Instead of setting definite goals for action in defined situations, we tried to work out, by means of a norm-analysis, "meta-norms." These general meta-norms were capable of directing the process of norm-building with different actors and in different situations. Examples include "capability of processes to continue," "enhancing the potential for development," and "co-evolution of social and natural systems."

Second, at the same time sustainability imposes a strong commitment to action aimed at change directed towards reshaping relationships between human beings and their environment. This occurs along different dimensions, reaching from patterns of production and consumption to reproductive behavior relevant for demographic transitions. At an *operative level* different concepts of action for the fields of politics, economy or culture must be developed, on the basis of general criteria of sustainability. Another question, then, arises. How can we work out, together with key actors in different fields of society, practical concepts for goal-oriented actions?

An important step is to strengthen the actor-orientation of research in order to assist in developing strategies that enhance the ability of key actors to move towards more sustainable practices. This step implies integrating the knowledge held by non-scientific actors within the research process. Actor-orientation of research could entail, in particular, choosing topics for investigation according to the needs of key actors, inviting non-scientific users to reformulate research issues, and involving them in various stages of the research process.

Third, at an *analytical level*, sustainability claims that societal development can no longer be viewed without considering its natural prerequisites. It is inseparably coupled with their reproduction. The focus of research problems, therefore, will be on transformations of patterns of interactions between societies and their natural environment. How, though, can we analyze these transformations?

The project tackled the most complicated problems at the analytical level. Achieving a more comprehensive understanding of interactions

between societies and their natural environment generates the hard core of the cognitive problem of integration, mentioned previously. It is located mainly within scientific discourse. The new knowledge base for sustainability requires innovative tools and strategies for integrating knowledge created in different branches of social science. Even more challenging, sustainability research needs bridge concepts between social and natural sciences. Sustainability holds far-reaching implications for the cognitive structure of social sciences and environmental research, the latter of which is still dominated by natural science approaches.

Social-Ecological Transformations

The international discourse on sustainability is centered around a new type of recently evolved complex global and regional problems. They result, on the one hand, from economic and technical globalization and their social, political and cultural impact. On the other hand, global and regional environmental changes are often intertwined in an indistinguishable manner with the globalization process. In the study group, we experienced how societies in the North and the South perceive these problems in different ways, in light of growing public awareness and refined scientific descriptions. They define problems within their prevailing institutional and intellectual frameworks, tackle them with available methods, solve them partially, and create new and previously unknown subsequent problems of a second order.

To sum up: In sustainability research science is part of the problem and part of the solution. Scientific efforts are embedded in a dynamic, self-referential process of solving and creating social and ecological problems on different scales of space and time. In these processes patterns of societal relationships to nature undergo major changes. Thus, we call these changes *social-ecological transformations*.

These transformations can be produced either by non-intentional evolution (such as economic globalization or spread of new technologies) or by goal-oriented innovations and coordinated management activities. Mostly, though, they are out of social control. With the normative concept of sustainability, desired changes are marked. Yet, how we stimulate or manage them at the operative level remains an open question. Surely we need knowledge about the behavior of strongly coupled social and ecological systems containing feedback loops – a type of *complex systems* we are only beginning to understand.

At the analytical level the term sustainability was used within the UNESCO-project mostly with a negative sign of absence, in order to identify non-sustainable states and processes. Analytically, this opens a “corridor” for different paths to more sustainability, a corridor bordered by “crash barriers.” Sustainability is related to stabilized and preserved patterns within social-ecological transformations over long periods of time. We addressed sustainability problems strictly in terms of processes instead of state. Following this procedure allowed us to redefine existing definitions of sustainability.

Conclusions

Fostering integration of knowledge requires new forms of cognitive and organizational alliances which need the support of research policy. The initiative of MOST – to bridge the gap between sustainability as a political framework for action and as a framework for scientific research – was a crucial prerequisite for success in the project. Additionally, we learned that transdisciplinary research requires an appropriate framework both at cognitive and organizational levels. Besides strict methodologies and sophisticated conceptual schemas, transdisciplinary research requires new forms of cooperation and networking, such as inclusion of researchers and laypersons with different social, cultural and gender experiences. The better these two levels are coordinated, the faster the onset of positive effects on theoretical and practical problems.

5.2.2 Ökostrom: The Social Construction of Green Electricity Standards in Switzerland

by Bernhard Truffer, Christine Bratrach, Jochen Markard and Bernhard Wehrli, Swiss Federal Institute for Environmental Science and Technology, Kastanienbaum, Switzerland

Recognition

The project Ökostrom “Green Electricity Standards” was chosen for addressing a political hot spot in Switzerland with professional interdisciplinary research as well as a regard for political and economic realities and necessities.

