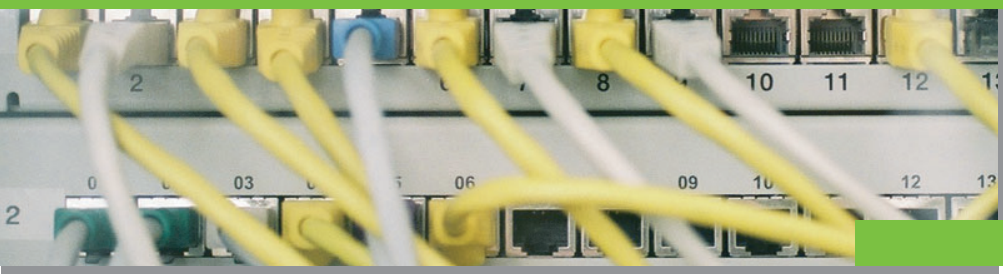
Matthias Bergmann, Bettina Brohmann,
Esther Hoffmann, M. Céline Loibl,
Regine Rehaag, Engelbert Schramm,
and Jan-Peter Voß

Institut für
sozial-ökologische
Forschung (ISOE)

Quality Criteria of Transdisciplinary Research



A Guide for the Formative Evaluation of Research Projects

With a Foreword by Thomas Jahn

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Institut für angewandte Umweltforschung

ÖSTERREICHISCHES
ÖKOLOGIE INSTITUT
für angewandte Umweltforschung

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sozial-ökologische
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**Matthias Bergmann, Bettina Brohmann,
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Quality Criteria of Transdisciplinary Research

A Guide for the Formative Evaluation of Research Projects*

With a Foreword by Thomas Jahn

* This guide is the central result of the project *Evalunet – Evaluation Network for Transdisciplinary Research. Evalunet* is funded within the research funding program *Social-Ecological Research* of Germany's Federal Ministry for of Education and Research under the funding registration number 07IFS06.

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Institute for Social-Ecological
Research (ISOE) GmbH
Hamburger Allee 45
60486 Frankfurt am Main
Phone +49 69 707 69 19-0
Fax +49 69 707 69 19-11
info@isoe.de
http://www.isoe.de

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Layout: Edith Steuerwald, Harry Kleespies (ISOE)
Translation: Mitch Cohen
Picture credits: Jürgen Mai

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Foreword

It is a familiar situation. In the middle of a high-level transdisciplinary research project, panic sets in – especially in the responsible project management. How can the various strands of research be brought together? How can the members of the heterogeneously composed team, who come from differing scientific and scholarly disciplines and from the realm of practice, be enabled to understand each other? How can the exchange of progress and results be organized so that necessary processes of finding agreement contribute to a good overall result? How are the results evaluated by the project's participants and from outside? And how can these results *endure* in science and at the same time be taken up in the context of practice, since they go against the grain of disciplinary criteria of quality? These and many other questions are typical of complex, transdisciplinary, and practice-related research situations.

Even today, research is carried out primarily within disciplinary boundaries. Problems are characterized by disciplinary interests; processes of solving societal problems with a problem core in practical or everyday life are not the primary goal. It is true that researchers increasingly act on terrain whose content is new, but the processes of scientific problem solving are still structured in accordance with patterns of disciplinary order, and the criteria of quality in research work are still discipline-related.

Concrete societal problems demand solution-finding processes (and solutions) that transcend the order of the disciplines and go beyond purely disciplinary research processes and approaches. The newer the practical problem that needs to be solved, the more important these boundary crossings become. The core of transdisciplinary research lies in these boundary crossings and in their methods. At the same time, this raises the question of standards of quality and of the practice of evaluating such research. Transdisciplinary research cannot yet claim a recognized canon for this, especially because of its youth; at best, the first beginnings in this direction can be observed. The project *Evalunet* marks a milestone on this path.

Transdisciplinary social-ecological research had to respond to this challenge early. Due to the uncertainty factors described above, it was confronted with several interrelated problems from the beginning. Thus, on the one hand, it had (and has) to deal with an accentuated problem of perception: The disciplinary patterns of perception cannot be applied to it, and this can lead to its devaluation or the devaluation of its results as science. Closely tied to this, on the other hand, is the problem of evaluation: Transdisciplinary research proposals and research results are generally subject to a multiple appraisal, compete with the criterion of top disciplinary achievement, and remain unevaluated in terms of the achievement of transdisciplinary integration – which means it is undervalued as a whole. There is no general, scientifically recognized "set" of criteria for good transdisciplinary research, no shared and recognized understanding of transdisciplinarity that corresponds to the understanding of disciplines. Beyond that, transdisciplinary social-ecological research has a specific problem in collaboration, since there is still a lack of practical routines of research and science for transdisciplinary integration processes on all levels of a research process, though this is precisely where the fate of concrete research projects is decided.

In recent years, these problems have been dealt with either in discourses shaped by academic science studies or in concrete research practice, especially in research conducted outside the university. A gap has systematically opened up between them. Closing this gap is the overarching goal of *Evalunet*. Necessary to this end was, first, that several institutions affected by these problems come together – a single institution alone could not have completed this task. And it also required its own – transdisciplinary – research concept with a tested relationship to practice, its own development of methods, and a transdisciplinary team.

But it was not until the Federal Ministry of Research set up the research funding program "Social-Ecological Research" in 2000 that the essential institutional and financial prerequisites were created to actually carry out the project and to expand the basic idea into a robust concept. This concept formed the framework for the research project "Evaluation Network of Transdisciplinary Research", whose work method, structure, and questions remain unique. In several years of work with the participation of numerous experts from a variety of scientific fields and institutional contexts, a wide range of transdisciplinary research experience was evaluated and processed into criteria and procedures for evaluation. Here, the broad spectrum of research content and research settings of the transdisciplinary research projects evaluated within the project was a central prerequisite for working out a guide suitable in practice for transdisciplinary research, as is presented with this criteria catalog. On the one hand, it is the conclusion of this process of several years of work and research; but we hope it is also the beginning of the next phase of a practice-reflecting way of dealing with the understanding of transdisciplinary research and thus of a next phase in the strengthening of transdisciplinary research practice as a whole.

Recognition that research and science are not independent of the participating persons was a decisive factor in the work in the project *Evalunet*, but it can also be applied to transdisciplinary research in general. Those active in transdisciplinary research have to bring with them the ability to deal with quite various forms of knowledge and work. They have to recognize their own – disciplinary – limits and muster the willingness and interest to tread new conceptual and methodological ground.

With their openness and willingness to cooperate and discuss, the members of the *Evalunet* project group and the colleagues supporting them from a wide variety of research contexts have decisively contributed to making it possible for the ambitious task of *Evalunet* to achieve the result presented here. Special thanks are due to Matthias Bergmann, who successfully led the work of the project group and who had an essential part in the production of this criteria catalog in its present form. Without him and his ability to hold differences and different things in a productive balance, this project would not have been possible.

Thomas Jahn
Institute for Social-Ecological Research ISOE

Frankfurt am Main, 15 September 2005

I. Abstract

Transdisciplinary research projects investigate problems from everyday life. Experts from various disciplines and practitioners from the practical field in question have to co-operate to cope with the problem appropriately. Multiple forms of collaboration, differentiation and integration, methods and theories are significant for such projects. So conventional methods of disciplinary evaluation cannot be transferred and applied directly. In this situation, *Evalunet*, the Network for Transdisciplinary Evaluation, offers this guide, which provides researchers with very detailed evaluation criteria and descriptions of evaluation methods and practices. The criteria and procedures were identified in an empirical process by evaluating a number of transdisciplinary research projects. In this process, the Evalunet team was supported by numerous experts from various research areas. The main purpose of the guide is to provide guidance for the evaluation of transdisciplinary research projects. The criteria mainly support discursive evaluation processes that initiate learning processes for researchers and evaluators (formative evaluation). A set with a reduced number of criteria (Basic Criteria) offers a basic procedure for the evaluation, while the larger set with more detailed criteria (Detailed Criteria) provides explanations and assistance in making a judgment. Criteria can also be used for conceiving and constructing new research projects.

Transdisziplinäre Forschung befasst sich mit lebensweltlichen Problemstellungen. Bei der Forschungsarbeit müssen Experten/innen aus verschiedenen Fächern bzw. Disziplinen und aus der Praxis zusammenwirken, um die komplexe Problematik umfassend behandeln zu können. Diese Vielfalt, die besondere Formen der Kooperation, der Differenzierung und Integration, Methoden und Theorien impliziert, bringt es mit sich, dass gängige, bei der fachbezogenen Bewertung hinreichende Verfahren der Evaluation und der Qualitätssicherung nicht unmittelbar auf solche Forschungsvorhaben übertragen werden können. Diesem Mangel an Kriterien und Methoden der Evaluation begegnet *Evalunet*, das Evaluationsnetzwerk für transdisziplinäre Forschung, mit dem vorgelegten Leitfaden für die Forschungspraxis, der vor allem ausführlich beschriebene Qualitätskriterien enthält und ebenso Aussagen zu methodischen und Verfahrensfragen macht. Er ist aus der empirischen Auswertung konkreter transdisziplinärer Forschungsprojekte und unter Mithilfe zahlreicher Experten und Expertinnen aus verschiedenen Fachrichtungen entstanden. Der Leitfaden dient dem Zweck der Evaluation von transdisziplinären Forschungsprojekten, wobei dieses Instrument auf den Aspekt des Lernens aus dem Evaluationsvorgang (formative Evaluation) zugeschnitten ist und bei der Aus- und Bewertung auf einen Diskurs setzt (diskursive Evaluation). Neben einer Evaluierung mittels der ausführlich beschriebenen Detailkriterien ist auch eine weniger aufwändige Evaluation mit Hilfe einer Kriterienauswahl (Basiskriterien) möglich. Die Qualitätskriterien können auch für die Konzipierung neuer transdisziplinärer Forschungsvorhaben genutzt werden.

II. Introduction

Preliminary Remarks

Transdisciplinary research has central importance in discussions about new relationships between science and society. It is particularly relevant for complex problem fields like sustainability[1]. Problems 'transcending disciplines' can be taken up with transdisciplinary research approaches and worked on, by developing appropriate methods to integrate knowledge that is segmented into different scientific fields and fields of practice.

In Germany and Austria since the 1970s, especially in environmental research conducted outside of universities, a research culture with problem and problem-solving orientation has developed that brings together the needed competences from science and practice in order to work on societally relevant and usually complex problems. As a rule, actors with extremely divergent perspectives, interests, and work styles thereby encounter each other.

In contrast to the established routines and methods of work in the framework of scientific disciplines, in such heterogeneous contexts, practical research work must be learned anew each time, because the problems arising in everyday life always demand their own specific forms of a research setting. Such work in the research process brings together different actors who bring with them different methods of working on problems and who come from different contexts, each with its own work cultures and institutional obligations. Integrating such differently contextualized knowledge and personnel poses one of the biggest methodological challenges of transdisciplinary research.

In the face of increased societal expectations placed on science's supporting function in solving complex problems in everyday life, working through such methodological challenges and developing procedures and criteria for securing quality in transdisciplinary research are gaining importance.[2] *Evalunet – Evaluation Network for Transdisciplinary Research* was developed with this goal. The core of *Evalunet* consists of seven researchers from institutes with many years of experience in transdisciplinary research; they form the Evalunet project group. The Evalunet network was formed out of the research association *ökoforum*. Five of the *ökoforum* institutes (see appendix) are the pillars of Evalunet, which is carried out under the auspices of the ISOE and headed by Matthias Bergmann.

Transdisciplinary research projects (and experience) were evaluated with the support of numerous experts from various scientific fields and institutional contexts (see appendix). These evaluations formed the basis for the criteria and procedures worked out for the evaluation of transdisciplinary research. The Evalunet project group would like to express our thanks to all the experts who encouraged the process and to all project workers who provided access to their projects, for without the intensive discourse with them, this guide would not have resulted in the present quality.

Our special thanks also go to Thomas Jahn. As head of the Institute for Social-Ecological Research (ISOE), he conceived the idea of *Evalunet* and played a leading role in designing it. For this reason and also as the person responsible for the project in the framework of the ISOE auspices, he accompanied the project and the head of the project group very helpfully with his methodological and conceptual knowledge.