Introduction

Markets for green products have received considerable attention in many countries recently. Organic food, for instance, is gaining increasingly important market shares, and other product sectors are following suit (Viliger et. al. 2000). The liberalization of electricity markets has also opened up opportunities for electric power companies to differentiate their products in the marketplace. Conventional electric utilities, as well as new Green Power marketers and traders, have begun to develop Green Power products (Loskow 1998; Holt 1997). As in other Green Goods markets, quality control is a key success factor. Recently, a number of Green Power certification initiatives have emerged, aimed at assessing and communicating environmental benefits of Green Power products (Markard and Truffer 1999). Worldwide, about a dozen labeling schemes exist today.

Hydropower has an ambivalent position among electricity generation technologies, which are included in Green Power products. This ambivalence is reflected in the variety of criteria used to identify Green Hydropower plants. Most labeling schemes set a limit at generating capacity. Others restrict admission to old plants and do not want to support new projects. However, from an environmental standpoint, neither capacity nor construction date has ecological significance. An environmentally-motivated and scientifically-derived set of criteria would correspond better to the needs of a trustworthy eco-label.

Political Debate on Green Hydropower in Alpine Countries

One major reason for the ambivalent treatment of hydropower is associated with environmental characteristics of hydropower plant operation. Electricity from hydropower plants creates no air pollution, no nuclear waste and, in most cases, virtually no CO₂ is emitted. Furthermore, hydropower plants are extremely energy-efficient, and energy from storage plants is available instantaneously. Nevertheless, construction and operation of hydropower plants have local impacts, which may be severe. They include extinction of fish populations, loss of aquatic habitats, sinking ground water levels, and deterioration of landscapes.

This double characteristic – a globally preferable and locally-destructive energy system – has gained high political relevance in many countries (IUCN and World Bank 1997). The negative effects are pervasive, especially in the alpine region of central Europe. Most rivers have been dammed for hydropower generation. In Switzerland, this situation led to considerable political struggle (Truffer 1999). In the 1980's conflicts escalated in the form of public protest movements against new dam projects. As a result, a new and stricter water protection act was passed by popular vote in 1991, deepening political segregation into two conflicting camps – hydropower producers and environmentalists.

Although the water act demands environmentally-optimized operation modes, few plants have adopted them. Long-term licensing of water use rights for power plants is a major reason. The renewed water protection law demands, for instance, minimum flow requirements. But, its application is tied to relicensing of power plants. For the majority of plants, this renewal is due in 20 to 40 years from now. Furthermore, market liberalization has changed the economic context of hydropower generation dramatically. Most Swiss dam projects have been abandoned or postponed, and some existing hydropower plants are threatened by closure if no supporting actions are taken.

Defining New Roles for a Research Institution

The Green Hydropower Project

Analysis of the political background and future challenges of the hydropower sector led a team of social and natural scientists to start a

transdisciplinary project aimed at developing an eco-label for Green Hydropower plants (Truffer et. al., 1998). Members of the team are primarily located at and supported by the Swiss Federal Institute of Environmental Science and Technology (EAWAG). The project was started with the explicit task of developing a “new kind” of research.

For three decades, EAWAG has been successful in advising governments about technical water protection measures, such as waste water treatment plants and lake oxygenation. Additionally, it has established an international reputation for high-level basic environmental research. Research and practical applications have developed alongside each other for a long time. Increasingly, however, we have realized that by continuing to develop ever more sophisticated end-of-pipe technologies and by mainly increasing output of research results, the institution is losing its grip on newly-emerging problems.

These new problems are defined by complex cause-effect relationships that demand increased collaboration between different disciplines in environmental sciences and engineering. Furthermore, solutions must be developed for complex institutional settings. Therefore, social sciences have been identified as potentially important research partners. Finally, solutions must be defined by explicitly taking value considerations into account. This means projects have to be organized to allow stakeholders stronger involvement than in the past.

Given the lack of scientific background in hydropower certification and the highly politicized context of hydropower regulation, the project team identified development of an eco-label for Green Hydropower as an interesting focus. The team began by carrying out extensive interviews and discussions with hydropower operators, government officials, and environmentalists. As a result, the project could be substantially focused and a first constituency formed.