1 Funtowicz/Ravetz 1993; Ravetz/Funtowicz 1999; Gallopín et al. 2001; Becker/Jahn 2000

2 Gibbons et al. 1994; Nowotny et al. 2001; Bammé 2004; Hollaender et al. 2002; Hirsch Hadorn et al. 2002; Thompson Klein et al. 2002; Grunwald 1999; Brand 2000; Jäger/Scheringer 1998; Mogalle 2001; Bergmann 2003; Schophaus et al. 2004; Pohl 2004; Loibl 2005; Jahn 2005

This paper is the central result of this work. It contains a guide with criteria for the f*ormative evaluation*[3] of transdisciplinary research projects. The guide is intended for quality assurance during the course of a project, as well as for evaluating the success of a project, and primarily addresses project team members or the institutions employing them. It also supports the task of constructing new project plans.[4]

This text is thus intended for use, i.e., it is to be applied when conceiving and evaluating research projects and as a support in transdisciplinary research practice. We have attempted to increase its use value by means of stringent organization and pragmatic formulation; it is thus less a scientific paper than a guide for daily use. Nonetheless, four years of scientific/analytical work are the foundation on which this guide is based, for it was worked out in intensive discourse with many experts from science and research practice (on this, see the next section). The analytical dimension of the text may also become clear in that the prerequisite for the identification of quality criteria in transdisciplinary research was a thorough delving into questions of methodology and the theory of science.

Method and Procedure for Obtaining the Criteria

The underlying approach of Evalunet is to obtain, primarily by dealing with research practice, the knowledge for operationalizing quality criteria and to identify the conditions for successful transdisciplinary research processes. This is why Evalunet arrived at such criteria in the discursive analysis of six transdisciplinary research projects and their assessment in discourse in the Evalunet network. The criteria catalog presented here is the central result of these project evaluations and of the exchange of experience among the members of the Evalunet project group. It was developed by directly dealing in discourse with the researchers and with experts in science studies, the administration of science, and respective central scientific fields.[5] In its work, *Evalunet* thereby refers to transdisciplinary research as a whole, quite apart from the specific content of research fields or types.

Transdisciplinary research lives from, among other things, the composition of the temporary inter-institutional research association carrying out a research project. This composition must be well-targeted and appropriate in terms of personnel, scientific fields, and practice-orientation. The variety of research perspectives in such project teams necessitates also taking a variety of perspectives on the process of research when evaluating transdisciplinary projects. A peer review in the conventional sense – i.e., an evaluation by colleagues within the scientific field – is thus hardly conceivable. The procedure of evaluation applied in the project evaluations can be described as an **expert review** in which the group of evaluators is composed of specialists who can judge the object of investigation from an individual disciplinary perspective and/or from a perspective of integrated fields and of scientists who have experience or expertise[6] in carrying out, conceiving, or evaluating heterogeneous or transdisciplinary research. In addition, to a lesser extent, experts were also involved who gather experience with research in the context of their tasks, for example staff from research-fun-

3 On this, see the following section "Method and Procedure for Obtaining the Criteria".

4 Quality criteria serving the evaluation of research projects can also generally serve as tips for the formulation and construction of new projects. The two applications are usually distinguished solely in the formulation of the respective aspect.

5 A list of the evaluated projects and the experts and commentators who supported the Evalunet project group is found in the appendix.

6 Here, science studies (in particular the sociology and the theory of science) proved especially relevant.

ding institutions (ministries, foundations, etc.), from departmental research institutions of the federal and Länder ministries, and from institutions accompanying research (project executing organizations, consultants, etc.).

At the beginning of the development of a suitable methodology stood the formulation of questions posed to the researchers. It is true that the research teams presented extensive documents on their research work to be assessed by the evaluators, but such reports, publications, etc. generally say little about transdisciplinary research processes, about successful or failed methods of integration, and thus about important testimony on research work, beyond the substantive results. This is why the Evalunet group developed a catalog of questions that addresses precisely these aspects. It arose from the literature devoted to this topic,[7] which is not exactly extensive, as well as from the group's own experiential knowledge; and it was improved when moving from one project analysis to the next, on the basis of the experience gained. Each research team answered it as a group. The documents with the questions answered by each team can be regarded as an important stock of materials, upon which Evalunet's criteria formation is based. Like the commentators' written statements on the projects and the written documentations of the overall analyzing process and its results (in regard to project evaluation and criteria formation), they will not be made publicly accessible. Since the project analyses served primarily the purpose of forming criteria and were not conducted directly in the public interest, the project teams were assured that the directly project-related evaluation results would be confidential, thus guaranteeing the greatest possible degree of openness in the evaluation process. The generalizing conclusions from the project evaluations are found in this document. In addition, several publications resulted from or in conjunction with the Evalunet project.[8]

In the course of this project, it turned out that, beyond all the intensive concern with documents on the research results and the written answers to questions, one procedural aspect deserves special attention: the discursivity of the evaluations. In the **discursive evaluation** applied in Evalunet, the evaluators and the evaluated jointly conduct an analytical discourse on the backgrounds of the successes and failures of the research project examined. Only in direct discussion was it possible to gain a deeper understanding of the complicated processes, steps toward integration, revisions of plan, and much more, in order to be in a position to adequately evaluate the project. Accordingly, this joint work was especially important for identifying generalizable quality criteria.

In these intensive discourse analyses processes, it also became clear that the ***formative* function of the evaluations** (Kuhlmann 2003) made the work truly worthwhile for the evaluated, but also for the evaluators. The project evaluations were useful not only for the description of criteria (for Evalunet), but also for the evaluated project's team members' learning for future transdisciplinary research tasks. The evaluations did not have the character of a purely *summarizing* inventory of project results.[9] *Formative evaluations*, rather, emphasize the goal of learning (either for a project still continuing or for the design and processing of new transdisciplinary projects); evaluation and judgment are thus carried out with a view to conclusions for one's own further research work.

7 Defila/Di Giulio 1999; Krott 2002

8 Bergmann 2003; Loibl 2003; Nölting et al. 2004; Jahn 2005

9 The criteria of this guide have limited use for conducting output/outcome evaluations oriented toward scalable benchmarks.

Once the project evaluations were completed, the quality criteria identified on the basis of the project evaluations were presented for discussion to a large number of different experts in four workshops:

- Workshop with the managements of the institutes participating in Evalunet: Strategy for Applying the Evalunet Results (November 2003)
- Workshop with stakeholders in the areas of research funding, project management agencies, research evaluation (evaluation on the program, project, and institutional levels), and research advisory boards: Discussion of the Suitability of the Criteria Catalog as an Instrument of Evaluation (October 2004)
- Workshop with colleagues from transdisciplinary research in the institutes participating in Evalunet: Discussion of the Criteria Catalog's Suitability for Practice in Internal or Self-Evaluation (February 2005)
- Workshop with experts from science studies (philosophy of science, sociology of science), research funding, science management, and evaluation research: Concluding Consultation on the Results of Evalunet (April 2005)

III. Brief Instructions

For those in a hurry, here are brief instructions for a formative project evaluation using the criteria catalog. The explanatory texts, definitions of terms, and extensive instructions for use in Chapters IV. To VI. are left out.

Step 1 – Determining transdisciplinarity:
Section VI. lists the characteristics that permit the recognition of transdisciplinary research as such. These characteristics must be used to determine whether the project to be evaluated can be categorized as transdisciplinary. In this connection, the understanding of transdisciplinarity must be clarified among all those taking part in the evaluation, in order to make the basis of the evaluation transparent.

Step 2 – Determining the Goal and Extent of Effort:
In regard to the acceptable extent of effort, it must be decided – depending on the size and relevance of the project – whether an evaluation will be carried out solely by (all/some of) the project's participants and/or representatives of the participating institutions or whether a procedure will be chosen in which external persons take part, especially in the assessment. Additionally, an agreement must be made to define the goal of the evaluation (for example: the general advance of knowledge for transdisciplinary research; the development of personal or institutional competence; quality assurance; personnel development; or budget apportioning).

Step 3 – Agreeing on the Materials for Evaluation:
The materials and the information on the investigated project that are to be the basis of the evaluation must be made clear. If external persons participate, everyone participating in the project should accept these external persons.

Step 4 – Determining Aspects of the Procedure:
It is advisable to start by having each person answer the evaluation questions as an individual, and then for the team to discuss the answers and arrive at a common result. The prerequisite for this is that everyone taking part in the evaluation is able to judge the overall project. If this is not the case, it must be clarified whether individual participants can assess only partial aspects. The *discursive, formative* character of the procedure should be adhered to. The criteria support an assessment arrived at in a discursive (learning) process. A scaled measuring of success is hardly compatible with the character of the presentation of the criteria. We therefore recommend conducting a discourse among all participants about judgments and assessments and avoiding distributing and counting "points" or any similar summarizing instruments.

Step 5 – Using Quality Criteria:
The **Basic Criteria** are the unrenouncable evaluation questions (standard case). It is essential that the questions posed in the basic criteria be answered. If one or the other question does not apply, due to a special project setting, it can be left out. In the group process, unanimity should be arrived at about these omissions. If needed, an explanation of the demands to be filled and additional instructions can be found in the appropriate detailed criteria (see the cross-references between the basic and the detailed criteria).

With large-scale projects in transdisciplinary research or when there is a need for detailed knowledge, the basic criteria should be ignored and the evaluation carried out with the aid of the deeper and more differentiated questions of the **Detailed Criteria**. Well-founded instructions are given for each criterion to determine whether it has been fulfilled. With complex criteria, additional examples of elucidations are given. This can substantially increase the validity of the evaluation's assessment.

Step 6 – Adhering to the Project Chronology:
The evaluation questions of both catalogs (basic and detailed criteria) are organized in terms of a *project chronology*, because this logic has proven helpful and transparent in evaluating projects. Since there may occasionally be a need for theme-oriented evaluations, the appendix provides a matrix setting all the criteria in correspondence with some essential aspects of transdisciplinary research projects.

IV. The Transdisciplinary Project

Distinguishing Characteristics

To identify "good" transdisciplinary research, the characteristics of transdisciplinary research must first be clarified. A general understanding of it is still developing; a generally accepted definition is still being sought that, on the one hand, is narrow enough to enable one to make clear distinctions, but that, on the other hand, is open enough to do justice to the heterogeneity and diversity of existing transdisciplinary research processes. The projects evaluated in Evalunet (see appendix) come from the area of research on sustainability. The definitions, like the evaluation criteria, are shaped by this context. Nevertheless, the definition formulated by Evalunet and differentiated in the course of the work process definitely embraces transdisciplinary research conducted in other problem fields.

Evalunet's Working Definition

Transdisciplinary Research ...

... takes up problems or questions from everyday life,

... in describing the resulting research questions and their treatment, draws on scientific fields and disciplines in a manner that is adequate to the problem (differentiation) and, in addressing the questions, steps across disciplinary and field boundaries,

... draws on knowledge from practice that is necessary for the suitable treatment of the questions and establishes a relationship to practice that serves the development and implementation of actor-oriented strategies in a manner adequate to the problem,

... in the course of the project, ensures the compatibility of parts of the project and parts of the task, carries out the transdisciplinary integration of scientific knowledge, and thus connects the latter to knowledge from practice in a suitable manner (transdisciplinary Integration 1),

... in order to formulate, from this, new scientific knowledge or questions and/or practice-relevant strategies for action or solutions (transdisciplinary Integration 2) and to bring them into the discourses in the realm of practice and in science (Intervention).

This description helps pinpoint characteristics by which transdisciplinary research as such can be recognized:

Problem Orientation and Problem Translation

Transdisciplinary research aims to shape real processes, not merely to observe and theoretically model them. To this end, it takes up problems from everyday life, rather than solely from within pure science. Together, the project participants translate these everyday life problems into research questions. The work on these research questions (whether disciplinary or transdisciplinary and involving knowledge from practice) and the project structure ensure that the various project modules fit together and enable the pursuit of a common research goal.

Actor Orientation

Transdisciplinary research is characterized by its orientation toward actors. Interaction with representatives of societal practice is regarded as an essential characteristic of transdisciplinary research processes. A broad spectrum of different forms is thereby possible.[10] The research results are oriented toward target groups and brought into fields of societal action, taking societal framework conditions into consideration.

Transdisciplinary Integration Concept

An essential characteristic of transdisciplinary research is the integration of knowledge from several disciplines or specializations and from the field of practical action that the research is related to. To this end, suitable methods and working approaches of transdisciplinary integration must be developed or applied.