Both plant operators and environmental organizations emphasized the urgent need to find new and less antagonistic ways for dealing with the public image and environmental impacts of hydropower plants. Green Hydropower was seen as a potentially beneficial but highly uncertain opportunity. Additionally, it was clear that none of the traditional conflict groups could take the lead in trying to overcome the dilemma. By proposing a scientifically-grounded Green Power certification procedure, the research institution could play an important role in supporting a more rational discussion about options for sustainable hydropower production.

These findings led to defining the following goals:

Project Goals

1. A certification procedure for hydropower plants had to be developed that would respect the high complexity of ecological and political contexts of hydropower operation. This procedure should be adapted to the specific political and ecological context of Switzerland, but also be applicable in an international (at least European) setting.
2. The substantial uncertainties with regard to future market conditions of the green power products should be reduced, as far as possible, by defining a number of social science research projects focusing on these topics.
3. A broadly-based constituency should be put into place, capable of making decisions about highly value-laden questions and supporting the eco-label scheme.
4. Finally, the whole project should create a context in which high-level social and natural scientific research projects could take place.

At the beginning of the year 2000, the Green Hydropower effort encompassed about 20 individual projects, divided into four working groups that tackle specific problem areas:

- One group focuses on developing new tools for determining minimum flow regimes. It encompasses projects on fish and benthic ecology and its interaction with habitat and hydrology, sediment transport, temperature regimes and chemical substances.
- A second group analyzes adverse effects of hydropower operation on flood plain ecosystems. Exchange processes between ground water and riparian ecotones, distribution of benthic organisms and terrestrial vegetation, and the importance of sediment transport are analyzed.
- Results of these two groups are fed into the third group, focused on assessment. This group, which develops a tailor-made certification procedure, must specify a scientifically sound, credible and effective procedure.
- The fourth group concentrates on market and political sides of Green Power products. It develops marketing strategies, analyzes learning processes of consumers and looks at complementary policy measures to enhance the effectiveness of Green power markets.

A pilot study of the project was carried out during the first year, with the goal of setting up the project and finding support from major stakeholders. Work began with a two-year case study, focused on options of sus-

tainable hydropower operation in the Blenio valley in the southern Swiss Alps. The goal of this phase was to develop a comprehensive assessment procedure, applied to the first hydropower plants in summer 2000. Following this phase, scientific projects will focus on specific research issues and on certification of concrete hydropower plants.

Lessons Learned

The product of the Green Hydropower project – the eco-label – is only one result. At a more fundamental level, development of widely-accepted standards is at stake. Two questions are uppermost. How is a system of environmentally sound electricity generation defined? And, how could we describe and reach a preferable energy future? Such standards cannot be prescribed by experts alone and do not derive from purely objective facts. They will be socially constructed in processes of mutual learning by and among diverse societal actors.

A research institution striving for objectivity and truth still has an important role to play. In our case, it must provide tools and methods for assessment of river ecosystems used for hydropower generation. Researchers have to structure different aspects of hydropower management and to communicate relevant facts that can support rational decisions. However, they must be prepared to define their role in an ongoing learning process and to clearly communicate the limits and uncertainties of their knowledge. They must also be explicit about where value judgments should be made by different interest groups. The Green Hydropower project has yielded some initial success in actualizing new roles, making it a promising though highly demanding undertaking.

The promising part is that all involved parties contributed essential elements to solving the problem: environmental scientists defined a scientifically sound assessment procedure and developed tools to evaluate and simulate effects of environmentally optimized operation modes. Social scientists aimed at reducing uncertainties related to market liberalization and at sketching strategies for Green Power market development. Representatives from different stakeholder groups had to overcome taken-for-granted problem-and-conflict definitions and to embark on a mutual-learning process.

The demanding part was overcoming a number of prejudices among the researchers, in two respects. First, the need for a professional project management and a strong product orientation created a lot of discussion and irritation among many scientists. One major conflict was the differ-

ing time horizons of scientists and stakeholders. Scientists regarded time horizons of at least five years as a starting point for involvement. Stakeholders, on the other hand, did not show interest in a common undertaking that would take more than a couple of months. Ironically, it took almost three years for a common standard to develop, a risky time lapse for both parties.

Second, many stakeholder groups did not accept the scientific institution as a “neutral” mediator. Instead, the project team was accused of being an agent of the “other” side of the political conflict. Building trust, therefore, required recurrent bilateral exchanges with several representatives of all interest groups. These time-consuming processes could only be carried out because of strong moral and financial support from the directorate of EAWAG. Several times the project was on the verge of being closed because of heated opposition to the initiative.