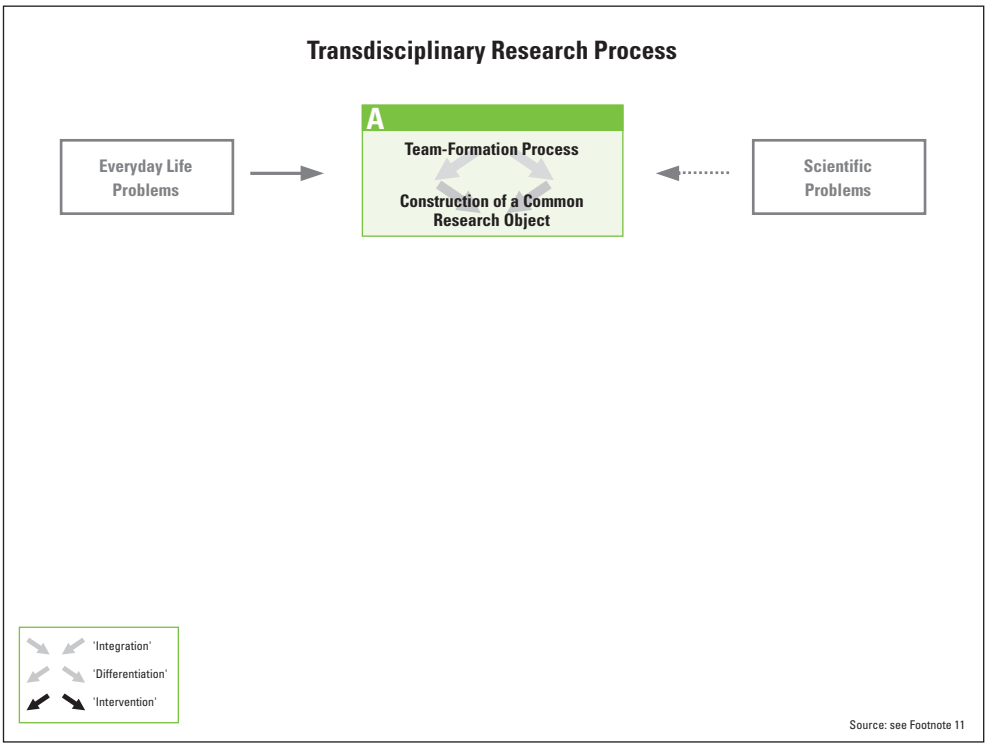
Context-Relatedness

To ensure successful implementation of the project results, the concrete, including local framework conditions and possibilities of action are taken into account. Various levels of effect must be taken equally into consideration, so that they do not hinder each other or have unintentional or negative mediate effects.

[10] A broad description of transdisciplinarity also includes the integration of knowledge from practice via questioning and observing, but without direct interaction. Here there are special requirements for the development of problem definitions and strategies for action that take adequate account of the actors' actual implementation contexts.

Paradigmatic Procedure of a Transdisciplinary Research Project

The following illustrations and the accompanying descriptions provide a picture of a paradigmatic transdisciplinary research project on which the work and understanding in Evalunet are based.[11] At the same time, essential characteristics of a project procedure are described and reference is made to the organization of the two criteria catalogs *(Basic* and *Detailed Criteria)* in the three project phases A, B, and C.



Source: see Footnote 11

A Actors, Project Construction and Project Formulation

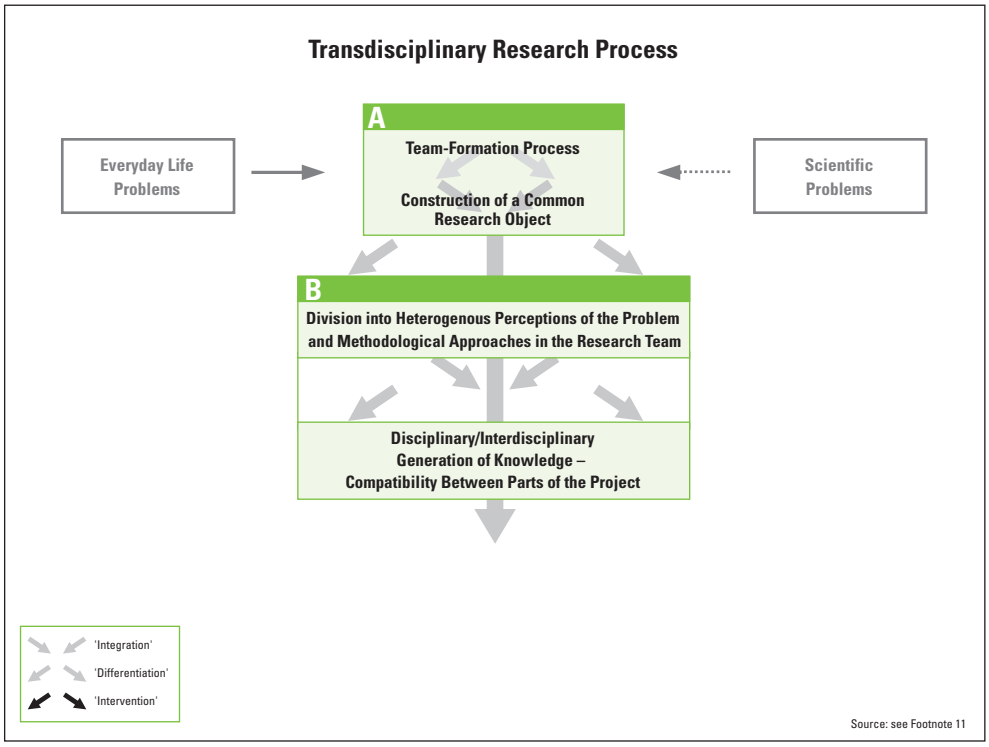
■ Starting from a problem from everyday life, a research team is formed that includes the scientific fields needed to work on the problem.

■ In accordance with the object of research, appropriate persons from practice[12] are involved, i.e., those who can represent the companies, NGOs, administrations, associations, political areas, etc. that are relevant to the arising, analysis, and solution of the problem.

11 Thomas Jahn conceptualized the graphic (for greater detail, see Jahn 2005). The version worked up here also takes recourse to Loibl 2005, 55 ff. and to Bergmann/Jahn 1999, 256 ff.

12 Evalunet makes the following distinctions: **Practice partners** are actors who take part in the project by making their immediate field of activity (their company, their agency, etc.) available as a pilot field. They can also be part of the project leadership. **Practice representatives** are persons who take part in the research project on behalf of a group of actors. **Practice actors** are a group of actors who are affected by the object of research, but who are not directly involved in the research work (or at most as respondents in a social-empirical study). To avoid these attributions in the text, a general formulation has been chosen.

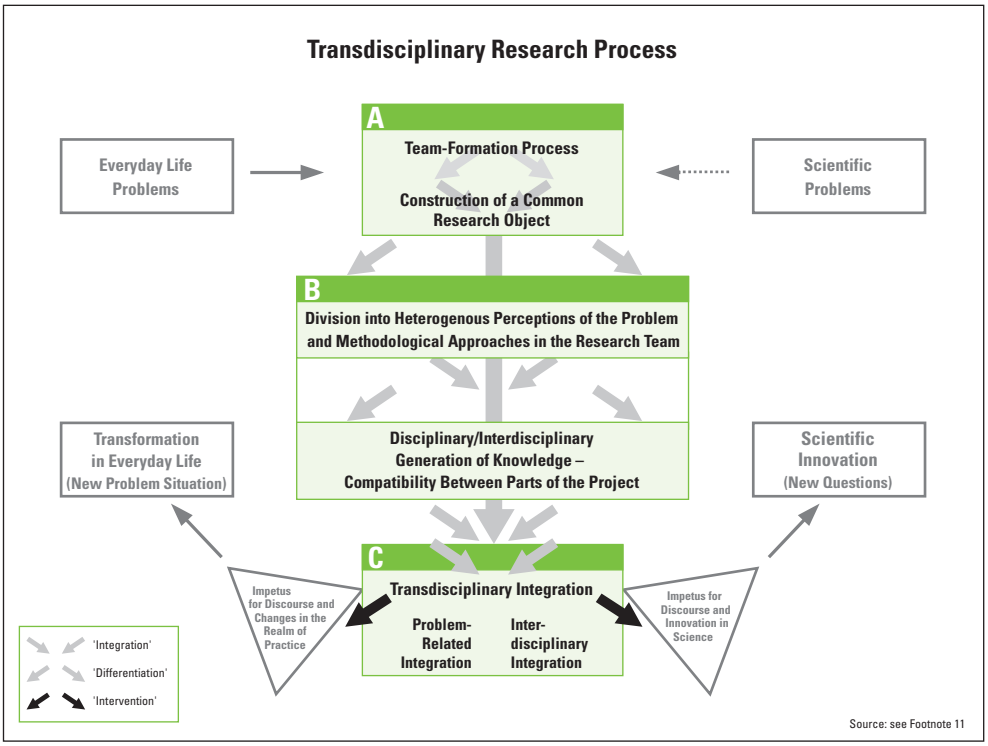
- Together, the team formulates a problem; this simultaneously describes the research goal common to all participants.
- The team assays a translation of the everyday life problem into research questions that permit disciplinary or interdisciplinary work on it. *(Differentiation 1)*
- The project proceeds in alternating phases of *Integration, Differentiation, and Intervention* (Bergmann/Jahn 1999).



B Project Execution and Methodology

- The problem is subdivided into modules/subprojects/partial projects that – with the involvement of knowledge from practice – embrace the disciplinary and/or interdisciplinary perspectives of working on it. *(Differentiation 2)*
- In the process of research, the production of new knowledge or the combination and integration of existing knowledge from various fields and practice is carried out in such a way that a high degree of understanding of each other's content, of agreement on needs for cooperation, and of compatibility and integratability of the partial contents is created between all modules.

C Results, Products, and Publications; Creating Value



■ Transdisciplinary integration includes not only the summarization of the module results in an integrated perspective on the overall problematic to be worked on *(Integration 1)*, but also a subsequent integration in elaborating scientific or practice-relevant results. (*Integration 2*)

■ Accordingly, the phase of conversion to value includes not only impulses for actor-oriented strategies, innovation, and transformations in practice, but also for scientific innovation. (*Intervention*)

V. Notes for Use

With this document, the Evalunet project group presents for the first time a suggestion for a standard for evaluating transdisciplinary research and submits it for discussion in the practice of transdisciplinary research and research funding, as well as of science studies. The primary goal of Evalunet is to support transdisciplinary research in the participating institutions by providing criteria for quality assurance. But it also strives to launch a dialogue among researchers, evaluators, and actors in research funding and administration. It is foreseeable that the criteria contained in this proposal will be subject to change or further development. This process of debating our results could initiate a development of standards that can strengthen transdisciplinary research by broadening the general understanding of its quality criteria.

Prerequisites

We should mention in advance that the criteria catalog in the form presented here has emerged from a specific task situation: in the course of the infrastructure-fostering measures of the research funding program Social-Ecological Research, the criteria were developed as support for the work of the researchers at the participating institutions (and other institutions of the same research type). This means that, in the course of the criteria-developing work, elaborated material was summarized from this perspective. The material has not yet been systematically prepared from other perspectives, for example that of actors in research funding and administration, though many aspects or criteria will be significant for this circle of users, as well. The formulation of the evaluation and examination tasks thus depends on what actors want to use it.

The primary goal of Evalunet is thus to provide scientists who carry out or head transdisciplinary research projects with criteria with which they can internally evaluate their work and which provide an explicit basis for assuring the quality of their research work. The following notes are thus intended for this group of actors.

An **important note** is appropriate in advance: Particularly in international comparison, transdisciplinarity is described in different ways, with varying degrees of emphasis on various aspects. In transdisciplinary research in Austria (for example, the programs *Austrian Landscape Research* and *proVision*), the direct involvement of practice partners in the research team is made a precondition for receiving a commission, to a much greater degree than in Germany. It is difficult to take such differences into consideration in the criteria. We therefore recommend that, during evaluation, the users of the quality criteria themselves consider the various versions of individual aspects of transdisciplinarity by suitably adjusting the evaluation questions.

Recommendations for Use for Internal Evaluation

Definition: The evaluation must be based on a clear understanding of transdisciplinarity, not necessarily in the sense of a definition generally accepted in the scientific community, but in the sense that the evaluators and the evaluated have clarity about the conceptual interpretation of transdisciplinarity that will be the basis of their evaluation process.

Internal Evaluation/Self-Evaluation: "Internal" evaluation does not necessarily mean that the evaluators come from the institution or the institutions participating in the project to be evaluated. "Internal" means merely that the evaluation is carried out on the initiative of the institution or the research project itself. It can thus certainly involve external experts. In an internal evaluation, the project to be evaluated should first be jointly evaluated in writing by the project team in accordance with the selected criteria. On the basis of the information thereby gained, an evaluation should then be undertaken together with persons external to the project (if such are to be involved) in a process of discourse.

A self-evaluation is carried out solely by project participants. Here, after selecting the relevant questions, the evaluation questions should first be answered individually; then, in discourse, the participants should compare and discuss their answers and then come to a joint assessment.

Extent of Effort and Selection of Criteria: The extent of effort for the evaluation must stand in a suitable relation to the dimensions of the project. For each evaluation project, a selection must be made from the two sets of criteria; the chosen criteria must suit the concrete project to be evaluated and its givens (project setting, objects of research, etc.). The Basic Criteria may thereby be grasped as the core questions for the evaluation, whereby individual questions can be found here as well that are not appropriate for the specific project to be evaluated in the respective setting and that thus need not be considered.