Taking these difficulties into consideration, it is clear that transdisciplinary research in a highly politicized problem area is not an easy road to travel. Problems are extremely complex, uncertainties are substantial, and the probability of failure is high. This is all the more true when the ultimate success or failure of a project depends on the good-will and initiative of stakeholders and is, therefore, outside the control of project management. One of the most crucial variables is the ability to translate between different positions, both within stakeholder groups and among scientists from various disciplines.

At the same time, transdisciplinary research has shown some definite benefits. First, researchers, especially young students, become highly motivated to work in a context that shows immediate relevance. At the level of individual researchers, a deeper understanding of the variety of aspects of a particular problem can be gained. New solutions may also be developed, a prospect that rarely emerges when following purely disciplinary research routines. Additionally, exchange with different stakeholders proved to be inspiring and motivating for researchers.

The ultimate contribution of an eco-label for electricity to resolving environmental problems is still too early to assess in detail. The instrument holds promise, but in the end the market has to tell. Independent of ultimate market shares that may be reached by eco-friendly power products, the eco-label definition process has created a context in which older conflict positions can be questioned and space for compromises built. All in all, we experienced the project as a highly motivating and gratifying experience and are eager to evaluate it in a way that increases potential benefits while decreasing difficulties in future transdisciplinary undertakings.

5.2.3 The Green Leaves of Life's Golden Tree: The Project "Research in Public"

by Robert Lukesch, Wolfgang Punz, Helmut Hiess, Gerhard Kollmann, Franz Kern, Sepp Wallenberger, Bernhard Morawetz and Helmut Waldert, ÖAR Regional Development Consultants Ltd, Fehring, Austria

Recognition

The project "Research in Public" was chosen as an innovative and courageous participatory approach to developing a sustainable way of suburbanization in rural areas.

The Topic: Suburbanization in Rural Areas

- *Suburbanization* is a ubiquitous phenomenon that we address with regard to challenges for rural areas. The project "Research in Public" was carried out from the focus of cultural landscape research, which the Austrian Ministry of Science has promoted and financed since 1995 (BMWV 2000).
- *Cultural landscape* carries not only essential life functions and provides space for human activities. It also conveys an aesthetic context of quality of life and one of the most influential image factors in the minds of Austrians and foreign visitors.
- *Austrian rural areas* are an outcome of historical striving for survival among farming populations. Having absorbed a continuous flow of clearing, cutting, mowing, sowing and harvesting labor through generations, farmers today are sanctuaries of Austrian identity.

While generally acknowledged, these facts are contravened by a lax attitude evident in the increasing consumption of open landscape. Settlements are spreading and commercial activities being dispersed to peripheral zones called *edge cities* (Garreau 1991) or *para-cities* (Holzinger 2000). Both growth phenomena can be criticized:

- Typical landscape features are degraded by "urban blight" (Zibell and Gürtler-Berger 1997).

- Urban characteristics get lost in their peripheries (Pawley 2000).
- Resources such as soil and fuel are wasted and pollution increases, mostly due to higher energy consumption for traffic and dispersed housing (Schremmer 1999).
- The financial burden rises for constructing and maintaining extensive supply infrastructures (Schremmer 1999).
- Commercial activities in urban centers decrease, leading to loss of workplaces and thinning of vicinity services (retailers and service shops next to where people live)
- Society becomes fragmented and sometimes partially isolated in peri-urban ghettos (Heise-Verlag 2000).

Many parties are involved. *Space planners* and *local authorities* try to stop these trends through authoritative or contractual regulations (Örok 1995). However, regulations sometimes seem to cause more chaos than they prevent (Zibell and Gürtler-Berger 1997). *Municipalities* compete with neighboring communities for tax benefits from investments on the green lawn (investments outside settlement limits, or along exit roads) (WKSt 2000). Some attempt intermunicipal cooperation, but successful examples are rare. *Entrepreneurial lobbies* undertake city marketing initiatives to countervail centrifugal forces, fostered by the attractiveness of extensive space for productive or commercial activities and the generalized use of cars. *Consumers* appreciate extensive parking lots, supermarkets' competitive offers, and the convenience of buying everything under one roof. Yet, not everyone owns or has access to a car, especially the elderly. Young people are attracted by peripheral movie centers and hang-outs, but they resent the decline of gathering places in their home towns and villages.