With more complex projects that require more time and means, if the project funds are sufficient, the Detailed Criteria should be used instead of the Basic Criteria, because the former offer much more differentiated questions, substantially increasing the validity of the evaluation. In addition, in the Detailed Criteria, explanations of the relevance of the questions and some examples of good transdisciplinary methods, ways of working, etc. are found under *Requirements* and *Additional Notes*.

Organization of the Criteria: The Basic Criteria and the Detailed Criteria are organized in three sections that follow a **project chronology** (A Project Formulation and Construction – B Project Execution – C Project Results). In the course of the project analyses, it was noted that the logic of project chronology eases access to the complex matters and interdependencies of a transdisciplinary research project and makes the evaluation transparent for all participants, because the process of the research project's development can be understood and causes and effects recognized. This chronological approach is therefore recommended, especially for a more precise project evaluation.

It makes sense to pose some questions in all project phases. The chronological organization of criteria thus results in thematic repetition in some parts of the detailed criteria. For example, one question asks whether the integration of knowledge was adequately planned (see A.3.3) while the project was being conceived (Section A). In the framework of the phase of project execution (Section B), it should be asked whether this planning is being successfully implemented (see B.2.1). This may seem to be a repetition, but it makes sense, in order to avoid forgetting this important topic, which can happen if the evaluation concentrates solely on the planning **or** the project execution.

Although we explicitly recommend conducting the evaluation in terms of the project chronology, tasks could emerge in the course of an evaluation or project assessment that justify the use of a **theme-centered organization of the criteria**. For this case, the appendix provides a matrix that sets all criteria in correspondence with several essential aspects of transdisciplinary research projects.

Note – Do Not Forget Content: The criteria catalogs delve thoroughly into processual questions of the research project. Questions of the substantive quality of the research are treated only quite generally (key words like relevance, innovation, successful relation to target groups, achieving the research goal, fulfilling criteria of success, etc.) A criteria catalog of such general validity cannot treat these more specifically. For this reason, participants are called upon to discuss and assess such questions with an eye to the specific content of the project to be evaluated.

Note – Examine Gender Relevance: The catalog of *Basic Criteria* and the *Detailed Criteria* both include criteria that the Evalunet group regards as sensitive to gender. Here we are primarily thinking of a conscious decision for an adequate gender composition of the team (for example, in terms of gender justice), the distribution of roles and tasks on a project's various decision-making levels, and the rules and habits of communication.
In the catalog of *Basic Criteria*, these criteria are: 1, 3, 12, 15, 16, 18, 22.
In the catalog of *Detailed Criteria*, these criteria are: 1, 3, 5, 9, 11, 13, 19, 31, 32, 38, 39, 40, 44, 46, 47, 48, 50, 51, 55.

A second aspect is addressing target groups and adjusting results and products to the societal context of their application. The description points this out for some *Detailed Criteria* (8, 18, 35) that display special gender relevance or demand increased attention to this theme.

The objects and investigatory questions of transdisciplinary research are seldom gender-neutral. A third aspect to be examined is therefore the **criteria-superordinated** question whether, in the project formulation and research design, the relevance of gender-specific differentiation in regard to the joint problem formulation and the research design have been examined in terms of the problem description and the effect of research results.

Temporal Perspective of an Evaluation: Transdisciplinary research is characterized, among other things, by the idea of intervention. Actor-oriented strategies are to be formulated on the basis of the research results and to lead to discourses and changes in the context of practice. It is therefore logical for an evaluation of such projects to also include their effects in practice. This means that, after the completion of the actual (research) project work, it should be considered whether to devote longer periods of time to watching for such manifestations. Here we make no corresponding recommendations, because they would greatly depend on the context.

Placing Emphasis: In terms of *evaluation as a learning process*, it should be considered that the evaluation of events during the formulation and construction of the project generally provides the most instructive information on why a research project succeeds or fails. Experience shows that the design of the project creates facts that not only strongly predetermine the execution of the project, but also influence the later success or failure of results, products, and publications. It is often difficult to change these facts in the course of the project.

Methods and Procedures: On this, see the methodological statements on *discursive, formative evaluation* in II.

Evaluation as a Component of the Research Process: With more extensive research projects, it is recommended that an internal evaluation be anchored in the research proposal and that its tasks and, above all, criteria be described. The resources needed for the evaluation should be applied for as a component of the research project.

Of course actors in research funding and accompaniment can use the material gathered in Evalunet (for their work in connection with calls for proposals/announcements, ex-ante evaluation procedures, and project management tasks). A focused assessment for such purposes will follow the completion of this first task and then be published separately.

The following overview makes it clear that there is a close connection between the two catalogs and that it is possible to alternate directly between them:

Organization of Basic Criteria and Detailed Criteria

Course of the Project	Project Segment	Basic Criteria No.	Detailed Criteria No.
	A Project Construction and Formulation, Actors and Applying for Funds	**1–11**	**1–29**
	A.1 Actors and Competences	1–2	1–10
	A.2 Problem Formulation, Focus, Goals, and Criteria of Success	3–9	11–20
	A.3 Project Planning and Financing	10–11	21–29
	B Project Execution and Methodology	**12–16**	**30–40**
	B.1 Work Planning and Project Management	12–13	30–32
	B.2 Transdisciplinary Methodology and Integration	14–15	33–37
	B.3 Reflection and Communication	16	38–40
	C Results, Products, and Publications	**17–24**	**41–56**
	C.1 Results	17–19	41–49
	C.2 Products and Publications	20–22	50–53
	C.3 Generalizability and Implementability of Results	23	54–55
	C.4 Justification of the Transdisciplinary Approach	24	56

VI. Localizing the Project Within Transdisciplinary Research and One's Own Criteria of Success

Before the evaluation begins, the project team should first use the description of transdisciplinarity given in IV. to examine whether its project should be categorized as transdisciplinary. Additionally, at the beginning of the project, it should once again set down its own explicitly or implicitly formulated criteria of success, in order to be able to use them as a yardstick for the project's substantive success in the framework of the evaluation.

In addition, questions are posed here about some characteristics of the project. On the one hand, the answers can then help clarify the project's dimensions and setting or be used as a yardstick for the justifiable dimensions of the evaluation. On the other hand, this can ease the selection of the evaluation criteria relevant to the project.

Distinguishing Characteristics and Criteria of Success

a) Examination in Terms of Distinguishing Characteristics
It should be examined whether the project to be evaluated should be categorized as transdisciplinary in accordance with the description of transdisciplinarity in IV.
Especially in the specialized literature but also in research programs, descriptions of transdisciplinarity can definitely be found that substantially differ among themselves as well as, in some points, from the definition used here (for example, in terms of involving partners from practice). So all those taking part in the evaluation must always clarify their own understanding of transdisciplinarity. If the same deviations from the definition given here are common to the team, then their own description should be made the standard for this step of assessment.

b) The Project Team's Criteria of Success
The project team's criteria of success should be specific, both in terms of the effects desired in the field of action examined as well as in terms of scientific innovations. These criteria of success also provide a standard for the evaluation (see Basic Criteria Nr. **6** and **19** as well as Detailed Criteria Nr. **15**, **24**, **41**, **42**, and **45**.

c) Sustainable Development
To what degree does the project promise a contribution to a solution in the sense of sustainable development?

d) Gender Mainstreaming
To what degree is gender mainstreaming or the difference between the sexes taken into consideration in the project concept and in the research questions?

The Project's Key Data

e) Actors
A list of the participating actors from science and practice with information on their scientific fields or professions/tasks in practice and their institutions.

f) Project Dimensions
Information on the project's dimensions in terms of the participating disciplines, the number of institutions, scientists, and actors from practice, and the duration of the project.

g) Financing
Information on financing with free and earmarked funds (from donors, commissioning parties, practice partners; own funds).

VII. Basic Criteria for the Evaluation of Transdisciplinary Research Projects

These *Basic Criteria* are a basic set of criteria that include the fundamental questions with which the evaluation of transdisciplinary research must begin. They enable a short version of evaluation. The *Basic Criteria* were distilled from the more extensive catalog of *Detailed Criteria* (Chapter VIII.). The *Detailed Criteria* deepen and supplement the *Basic Criteria*. The *Detailed Criteria* provide additional notes for appraisal and examples of successful and failed procedures with the respective aspect of the examination.[13]

To apply: see the Notes for Use in Chapter V.

[13] On the first two levels (for example, A/A.1.), the titles of the *Basic Criteria* are identical to those of the *Detailed Criteria*, enabling direct connection. But not all the aspects mentioned are actually addressed in the *Basic Criteria*.

A Basic Criteria: Actors, Project Construction, and Project Formulation

A.1 Actors and Competences

1 Do the disciplinary composition and the competence in the team permit the treatment of the essential aspects of the problem or object of study?

- ☐ Yes, because ...[14]
- ☐ Yes, but ...[15]
- ☐ The competences are not adequate, because ...[15]
- ☐

2 Is the competence of the practice partner appropriate to the everyday life problem and its solution (relevant knowledge, role in the project, possibilities for implementing results)?

- ☐ Yes, because ...
- ☐ Yes, but with limitations, because ...
- ☐ No, because ...
- ☐ Inapplicable, because ...
- ☐

You can navigate in this document! Anywhere where the cursor turns from a "hand" to a "pointing finger", you can jump to the indicated goal by clicking the mouse. A click on a cross-reference with green background takes you from a passage in the basic criteria to the corresponding in the detailed criteria and vice versa.

The corresponding Detailed Criteria are found in:

⌦ A.1 Actors and Competences (A.1.1 to A.1.4)

A.2 Problem Formulation, Focus, Goals, and Criteria of Success

3 Does the project take up an everyday life problem, and how is this problem relevant?

- ☐ Yes, it takes up an everyday life problem, because ...
- ☐ Yes, the problem is relevant, because ...
- ☐ No, because ...
- ☐

[14] The suggested answers in the evaluation grid require supplementation. Additionally, space is left for an answer without a prompting introduction so that peculiarities of the project under evaluation can be taken into consideration. Additional answers that fit the concrete case better are imaginable, of course. These can be worked out in the team, following an individual assessment.

[15] With questions that include several sub-questions, like this one, each sub-question must be answered and explained.

4 **Is the everyday life problem adequately translated into scientific questions? Is the current state of knowledge taken into consideration and can the research questions be regarded as innovative in relation to this state of knowledge?**[15]

- ☐ Yes, the translation is adequate, because ...
- ☐ No, the result of the translation is inadequate, because ...
- ☐ Yes, the research questions are innovative, because ...
- ☐ No, the research questions are not innovative, because ...
- ☐ Inapplicable (please explain!)
- ☐

5 **Is a common research object formulated that covers the whole research team, and can it serve in the research process as a basis for knowledge integration?**[15]

- ☐ Yes, the common research object consists in ...
- ☐ No, the common research object cannot be recognized, because ...
- ☐ Yes, it is helpful for knowledge integration, because ...
- ☐ No, a basis for knowledge integration is not recognizable, because ...
- ☐

6 **Has the project team formulated plausible criteria of success for the project?**

- ☐ Yes, they consist in ...
- ☐ No, because ...
- ☐

7 **Is a distinction made between goals of scientific knowledge and goals for practice? Are reasons given for the focus?**

- ☐ Yes, the distinction is clear and reasons for the focus are given (please describe!)
- ☐ No, the distinction remains unclear, because ...
- ☐

8 **In the research project, is flexibility ensured by permitting research with as few normative goals as possible (the desired goal situation in the realm of practice; not anticipating the result)?**

- ☐ Yes, there is no fixed expectation about the result, because ...
- ☐ No, because ...
- ☐

9 Do the methods envisioned, the interfaces of transdisciplinary collaboration, the form of integration of practice, and the form of results and products in the project fit the solution strategy sought for the project goal?

- ☐ Yes, because ...
- ☐ Only partially, because ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:

⌦ A.2 Problem Formulation, Focus, Goals, and Criteria of Success (A.2.1 to A.2.3)

A.3 Project Planning and Financing

10 Does the structuring of the project (work steps, connection between modules, integration steps, etc.) correspond to sensible processes of generating and integrating knowledge in the research process and to the requirements of the participating actors?

- ☐ Yes, the project structure supports the generation and integration of knowledge, ...
- ☐ No, because ...
- ☐

11 Have means and opportunities for the specific tasks of coordinating, integrating, and organizing a transdisciplinary research project been planned?[15]

- ☐ Yes, the means seem adequate, because ...
- ☐ Yes, the opportunities for collaboration, integration, etc. are adequately provided by ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:

⌦ A.3 Project Planning and Financing (A.3.1 to A.3.4)

B Basic Criteria: Project Execution and Methodology

B.1 Work Planning and Project Management

12 Did the research team plan the work jointly?

- ☐ Yes,
- ☐ Yes, but only partially, because ...
- ☐ No, because ...
- ☐

13 Are the kind of project management and the decision-making structures described, and do they seem to promise success under the conditions of the project?