The shady sides of suburbanization take longer to surface than their immediate image-boosting benefits. Negative effects are often masked by dilution or dislocation:

- Exploding infrastructure costs such as waste water devices are subsidized by federal funds (Schremmer 1999) and not fully carried by those who cause them.
- Traffic congestion may disturb a neighboring community more than the immediate location of a commercial center.

As we see, suburbanization in rural areas is complex in its temporal, social and spatial dimensions:

- Its pace has accelerated in recent times, as economic internationalization moves forward and tears down barriers of geographical competition.
- Phenomena related to suburbanization processes touch nearly everybody in some way.
- It is an issue of “general interest.”

The effects on cultural landscape are deep, hard to reverse and in direct conflict with long-term sustainable development. This multifaceted problematic requires not only an interdisciplinary but a genuinely trans-disciplinary approach. Shifts of perception go hand in hand with social and political action, and scientific observation cannot be separated from introducing changes either. Complex problems require complex answers (Malik 1992).

Project Setting

We chose two project sites, the rural towns of Horn (Lower Austria) and Weiz (Styria) and their neighboring municipalities. Our *first hypothesis* was that Weiz (9245 inhabitants, 5 km²) does better in dealing with the described problematic than Horn (6364 inhabitants, 39 km²). The reason appeared to be intermunicipal cooperation within the territorial association REV (Regional Development Association), which has 17 member municipalities in the Upper Raab valley between the rural towns of Weiz and Gleisdorf.

This led us to a *second hypothesis*, that creation of cooperative structures depends on essential factors which either promote or hamper their emergence and consolidation. There is, for example, greater open space in Horn, which is nearly eight times larger than Weiz and has fewer inhabitants.

The project is also embedded in ongoing local development processes:

- An eco-management plan being implemented in Weiz (Ökologic-Institut 1996, 2000, Ökoplan Weiz) and first attempts to coordinate strategic resource management on the intermunicipal level within the REV.
- A *city marketing initiative* in Horn, whose urban center suffers severely from business dispersion to the city limits, known popularly as the “golden mile.”

The team has the following members:

- the coordinator (a regional development consultant)
- a team of space planners
- a team of ecologists
- a team of social scientists
- a marketing specialist
- two local coordinators (integrated into local actors' networks, one the manager of a local innovation center in Weiz, the other a city marketing manager in Horn)
- an Austrian broadcast journalist, who links up with colleagues in local radio and TV.

Aims

The project has four aims:

- 1) *Shifting perception:* We want to raise awareness among local populations and interested consumers of broadcasting and TV programs of the effects of private and job-related roles in the suburbanization phenomenon. They will gain insight into the ambivalence of behavior patterns stimulated by short-term and economic benefits that are not generalizable.
- 2) *Creating strategic options:* We want decision makers and economic key players to perceive additional choices for developing the infrastructural and economic context, based on shared visions.
- 3) *Mutual learning:* We want key actors in both locations to have an opportunity to exchange experiences and to transfer good practices in problem solving.
- 4) *Making language permeable:* We want to gain new insights into possibilities of interlinking scientific and everyday language, partially mediated by mass media, for societal problem solving.

The fourth aim, in particular, is driven by the fact that we deal with three types of “public,” and, therefore, three different languages: the languages of researchers and technicians, of local actors and decision makers, and of the “broad public” represented by mass media consumers and journalists.

Methods

The methods respond to two main questions:

- How can we make the creeping spatial processes visible and tangible for the population, usually preoccupied with other matters and not perceptive about those changes, in spite of their high esteem for an intact cultural landscape?
- How can we connect local problem solving with the more abstract concept of sustainable development?

In order to meet the *first requirement* we chose the method of *future images and stories* (BMWV 1998). *Hiess* defines the method:

This method has been elaborated and tested in a number of cultural landscape research projects in Austria. It intends to enhance the awareness towards potential changes, to strengthen the motivation for common action and to improve the transparency of consequences of supraregional decisions on a regional level. To this end, regional images of the future will be developed on the basis of supraregional sectoral scenarios. By combining utilization of maps, aerial photographs and fotos into cut- and paste montages, the landscape is depicted at a future point in time. At the same time, the everyday life of various protagonists (farmers, tourists, mayors, entrepreneurs, etc.) is to be described at a future moment based on foreseeable developments. In addition, the possible impact on the landscape will be deducted from their behavior.

In order to meet the *second requirement*, we chose an interactive, team-oriented instrument for assessing the territorial potential for change towards sustainability. Its roots lie in the empirical evidence of several hundred case studies on innovation in European rural areas, analyzed by a working group of the European Rural Observatory (AEIDL 1997). The instrument of *innovation compass* was developed by the ÖAR Regionalberatung (Lukesch 1999) as a result of inductive conclusions based on that empirical work. It combines regional diagnosis with identification of key development strategies. The compass comprises nine realms of territorial development:

- a. Environment (natural and built heritage and resources)
- b. Images (people's own views of the territory, other people's views of territory, and people's assumptions about the views of others)
- c. Markets (internal and external exchanges of goods and services)
- d. Financial resources (financial capital and commercializable assets)
- e. Enterprises (profitable and non-profit activities)
- f. Competences (formal and tacit knowledge and skills)
- g. Governance (rules, institutions and decision making processes)
- h. Identities (feelings and beliefs about the collective "self")
- i. Human Resources (demographic features, human potential and relations)

The results of rating these nine components in a team process are visualized in a nine-edged radar whose respective shape allows deducing hints for appropriate development strategies under the guiding principle of sustainability.

Description and Actual State of the Process

The research project has three overlapping phases (Fig. 1):

First Phase

The project started with a detailed diagnosis of current socio-economic and ecological states and trends on project sites. Relevant elements of general sectorial trend forecasts are put in relation to the local situation, in order to create a coherent future image of the place around the year 2025. These future images are synthesized in an *expert workshop* with the research team and local key actors and decision makers. This workshop marks the start of the *mobilization phase*, during which quantitative elements are complemented by individual "future stories" and other creative local inputs (from local people, schools, etc.). Receivers of directly mailed leaflets and readers of these posters are invited to express an opinion on the possibly irritating or worrying pictures. They are also invited to participate in Future Workshop 2025, two months later, where an alternative, desirable future is elaborated. Local and Austrian-wide broadcasting contributes to spreading this call for participation and contributions.

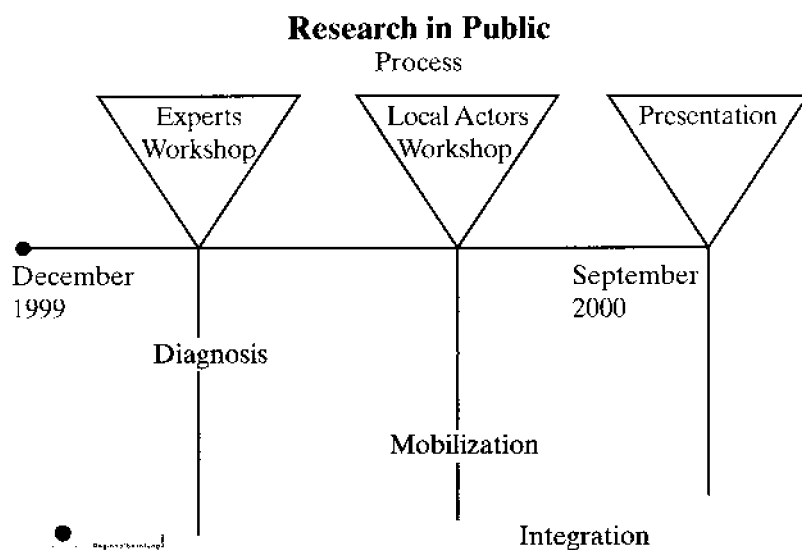


Figure 1
Process of Research in Public

Second Phase

After duly screening and selecting suggestions, the material (future images, stories and other contributions) are exhibited. The above mentioned Future Workshop 2025 results in a shared vision of a desirable future with regard to specific themes (such as traffic, urban revitalization, intermunicipal cooperation, etc.). This Workshop is the most important event of the second phase, marking the end of the diagnosis phase and the start of the *integration phase*.

Third Phase

The thematic issues are concretized within work groups until final results are presented in each area, two months after the Future Workshop 2025, with key actors of other project sites present. The final presentation marks the end of the mobilization phase and the project. We presume the third phase (*integration*) will go on beyond the project, and its results will

be embedded into local development strategies. Results will be broadcast in an Austrian-wide program.

The project started in December 1999. Expert workshops and future workshops have been held with encouraging outcomes. Municipalities and local businesses are willing to support implementation with their resources. Scholars' workshops are held because they are eager to learn how to make a radio transmission together with the journalist. The topic will be – of course – the future of the place in which they live. Furthermore, people contributing suggestions receive vouchers for shopping in the urban center, contributed by local retailers.

The final presentations will be in fall of 2000. After this event, the expert team will step out of the process, but local people will continue to build the world in which they want to live.