- ☐ Yes, the management and decision-making structures are described and promising, because ...
- ☐ Yes, they are described, but do not appear to promise success, because ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:

⌦ B.1 Work Planning and Project Management (B.1.1 to B.1.2)

B.2 Transdisciplinary Methodology and Integration

14 Are suitable methods used or have they been developed to conjoin contributions of knowledge from the participating scientific fields and from practice?

- ☐ Yes, because ...
- ☐ No, because ...
- ☐

15 Is there regular reflection on the cooperation in the team and on the implementation of plans for knowledge integration? If applicable, are conclusions drawn from this? [15]

- ☐ Yes, it takes place in that ...
- ☐ Yes, conclusions are drawn in that ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:

⌦ B.2 Transdisciplinary Methodology and Integration (B.2.1 to B.2.2)

B.3 B.3 Reflection and Communication

16 Are the planned procedures of self-reflection and quality assurance used ("revision points") and, if applicable, are adjustments made (procedure, structure, products)?

- ☐ Yes, in that ...
- ☐ Yes, but there are/were not adjustments made, because ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:

⌦ B.3 Reflection and Communication

C Basic Criteria: Results, Products, and Publications

C.1 Results

17 Have the scientific goals been achieved? Do scientific innovations (methodological/conceptual) come about?

- ☐ Yes, goals and innovations are achieved, because ...
- ☐ Yes, goals are achieved, but these cannot be termed methodological/conceptual innovation, because ...
- ☐ No, because ...
- ☐ Not yet foreseeable, because ...
- ☐

18 Can the result make a contribution to solving the everyday life problem?

- ☐ Yes, because ...
- ☐ Yes, but only partially, because ...
- ☐ No, because ...
- ☐ Not yet foreseeable, because ...
- ☐

19 Are the criteria of success set by the research team being fulfilled?

- ☐ Yes, because ...
- ☐ Yes, but only partially, because ...
- ☐ No, because ...
- ☐ Not yet foreseeable, because ...
- ☐

The corresponding Detailed Criteria are found in:
⌦ C.1 Results (C.1.1 to C.1.4)

C.2 Products and Publications

20 Do publications and other products (for example, changes in actors' strategies, organizational reforms, social network structures, guides, ranking, artefacts) represent an appropriate yield from the project?
(➔ C.2.1 for a quantitative measurement)

- ☐ Yes, because ...
- ☐ No, because ...
- ☐ Not yet foreseeable, because ...
- ☐

21 Are the methods and procedures of transdisciplinary knowledge integration and collaboration presented and their successes/problems reflected?

- ☐ Yes, in that ...
- ☐ Yes, but not adequately, because ...
- ☐ No, because ...
- ☐

22 Are the publications and products tailored to the needs of and actively conveyed to the target groups?

- ☐ Yes, because ...
- ☐ Yes, but with the following limitations: ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:
⌦ C.2 Products and Publications (C.2.1 to C.2.2)

C.3 Generalizability and Implementability of Results

23 Are there elucidations on whether and how research results that are context-related or worked out on the basis of a model case can be generalized?

- ☐ Yes, there are ...
- ☐ Yes, but not adequately, because ...
- ☐ No, because ...
- ☐

The corresponding Detailed Criteria are found in:
⌦ C.3 Generalizability and Implementability of Results

C.4 Justification of the Transdisciplinary Approach

24 What additional use for the research result does the transdisciplinary approach have in comparison with other research approaches?

- ☐ The additional use is that ...
- ☐ There is not additional use, because ...
- ☐

VIII. Catalog of Detailed Criteria

The use of the Detailed Criteria is recommended for more extensive, longer-term projects conducted by research teams from a number of institutions and whenever certain questions of the Basic Criteria are to be examined more deeply or in greater detail (both catalogs contain cross-references to this purpose). The Detailed Criteria provide detailed explanations with instructions for assessment and sometimes also with examples of cases. This level of detail is the direct result of the project analyses and discourses in Evalunet.

Here we would like to mention once more that the criteria are presented in the sequence and according to the logic of a project chronology (on this, see V.). If needed, the matrix shown in the appendix (IX.) can be used as an aid; it lists all the criteria in accordance with themes or tasks.

A Detailed Criteria: Actors, Project Construction, and Project Formulation

A.1 Actors and Competences

You can navigate in this document! Anywhere where the cursor turns from a "hand" to a "pointing finger", you can jump to the indicated goal by clicking the mouse. A click on a cross-reference with green background takes you from a passage in the basic criteria to the corresponding in the detailed criteria and vice versa.

The Basic Criteria for Section ⌦A.1 deal with:

- Composition of the Research Team
- Relation to Practice

A.1.1 Project Initiative

1 **Are the project participants included when formulating, constructing, and acquiring funds for the project?**

☐ Yes, throughout the entire process, because ...[16]
☐ No, because ...
☐

Requirements: It is favorable for the project participants to contribute to the project construction.
Project participants who do not take part in formulating and in acquiring funding for the project often require a long orientation process before the project work can be begun.[17]
Additional remarks: Already in the construction phase, it is necessary that the persons responsible for carrying out the project also take responsibility for its formulation and construction. An unclear distribution of decision-making authority between two acquisition teams (for example, business manager and project participants; substantive and financial decision-making authority) should be avoided.

2 **Are practice partners integrated in the project construction?**

☐ Yes, in the entire process, because ...
☐ No, because ...
☐

Requirements: The decision must be explained in the project design.

16 The suggested answers in the evaluation grid require supplementation. Additionally, space is left for an answer without a prompting introduction so that peculiarities of the project under evaluation can be taken into consideration. Additional answers that fit the concrete case better are imaginable, of course. These can be worked out in the team, following an individual assessment.

17 Italicized text passages in the **Requirements** section serve to explain and provide assistance in the evaluation.

Involving a practice partner in the project construction presents opportunities and risks: On the one hand, the implementation of the research results can become more successful; on the other hand, specific interests of the practice partner can narrow the translation into a scientific question and the openness of the research process.

A.1.2 The Project Team

3 **Is the composition of disciplines and competences in the team successful in terms of the formulated question?**

- ☐ Yes, because ...
- ☐ No, because ...
- ☐

Requirements: It should be assessed whether the essential partial aspects of the formulated question can be investigated and interconnected on the basis of the composition of scientific fields and competences in the team. An understandable justification for the decision should be presented.
Heterogeneous questions make extremely varied team compositions possible. Since the disciplinary composition of a research team is of fundamental importance for suitable work, an intensive process of reflection is necessary when putting the team together. The composition of disciplinary competences must therefore be justified in the project concept (on this, see also Criterion 16). Good reasons should be given if specific partial aspects are excluded. In addition, it should be elucidated how the specialized competences are put together in specific phases of research or for specific partial aspects of the project. It should be elucidated whether the work will be done in transdisciplinary teams or in disciplinary teams and why this is regarded as furthering the goal (see also the next criterion).

4 **Are subteams that carry out partial aspects of the project put together interinstitutionally and transdisciplinarily?**

- ☐ Yes, specifically ...
- ☐ No, because ...
- ☐

Requirements: In the project concept, the composition of the subteams should be explained and related to the individual research tasks. If the teams are not put together transdisciplinarily, it should be explained why this suits the task and how the cognitive integration is to be methodically carried out.
An interdisciplinary and interinstitutional staffing of project modules and subteams promotes the translation of the everyday life problem into joint scientific questions, its transdisciplinary processing, and understanding for the integration tasks and the cognitive integration. It is therefore advantageous if the subteams are not only transdisciplinarily, but also – in projects conducted by associations of institutions – interinstitutionally composed, to the greatest possible degree.

Additional remarks: In research conducted by multi-institutional teams, modular work planning with discipline-related responsibilities distributed to separate institutes also makes it difficult to respond flexibly to budget cuts, since the attempt is generally made to distribute the cuts "justly", instead of responding to the cuts using common sense in relation to the content. Here, interinstitutional subprojects offer the possibility to respond to funding cuts with cuts in content, without thereby marginalizing individual participants, since, for example, more than one partner is affected by the cutting of whole subprojects in which the project partners cooperate. In addition, knowledge integration is made easier in the face of the continual need for communication among disciplines and institutes.

5 **Is the size of the team appropriate for the problem posed and does it foster the integration of knowledge?**

- ☐ Yes, it is appropriate, because ...
- ☐ No, it is not appropriate, because ...
- ☐

Requirements: Observation of practice has resulted in the following benchmarks to keep common plans in a practicable framework: The number of participating research and practice institutions should not exceed seven, if possible, unless justification and a solid concept for management and the integration of knowledge in a larger association are provided. No more than 20 persons should contribute to projects, in view of the planning effort required for internal events and communication, finding agreement, and integration.
Projects in which a large number of research and practice partners of various types participate can make the necessary integration overly complex; it becomes difficult for the individual to comprehend the overall project. Contributions or subprojects can lose their integrated connection, endangering the overall result.

6 **Do the participants have experience in transdisciplinary collaboration?**

- ☐ Yes, specifically ...
- ☐ No, but this can be compensated by ...
- ☐ No, because ...
- ☐

Requirements: Explain the participating researchers' prior experience in transdisciplinary and transinstitutional research. Otherwise it must be shown that the respective institution(s) has/have experience and can provide relevant support (for example, qualification measures).
The ability to carry out integrated work or familiarity with research methods that enable the integration of different bodies of knowledge is an important basis for collaboration. This is true both for work on the project and for project management.

Additional remarks: In interdisciplinary and transdisciplinary collaboration, often the social basis for professional collaboration must first be created, since it is not possible to take recourse to the established social infrastructure (collaboration norms, language, habitus, etc.) of a single discipline or profession. If a team comes together that is not used to working with each other, this creation of social integration must be taken up in the project planning as a work step. These work steps should also be presented as specifically transdisciplinary project achievements.

7 **Is there a concept for collaboration with practice that takes into consideration the integration of knowledge from practice into the project, as well as the transfer of results from the project into the field of action (relation to practice)?**

- ☐ Yes, it consists in ...
- ☐ Yes, but ...
- ☐ No, because ...
- ☐

Requirements: The integration of knowledge from practice and the transfer of results must be formulated as a task. The procedures or approaches should be described and provided with their own time budgets and funds. It is not absolutely necessary that procedures for integration and transfer be present in the planning phase, but their development must be conceived in the project design. There should be an explanation of the points in time when integration and transfer seem to make sense and of the degree to which the procedure for integration and for transfer is suitable to provide impetus to the desired processes of creating knowledge, changes, and the setting of norms.
The relation to practice, i.e., the collaboration with practice partners or other ways of drawing on knowledge from practice (for example, from previous projects or work with a relation to practice), is an essential characteristic of transdisciplinary research. It opens up knowledge from everyday life and enables project results to be transferred into the context of practice. In the integration of knowledge from practice as well as in transferring knowledge from the project into practice, the (extra-scientific) rules of the actors in the realm of practice must be taken into account. This often presents unaccustomed challenges.
Additional remarks: (on this, see also A.3.3 Planning the Integration and Transfer of Knowledge). A project can be categorized as transdisciplinary due to its potential to shape processes in the real world, even if no practice partners are directly involved and no offers of solutions are made to concrete actors. For example, in projects that pursue precautionary strategies or solution strategies with especially long-term perspectives, it can be a problem to find actors from the realm of practice who are interested in taking part (on this, see A.2.1 Transfer from the Real World to Science).

8 **Is there a description of the tasks of the partners, actors, and/or representatives from the realm of practice? Do these tasks support the overall goal of the research project?**[18]

- ☐ Yes, there is such a description and it is plausible, because ...
- ☐ There is such a description, but ...
- ☐ No
- ☐

Requirements: The task assigned to a practice partner in the framework of the project should be described in the project concept. It should be possible to thereby describe the degree to which he or she shall support the problem to be worked on, the goals, and the desired form of results. The function or abilities of the practice partner that make it possible for him or her to contribute should also be described.
Knowledge from practice can have various functions for the tasks and goals of the project, for example:
a) aid in formulating the problem
b) providing knowledge about the field of activity
c) providing a value system and contributing to normative aspects
d) formulating changed conditions in the realm of practice
e) injecting acquired transformation knowledge into the realm of practice or implementing it there.
Additional remarks: on this, see Criterion 18 in A.2.3.
In the Evalunet project group, the following distinction was made: **Practice Partners** are actors who take part in the project by making their immediate field of activity (their company, their agency, etc.) accessible as a pilot field. They can also be part of the project management. **Practice Representatives** are persons who take part in the research project on behalf of a group of actors. **Practice Actors** are a group of actors who are affected by the object of research, but who are not directly involved in the research work (or at most as respondents in a social-empirical investigation).
When including knowledge from practice, gender differences should also be taken into consideration, if the project addresses everyday ecological or other problems with recognizable gender relevance.

A.1.3 Distribution of Roles

9 **Is there an analysis of the distribution of roles and tasks among the project actors from science and the realm of practice?**

- ☐ Yes, there is one and it is plausible, because ...
- ☐ There is one, but ...
- ☐ Non
- ☐

[18] With questions that include several sub-questions, like this one, each sub-question must be answered and explained.

Requirements: Especially on the level of work on content, a description of and reasons for the roles and tasks of the heads of the subteams and the whole team should be provided. The composition of the team should be analyzed in terms of potential role conflicts. In the course of the project, the description should be reviewed and, if applicable, adjusted.
A transparent description of roles and tasks upon which all partners have agreed makes it much easier to carry out a project with a heterogeneous composition of persons and contents. A classic role conflict is preprogrammed if a project coordinator also works on content. Such a double role can indeed lead to synergy effects, for example in integrating knowledge and in creating respect for the leadership on the basis of disciplinary competences, but it demands sensitivity to the associated risks. The particularities of involving partners from practice make transparent role distribution even more important than in research teams composed solely of scientists

10 **Is there an agreement between the participating institutions that regulates collaboration in the project (institutional commitment)?**

- ☐ Yes, there is one
- ☐ There is one, but ...
- ☐ No
- ☐

Requirements: The institutions (from research and practice) participating in a multi-institutional project should conclude a written agreement with which they commit themselves to a cooperative research process and regulate such aspects as expected work, collaboration, publishing rules, arbitration, etc.
The social integration of a research team as a joint group capable of working sometimes encounters the problem that the institutions behind the individuals pursue other (often competing) interests than those of the researchers. It is thus in the interest of the participants and of the research goal for the institutions to agree on a common basis of collaboration and on the goal of the project.

A.2 Problem Formulation, Focus, Goals, and Criteria of Success

The Basic Criteria for Section ⌦ A.2 deal with:

- Relevant problems from everyday life
- Translating the everyday life problem situation into scientific questions
- Object of joint research
- The project team's criteria of success
- The distinction between scientific and practice-related results
- Openness of the question and research flexibility
- The congruence between problem type, result type, and the type of practice-relatedness

A.2.1 *Transfer Between Everyday Life and Science*

11 **Does the project take up a problem from everyday life, and what is its relevance?**

- ☐ Yes, it takes up a problem from everyday life, because ...
- ☐ Yes, the problem is relevant because ...
- ☐ No, because ...
- ☐

Requirements: The everyday life problem should be described in a way showing what relevance the problem/question and its solution/transformation have for which actors. *Some concepts of transdisciplinarity replace the question of actor-related relevance with reference to a "general welfare" that the research aims at. We renounce this here, since it seems difficult to define this term without referring to specific actors.*
Additional remarks: Taking up everyday life problems does not necessarily mean that the problematic has been articulated in the world of everyday life or that societal actors have assigned science this problem. Rather, science can also take up the problematic as a way of making provision for the future. In this case, however, the integration of knowledge from practice and the framework conditions in the specific realm of practice must be especially thoroughly considered.

12 **Is there a description of the translation of everyday life problems into scientific questions?**

- ☐ Yes there is a description and it is plausible, because ...
- ☐ There is a description, but ...
- ☐ No, because ...
- ☐

Requirements: The project team should describe the transformation of the problem as a conscious act of transdisciplinary project construction. The description should clarify which aspects of the problem will be treated with which scientific or practice-based procedures and methods. Lack of a reformulation can be acceptable in the rare case of directly addressing the problem (action research). In this case, the team should explain why it consciously did without this reformulation.
The success of transdisciplinary research depends on reflecting and "translating" the problems from the realm of practice in such a way that they can be opened up and dealt with using scientific ways of working, instruments, and methods. As a rule, this simultaneously lays a foundation for the integration of knowledge in the project. To increase mutual understanding of the strategies for dealing with the problem, it is thus advantageous for the team to carry out this work together.

13 **Have the societal and institutional framework conditions in the field of activity under study been analyzed in terms of options and restrictions?**

- ☐ Yes, in that ...
- ☐ Yes, but ...
- ☐ No
- ☐

Requirements: The project concept should show what societal and institutional framework conditions affect the project in the field of activity. The analysis should relate to the choice of actors from the realm of practice and of target groups and to the strategies for implementing the research results.
The attempt to use research results to effect changes in a field of activity usually encounters complex societal and institutional contexts of activity that can be supportive or hindering for implementation.

A.2.2 Formulating a Common Research Goal

14 **Have integratively effective common goals, procedures, and objects of research been described for the project?**

- ☐ Yes, in that ...
- ☐ There is a description, but ...
- ☐ No, because ...
- ☐

Requirements: In the project concept, all participants should formulate common goals that provide parts of the project, modules, etc. with a point of orientation for the work and methodology, thus enabling a directed integration of knowledge. This discussion should address the degree to which the planned research approaches and methods can be integrated in an overall result that supports the goals.

Research work in complex, heterogeneous collaborations is also put on a basis common to all participants if all participants are able to describe and, through their research work, strive for a common research goal, a so-called "mediating object" or "boundary object". "Boundary objects are (for example technical) objects, but also ideas, plans, or concepts that are of central importance (i.e., relevant for action) within an arena and thus for the representatives of various social worlds in that arena." "Amateurs and professionals can find a common position" by means of boundary objects. But: "As long as the objects in question are not co-constituted by all involved parties, they cannot have a mediating effect. The concept of boundary work is based precisely on the conviction that successful mediation is a process that must be actively accomplished by both or all participating sides and that cannot be successfully managed solely by the one-sided establishment of mediating and coordinating objects (...)."[19]
Of course, other conceptual models, such as bridging concepts, modelings, etc., can help a team pursue a common goal and can ease cognitive integration.
Disparate interests of the participating institutions and staff can lead to individual results that resist integration because the methods and forms of results were not made compatible.
Additional remarks: Examples: In Project **(7)**,[20] the goal of uncoupling mobility from automobility and the concept of spatial/physical, social-spatial, and social mobility had this function. In Project **(3)**, the methodologically innovative step of connecting traffic behavior data with elements of lifestyle functioned as a binding element, as did the goal of using this connection to introduce a new qualitative dimension into mobility research.

15 **Has the team set up its own criteria of success in relation to the project goal and do these criteria plausibly represent project success?**

- ☐ Yes, in that ...
- ☐ Criteria have been formulated, but ...
- ☐ No, because ...
- ☐

Requirements: In the course of designing the project, the project's entire team (including Practice Partners) should jointly formulate criteria of success. In this step, it should be examined and explained whether there are partial criteria that satisfy only some of the project actors – for example in relation to science or practice. If the potential for conflict is given, it should be explained how conflicts can be avoided in the course of the project.
Formulating one's own criteria of project success is an important prerequisite for carrying out interim and final evaluations and for maintaining the possibility of revising a research project.

19 Strübing, J. 2005: Pragmatische Wissenschafts- und Technikforschung. Theorie und Methode. Frankfurt am Main: Campus, 258 ff.

20 See the list of evaluated projects in the Appendix, IX.

A.2.3 Focus

16 **Does the research concept take into account, on the one hand, an appropriate balance between absolutely necessary disciplines and, on the other hand, the avoidance of excessive complexity?**

- ☐ Yes, in that ...
- ☐ This is discussed, but ...
- ☐ No, because ...
- ☐

Requirements: In the course of planning the project, the following process of consideration must be carried out and, to make it understandable for others, described: On the one hand, all disciplinary aspects that are necessary to do research adequate to the problem must be taken into account. On the other hand, any content consciously excluded in order to make it possible to carry out the project and in particular to realize transdisciplinary integration must be explained. If applicable, it should also be explained whether the approach to and methods of research maintain compatibility with later involvement of the excluded or of additional disciplinary aspects.

17 **Are the research questions and methods adequately open for unforeseen results?**

- ☐ Yes, the research is open for unforeseen results, because ...
- ☐ No, because ...
- ☐

Requirements: The project formulation should explain whether the project aims to change something connected with the treated problem from everyday life and to what degree the openness of the research process for unforeseen results is ensured, despite this goal.
Transdisciplinary research projects that focus on implementation particularly often face the problem that a concrete goal for practice that is already set in the project formulation excessively narrows the corridor for discovery and the spectrum of methods for the research process. All the more so when achieving the goal for practice is tied to economic criteria of success. It can often be observed that, in acquiring a preliminary expertise in the approval process for a project, goals are externally set or scientific tasks are cut, substantially narrowing the research process. Openness for unforeseen results is an essential aspect of research.

18 **Do the methods, the way the realm of practice is involved, and the kind of results and products adequately address the practical problem?**

- ☐ Yes, an explanation is given and is understandable, because ...
- ☐ An explanation is given, but ...
- ☐ No, because ...
- ☐

Requirements: The congruence between problem, method, the way the realm of practice is involved, knowledge, results, and products should be described in the project concept. The actors in the realm of the practical problem should be named and addressed as a target group.

Due to heterogeneous personnel, content, and task combinations, transdisciplinary research projects can take a wide variety of forms. So in every project it is necessary to make the kind of problem addressed ("problem type"), the way the realm of practice is involved, the methods used to bring together knowledge attained within disciplines ("integration methods"), and the kind of results and products ("result type") fit each other.

Additional remarks: Possible forms of the aforementioned "types" include:

- **Result Type:** Initiating a change of paradigm; advancing innovation; making an actor able to engage in a particular strategy; making a collective of interdependent actors able to engage in systematic strategy.
- **The Way the Realm of Practice is Involved:** Advisory board; commissioning party; partners in the research process; participation (for example, mediating the information moving into and out of the project); methodological operationalization of relations to practice.
- **Type of Integration Methods:** For example, transdisciplinary concept formation; modeling; scenario workshops; assessments based on a plurality of criteria; negotiation.
- **Types of Knowledge:** Systems knowledge; target knowledge; transformation knowledge.
- **Types of Products:** Institutional reforms, technical artefacts; consultations; processes of discourse; publications in scientific journals; publications in media that target the realm of practice and the general public; (computer-based) models and tools; guides.

An example of achieved **congruence** in this combination would be:

If a project's task consists in making an actor able to engage in a particular strategy (i.e., creating actor-oriented concepts for a specific actor), then this practice actor should substantially or at least marginally participate in the research process, for example by carrying out scenario workshops with him or her as an aid to imagination for developmental perspectives, thereby working up transformation knowledge, for example in the form of a computer-supported guide for this actor.

Projects that aim to develop and implement social or technical innovations (transformation knowledge) should not produce solely scientific publications nor limit themselves to abstract methods of integration like models.

Projects with gender relevance (for example, those based on problems in everyday ecology) should make sure that the problem type, methods, result type, and product type are congruent in terms of the actors from everyday life.

19 **Can the project concept lead to an orientation of research work and results that fits the target group?**

- ☐ Yes, a target-group concept is presented and is convincing, because ...
- ☐ A target-group concept is presented, but ...
- ☐ No, because ...
- ☐

Requirements: The project concept should already describe the project goals clearly and differentiatedly in terms of various target groups in science and the realm of practice. Here it should also be considered whether the research approach promises results that can serve the target groups, for example by realizing actor-oriented transformation concepts (see also A.3.3 Product and Publication Planning).

20 **Does the project concept say how, on the one hand, the results can be implemented in the concrete context and, on the other hand, also how the results can be made transferable independently of this context? Is the focus on one of these two goals?**

- ☐ Yes, a concept/explanation is presented and is appropriate, because ...
- ☐ A concept/explanation is presented, but ...
- ☐ No, because ...
- ☐

Requirements: In the course of conceiving the project, it should be explained which segment of the field of tension "implementing results in practice – abstraction and transferability" the project will address or how the balance between these two poles will be maintained. The project planning should also consider the following:

■ Projects aimed at a concrete context and at processes of implementation must plan thorough documentation and, if applicable, publication of the methods and processes by which scientific and practical knowledge were integrated in the project.

■ Projects aimed at general problem structures and theory should explicitly reflect on the robustness of their results for application under concrete (local) conditions. As part of the research process, they should also plan on working out procedures with which their results can be further processed into concrete strategies for action under given framework conditions.

A demand placed on many transdisciplinary research projects is the simultaneity of context-related solutions to societal problems and scientifically generalizable innovations. Depending on whether they focus on a concrete case or on more abstract problem patterns, such projects often encounter the dilemma of reducing either relevance for implementation or the transferability of their results to other contexts.

A.3 Project Planning and Financing

The Basic Criteria for Section ⌦ A.3 deal with:

- Structure Planning, Coordination, and Integration
- Funds for Integration Tasks

A.3.1 *Structure Planning and Possibilities for Revision*

21 **Does the project have a structure plan and does it reflect the project's degree of complexity appropriately and comprehensibly?**

- ☐ Yes, a structure plan is present and appropriate, because ...
- ☐ There is a structure plan, but ...
- ☐ No, because ...
- ☐

Requirements: A structure plan must be created in the course of project conception. It should contain a detailed time schedule for the whole team that is based, for example, on milestones and related to content (with instruments for managing time and finances). The assessment should consider the completeness of information (project phases, modules, project participants, milestones, workshops, products, etc.), as well as the form of presentation (comprehensibility) and the appropriateness of planning (realistic time schedule). The plan should be presented as a comprehensible graphic.
Complex research projects carried out by a research team stemming from a number of institutions require transparence in regard to tasks. This permits the synchronization and integration of individual project components, results, and actors (including practice actors subject to their own time constraints).

22 **Does the project planning provide room for revisions and free planning space (provided with time and funds) for the research process?**

- ☐ Yes, "points for revision" were planned and make sense, because ...
- ☐ "Points for revision" were planned, but ...
- ☐ No, because ...
- ☐

Requirements: The project planning should contain "points for revision" (milestones, workshops, etc.) where the planning can be reviewed and, if desired, revised. For larger projects, such "points for revision" should be scheduled at least twice a year. In addition, time and financial resources should be reserved for the project management to use to redirect or change the planning in case of unforeseen developments.

The complexity of the tasks and integration requirements often lead to difficulties in the course of the project, necessitating an adjustment of the structure planning. Planning appropriate points in time and procedures for interim reflection ("points for revision") helps guide the team through the research process.

Additional remarks: Several criteria in sections B.1.1, B.1.2, B.2.1, B.2.2, B.3 refer to the "points for revision" addressed here. (B is concerned with project execution.) Various aspects are described that should be considered regularly at these "points for revision" of the project to be evaluated.

A.3.2 Financing

23 **Does the financial planning exhibit congruence between the tasks and the available funds? Are the costs of "transdisciplinarity" made explicit?**

- ☐ Yes, the financial planning seems to make sense, because ..
- ☐ The financial planning seems to make sense, but ...
- ☐ No, because ...
- ☐

Requirements: The budget must, first, display transparence in regard to the allocation of funds for individual tasks and project partners. Second, the project budges calculations must provide for typical transdisciplinary tasks (trans-site or transinstitutional collaboration, procedures of integration in relation to disciplines and practice – including workshop expenses, especially travel expenses, etc., managing/coordinating the association, supervisory support/moderation, reflection, revision, and iteration). The costs of quality assurance (for example, through internal or self-evaluation) should also be planned.

Additional remarks: As a benchmark for larger projects, 15% of a project's total budget should be made available for central management/coordination (this figure depends on the integration requirements).

"Transdisciplinarity costs" result from the effort to enable all participants to continuously follow and understand the progress of the project and to support the task of social and cognitive integration. It should also be ensured that all participants are adequately informed about the progress of the project, including in parts of the project that do not directly involve them. This presupposes regular exchange and sufficient time for meetings of all project partners. Project groups in which the staff work in several different places thus require an additional travel budget, in order to adequately secure cooperation and knowledge integration by means of working visits, workshops, integration events, etc. In each year of the project, each research partner should have the possibility to travel several times to visit other project partners for several days. In addition, travel expenses for visiting association events, conferences, etc. should be planned (at least four trips per year). The project management requires at least twice as many trips.

If funds are cut in the framework of the application process, then congruence between the task and the budget must be maintained, and disciplinary research work must not be protected at the cost of the tasks of transdisciplinary collaboration and integration.

24 **Do practice partners contribute to funding the project and are the implications of such contributions reflected?**

- ☐ Yes, such contribution is plausible, because ...
- ☐ A practice partner is contributing to funding, but ...
- ☐ No, because ...
- ☐

Requirements: The practice partner's own interests and his or her criteria of success must be made explicit in the project concept. Explain how the practice partner's influence can be made useful for the goal of the project.
If a practice partner contributes to funding a project, he or she may have to be granted more say in formulating the object of research, in the research process, and in the form of its results. This can alter the project's openness to unforeseen results.

A.3.3 Planning Knowledge Integration, Knowledge Transfer, Products, and Publications

25 **Is there a comprehensible integration plan that is adequate to the task?**

- ☐ Yes, it is presented and adequate, because ...
- ☐ It is presented, but ...
- ☐ No, because ...
- ☐

Requirements: Depending on the project focus in accordance with A.2.3, the project planning must present a description of the integration aim (knowledge integration focuses on bodies of scientific and/or practice-related knowledge). The structure plan must also contain the planned sites of integration (occasions or opportunities). Working procedures and methods of integration can already be described in the planning or else at least be named as a concept for development in the course of the project (on this, see also B.2.1).
The integration of disparate bodies of knowledge is a central challenge of transdisciplinary research. It involves scientific knowledge from the participating disciplines as well as knowledge from the realm of practice. The chances for successful integration of knowledge increase if integration is planned and methodically conceived, ideally already in the phase of project construction. In addition, knowledge integration is eased if attention is paid to socially integrating the participants in a team that acts in concert. Transdisciplinary integration cannot be ensured solely at the end of the project; it requires a continuous process of exchange and understanding throughout the course of the project.

26 **Is there a time plan for transferring knowledge from research into the realm of practice?**

- ☐ Yes, there is one and it is appropriate, because ...
- ☐ There is one, but ...
- ☐ No, because ...
- ☐

Requirements: The project planning should describe the time planning (on the procedure concept, see Detailed Criterion 7) for the transfer of knowledge gained in the project to the realm of practice. The time planning must correspond with the requirements of the overall course of the project (it makes sense to anchor it in the structure plan).

27 **Has a strategy been formulated for the transfer from research to practice after the end of the project?**

- ☐ Yes, a concept/explanation is presented and seems promising, because ...
- ☐ A concept is presented, but ...
- ☐ No, because ...
- ☐

Requirements: The project concept should contain information on how the project results can be transferred to the actors in the field of activity in question in a way ensuring that implementation strategies developed in the project can indeed be realized. This transfer strategy absolutely must be made in consultation with the commissioning party/funder/project executing organization, so that temporal and financial preparations/possibilities for accompaniment can be made.
It is often observed that the implementation of project results fails because, after the end of funding of a research project, the practice partner – no longer funded – is not in a position to implement the strategies or because structures that were initiated during the project but are not immediately economically viable cannot be maintained or operated, thus endangering the success of the project. This can also present a challenge to the sustainability of the initiated development.

28 **Does the project have a plan for products and publications?**

- ☐ Yes, there is one and it is appropriate, because ...
- ☐ There is one, but ...
- ☐ No, because ...
- ☐

Requirements: There should be a plan for products and publications that adequately reflects the project goals and that makes appropriate offers to the various target persons in science and the realm of practice. It should also be decided whether scientific innovations are to be expected for individual participating disciplines or in a interdisciplinary form and how they should be accordingly prepared.

Transdisciplinary research's paradigmatic orientation toward science and practice necessitates a target group concept, also and especially for the products and publications emerging from the research results.

A.3.4 The Form of the Project's Commission

29 **Commissioned research: Does the project construction take the form of the commission appropriately into consideration?**

- ☐ Yes, because ...
- ☐ No, because ...
- ☐

Requirements: If the commissioning party intends to use the research result to pursue concrete implementation or counseling plans, then there must be occasion during the course of the project for consultations (for example, presentations, work discussions). Such consultations should be held about twice a year, unless the commissioning party prefers to omit them.
The parties commissioning research projects generally have much greater interests of their own, for example regarding the use of project results, than funders do. This can have far-reaching consequences for the planning of the course of the project, for the form of the results, and for their publication. Both private institutions (including practice partners) and public commissioning parties (ministries, agencies, etc.) can pursue their own implementation interests.
Additional remarks: For example, the commissioning party the Umweltbundesamt (Federal Environmental Agency) generally pursues the goal of using research results achieved on its commission to advise federal environmental policy. It therefore formulates its own ideas on carrying out the research task. The DFG (Deutsche Forschungsgemeinschaft – German Research Association), by contrast, does not itself use the results of projects it finances. So in the first case, depending on the project, a certain degree of content-related collaboration with the funder is necessary to ensure that the project methodology and results are compatible with the commissioning party's use interests, as well as with one's own.

B Detailed Criteria: Project Execution and Methodology

B.1 Work Planning and Project Management

The Basic Criteria for Section ⌦ B.1 deal with:

- Joint Work Planning
- Cooperative Decision-Making Structures

B.1.1 Joint Work Planning, Collaboration, and Management

30 **Are execution, collaboration, and time management in the production and integration of knowledge successful/promising?**

☐ Yes, because ...
☐ No, because ...
☐

Requirements: It should be regularly[21] reviewed whether integration tasks and the corresponding instruments, events, etc. have been scheduled in a way that permits results/knowledge from individual project modules and from the realm of practice to be brought together and whether all participants have clarity on the course of the project and on knowledge integration.
Additional remarks: For example, strands of decentralized (for example, disciplinary) knowledge production must be traced and reviewed for their temporal and substantive compatibility with the central integration points.

31 **Is the collaboration in the research team and with representatives from the realm of practice (social integration) successful/promising?**

☐ Yes, because ...
☐ No, because ...
☐

Requirements: First the project management and then the entire team should regularly[21] review whether the cooperative processes considered necessary (bilateral and multilateral workshops, joint work phases, interfaces, interdisciplinary partnerships, etc.) are indeed taking place and whether they are leading to the desired integrated results. The result should be assessed. If necessary, the entire team should discuss how the situation can be improved.

[21] The project planning should schedule "points for revision" in the project, specific times for such reviewing (on this, see under A.3.1 "Structure Planning and Possibilities for Revision"). Of course, the criteria are also valid for retrospective assessments.

Planning a transdisciplinary project generally involves numerous levels or occasions on which cooperation is necessary. In the course of working on projects, it becomes apparent whether the partners are indeed able and willing to cooperate. The social integration of project participants, i.e., the development of ideas of a joint project success and of a team identity, is a basic precondition for cooperation and cognitive integration.

B.1.2 Project Management and Responsibility

32 **Are management and decision-making structures functional?**

- ☐ Yes, because ...
- ☐ No, because ...
- ☐

Requirements: In the phase of project construction, as well as regularly[21] in the course of the project, a review should be carried out on whether the constellation of actors in the project and the complexity of the course of the project can be managed with the chosen management and decision-making structure and whether practice partners' project-external decision-making structures have been taken into consideration.

Additional remarks: Depending on the constellation of actors, it can be advisable to strengthen hierarchical (vertical) or horizontal structures. If the partners' collective interest is sufficient to create a viable working relationship, then a flat hierarchy is adequate. In other cases, a hierarchical project management structure is necessary in order to achieve an integrated result. A flat, minimal hierarchy requires a structure that is transparent for all participants, in order to make decision paths comprehensible. A small plenum, in which all participating institutions are each represented with their project management, can assume the functions of, for example, securing binding decisions and integration. Individuals in management (project manager, overall coordinator, or the like) who have an integrating effect also promote security. The transparence of the decision paths must be ensured for all participants; commitments should be agreed upon among the project partners.

B.2 Transdisciplinary Methodology and Integration

The Basic Criteria for Section ⌧ B.2 deal with:

- Transdisciplinary Integration of Knowledge
- Reflecting on Cognitive Integration

B.2.1 *Methodology of Knowledge Integration; Focusing*

33 **Are suitable methods applied or developed to combine all bodies of knowledge coming from the participating disciplines and from the realm of practice?**

- ☐ Yes, because ...
- ☐ Methods were applied or developed, but ...
- ☐ No, because ...
- ☐

Requirements: It should be regularly[21] reviewed whether the method used to integrate all bodies of knowledge is effective. This assessment should focus on the planning to this end (see A.3.3), which describes which methods from the disciplines participating in the project have access to the problem and whether, in the course of the project, the various accesses permit the integration of the knowledge acquired, enabling it to be condensed to a joint result.

Additional remarks: Constructing one's own system of categories can be advantageous. Setting up common definitions, metaphors, categories, criteria, and instruments is a very helpful and advisable heuristic tool in transdisciplinary collaboration and knowledge integration. Here the assumptions and assessments on which the categories and criteria are based must be made clear.

An example: In project **(5)**, access for the participating disciplines (especially architecture and resource and waste management) to the urban space under study and intended for reshaping was gained through the following components of a categorial system:

- The urban situation was characterized from a disciplinary perspective on the level of four **activities** (nourishment and recreation, cleaning, dwelling and working, transportation and communication).
- To assess the existing situation and the options for reshaping, five **quality criteria** were set down: identification, diversity, flexibility (potential for change, ability to adjust), level of supply, and resource efficiency.
- On the level below activities and quality criteria, **instruments** were formulated that serve the collection of data and information.

34 **Are there specific working tools supporting the methods of the transdisciplinary knowledge integration and is their use successful/promising?**

- ☐ Yes, there are tools and they are successful/promising, because ...
- ☐ There are tools, but ...
- ☐ No, because ...
- ☐

Requirements: In the course of the project (or at its end), the effectiveness of the planned work procedures or of those developed in the course of the project must be regularly[21] reviewed. Appropriate qualification measures should be carried out for inexperienced scientists.
Additional remarks: To do justice to the task, knowledge integration should include work procedures that support internal quality assurance and mutual comprehensibility of the research results of the partners within the project. A consciously implemented interdisciplinary work method (for example, the *transdisciplinary loop* in **(5)** carried out in relation to all fields of activity) is an important, advisable measure for transdisciplinary cooperation and knowledge integration. Systematizing accesses with similar effects include e.g. an action impact assessment or other multi-criteria assessment procedures that relate to aspects of all participating disciplines, like advocate procedures, integration through central questions, and strategy fields.
On this, see also Criterion 18 in A.2.3.

35 **Is there congruence between the project focus (science and/or everyday life) and the type of the knowledge gained?**

- ☐ Yes, because ...
- ☐ No, but revision steps were launched, in that ...
- ☐ No, because ...
- ☐

Requirements: It should be regularly[21] reviewed whether the character of the attained knowledge makes it suitable to support project's or subproject's planned focus (primarily science or primarily the realm of practice). This assessment can relate to the question whether the recipients are likely to be able to deal with the research results and use them for their own purposes.
Among the constitutive characteristics of transdisciplinary research processes is the field of tension between scientific goals or innovations and the desire for implementable measures and structures. In every phase of the project, including its construction, it is thereby important to be aware of the kind of knowledge (systems knowledge, target knowledge, transformation knowledge) to be attained, in each focus in the respective step of work and to correspondingly adjust one's methods and ways of working.

Additional remarks: If a project aims to work out strategies of action for the realm of practice, then suitable transfer of the research results into practice is needed. This succeeds best if the results are primarily transformation knowledge or target knowledge. By contrast, if analytic, scientifically descriptive, or methodological systematic knowledge was attained, this transfer to the realm of practice will be difficult or may even fail. In this case, however, it is possible that recipients in science are still served. With gender-relevant questions, compare also Criterion 18.

36 **In the course of the project, can a shift between parts of the research with a scientific focus and parts with a practical focus be observed?**

- ☐ Yes, but revision steps were introduced, in that ...
- ☐ Yes, but there was agreement on the change in project focus, in that ...
- ☐ Yes, but there was no response, because ...
- ☐ No, because ...
- ☐

Requirements: It should be regularly[21] reviewed whether the distribution of temporal and financial resources between more scientifically oriented questions and concepts for action in practice remains as intended in the project plan. The conclusions from this assessment should be presented.
In research projects with an extensive portion devoted to practice and with close collaboration between scientists and practice partners, a tendency can be observed in the course of a project for scientific work progressively and unintentionally shift to become merely accompanying research for the practical problems of a practice partner or for resources for working on questions that stand in the interest of scientific research to be reduced.

B.2.2 Transfer of Knowledge from the Realm of Practice

37 **Is the application of procedures to integrate knowledge from the realm of practice successful?**

- ☐ Yes, because ...
- ☐ Such procedures are present, but ...
- ☐ No, because ...
- ☐

Requirements: In the course of the project (or at its end), the successful implementation of procedures related to practice (see A.1.2 and A.2.3) should be regularly[21] reviewed. Their success or failure should be explained.

B.3 Reflection and Communication

The Basic Criteria for Section ⌦ B.3 deal with:

- Reflexivity and Possibilities of Revision

38 **Are the planned procedures for self-reflection and quality assurance used? Were conclusions drawn from the interim review?**

- ☐ Yes, but no changes were necessary, because ...
- ☐ Yes, revision steps were introduced, in that ...
- ☐ No, because ...
- ☐

Requirements: The progress of the project and its congruence with the plan should be regularly[21] discussed and presented. Any necessary changes to the project design must make use of the project's progress and fit realistically within the framework of the project.
Additional remarks: External aid can contribute decisively to the capability to reflect in the project and to improve quality. If no funds are available for special assessment measures (building blocks for internal or external evaluation, revision workshops, or the like), similar effects can sometimes be achieved by making use of external aid. But funds are required for this, as well.

39 **Did the project follow the rules of communication that were laid down?**

- ☐ Yes, in that ...
- ☐ Yes, but ...
- ☐ No, because ...
- ☐

Requirements: During the construction phase, the entire team should agree upon rules of communication and set them down in writing. Adherence to them should be regularly[21] reviewed.
Jointly developed rules of communication make interdisciplinary collaboration easier and can, for example, help prevent the dominance of individual disciplines or institutions.
Additional remarks: Project evaluations and our own experience show that a temporary inter-institutional research association's external communication, in particular, must be regulated in agreement, in order to ensure that depictions presented externally reflect the whole project, rather than individual opinions, and to prevent individuals from making personal (institutional) gains at the expense of the whole.

40 **Were strategies for coping with conflicts or crises in the project implemented?**

- ☐ Yes
- ☐ They were present, but ...
- ☐ No, because ...
- ☐

Requirements: In the initial phase of a project run by a research network, a joint assessment of risk should be carried out under external moderation. Additionally, a rulebook for cases of conflicts should be agreed upon (for example, a multi-stepped arbitration procedure).
Large, complexly structured projects, which can involve a large number of scientists, can intimidate participants and lead to crisis situations. Disagreements of substantive, institutional, or personal character can hinder the research work and endanger the success of the project. But crises can also be turned to constructive use and made to strengthen the project.
Additional remarks: In cases of disagreements within the project, suitable measures or conflict-solution strategies should be implemented and crisis situations proactively used for learning effects. Indications of this can be, for example, revisions agreed upon by the entire team in regard to plans for the distribution of time and tasks, as well as applications for extensions or additional funds and new integration instruments.

C Detailed Criteria: Results, Products, and Publications

C.1 Results

The Basic Criteria for Section ⌦ C.1 deal with:

- Scientific Results/Innovations
- Contributions to Solving Everyday Problems
- Fulfillment of the Criteria of Success

41 **Is the research goal achieved?**

- ☐ Yes, because ...
- ☐ Yes, but ...
- ☐ No, because ...
- ☐

Requirements: The achievement or nonachievement of the criteria of success listed in the project formulation should be described and deviations explained and assessed. It should thereby be examined whether all project participants assess the success of the project in the same way. Here, above all, the degree of satisfaction with the overall result should be examined, which is also the basis for gauging the success of integration (specific examinations will be treated in later criteria).
Additional remarks: On the Criteria of Success, see also A.2.2.

C.1.1 Scientific Results and Methods

42 **Has there been scientific innovation/progress? Have new scientific methods, concepts, or instruments resulted?**

- ☐ Yes, in that ...
- ☐ Yes, in a interdisciplinary area, because ...
- ☐ Yes, in an individual discipline/individual disciplines, because ...
- ☐ No, because ...
- ☐

Requirements: The research partners should jointly assess the fulfillment of the scientific criteria of success that have been set. The entire project team should examine and present the achievement of a planned – or unplanned – development of new methods, the functionality of such methods, and the possible use emerging from them for other, later projects. Depending on whether the project has a more scientific or practice-oriented focus, the (additional) use of the development should be assessed. Where the focus is more practice-oriented, it should be asked whether the value for practice has suffered under the work on the scientific innovation. If this is not the case, the development can be assessed all the more favorably.

The development of new (integrated) scientific methods, concepts, and instruments can affect the researched content as well as the transdisciplinary integration work.

43 **Are the planned disciplinary results achieved?**

- ☐ Yes, in that ...
- ☐ Only partially, because ...
- ☐ No, because ...
- ☐

Requirements: The project's scientists should examine and present the project's yield in innovative disciplinary knowledge – beyond the integrated research results. If such yields were goals of the project (scientifically-oriented project focus), then this is a correspondingly important assessment factor.
The project formulation names the joint research goal. Along with it, there are usually criteria of success for the research work in the individual participating disciplines. Such yields can be important for the disciplinary reputations of the individual scientists.

C.1.2 Results in the Realm of Practice

44 **Is a contribution made to solving a societal/practical problem?**

- ☐ Yes, in that ...
- ☐ Only partially, because ...
- ☐ No, because ...
- ☐

Requirements: It should be presented whether and how the research results have promoted or can promote the intended transformation processes; the time frame for this is to be shown. It should also be elucidated whether the supporting or hindering framework conditions and sequences of action were examined and whether the "right" practice partners were involved, i.e., whether practice partners were selected who have the power to implement the "transformation".
This question should be examined independently of the participating practice partners' criteria of success.
Additional remarks: The time frame for implementation may be markedly longer than the duration of the project. In this case, an assessment of the probability of implementation should be carried out together with the practice partners.

45 **Are the practice partners' or practice representatives' criteria of success fulfilled?**

- ☐ Yes, in that ...
- ☐ Only partially, because ...
- ☐ No, because ...
- ☐

Requirements: The practice partners or representatives should be asked whether their criteria of success have been fulfilled. The result should be presented.
Additional remarks: The time frame for implementation may be markedly longer than the duration of the project. In this case, an assessment of the probability of implementation should be carried out together with the practice partners.

46 **Are the strategies for transfer from science to practice that were laid down in the project concept (and possibly already in the project proposal) successful?**

- ☐ Yes, in that ...
- ☐ There is a strategy, but ...
- ☐ No, because ...
- ☐

Requirements: In a retrospective assessment of the project (especially with projects that have concrete implementation products), it should be presented whether a frictionless transfer of responsibility, results, and products from the (usually scientific) project management to the practice representatives has taken place and whether the practice partners are able to take up the achieved results and products in a way that gives them long-term duration and allows them, if applicable, to be successfully further developed – or why a sustainable implementation of this kind creates problems (see A.3.3).

C.1.3 *Unintended and Indirect Results and Effects*

47 **Are there unintended direct effects in the scientific sphere and in the realm of everyday life, and how are they to be assessed?**

- ☐ Yes, there are, with a favorable effect supporting the project result, because ...
- ☐ Yes, there are, with an unfavorable effect hindering the project result, because...
- ☐ No, because ...
- ☐

Assessment: (Unintended) effects of the project work are to be presented and elucidated in terms of whether they support or hinder the achievement or implementation of the project goals. In addition, it should be assessed whether unfavorable effects could have been foreseen and countered in the course of the research work.
For the purpose of this question, unintended effects are consequences of the research work that were not intended, but that directly affect the project goals favorably or unfavorably.
Additional remarks: Examples of favorable effects: 1. The methodology developed in the project is adopted in other contexts. 2. A support group is founded to foster the effects the project intends in the field of practical action.
Examples of unfavorable effects: After publication of the project results, leading scientists in a discipline speak against methods newly developed in the research project.

48 **Are there unintended indirect effects in the scientific sphere and in the realm of everyday life, and how are they to be assessed?**

- ☐ Yes, there are, with a favorable effect supporting the project result, because ...
- ☐ Yes, there are, with an unfavorable effect hindering the project result, because...
- ☐ No, because ...
- ☐

Requirements: Learning effects from the research process and its results in the public realm of practice (social impact) and/or in science should be presented as effects of the project, if applicable. It should thereby be determined whether there is a relation to the integrated project results or if individual disciplinary perspectives are deepened. *Because of the relationship or ties to the realm of practice of many transdisciplinary projects, farther-reaching effects can emerge in the realm of practice without direct influence on the research and implementation result. These can be regarded as part of the success or failure of the project.*
Additional remarks: Examples: In transdisciplinary research processes, unusual heterogeneous collaborations and forms of working are often practiced. It can be observed that practice partners, for example, take up such boundary-crossing collaborations for their own working contexts (for example, new forms of working that transcend departments, or the like). In the scientific realm, for example, this can be advanced education offerings or curricula or academic qualification works resulting from the innovative research results.

C.1.4 Expenses

49 **How does the planned budget compare with the actual need for funds?**

- ☐ The funds expended remain within budget, specifically ...
- ☐ The funds expended exceed the planned budget. The excess was counteracted by...
- ☐ The funds expended exceed the planned budget. The project has to be ended without a satisfactory result, because...
- ☐

Requirements: A comparison between the planned and the actual temporal and financial budgets should be carried out. The use of participating institutions' own funds beyond the original planning should be recorded, differentiated among the individual project partners. The reasons for this development and possible strategies to prevent it should be noted in writing.
Complex research projects that last several years and involve many actors tend to overrun their temporal and financial budgets, because the extent of effort and expense were underestimated. Additional external funding, additional work supported by an institution's own funds, or unpaid work mean that the calculation was faulty, that unforeseen additional tasks arose in the course of research, or that funding cuts in the course of the acquisition phase were not correspondingly applied.

C.2 Products and Publications

The Basic Criteria for Section ⌦ C.2 deal with:

- Products and Publications
- Documentation of Transdisciplinary Methodology
- Product Presentation/Publication

C.2.1 *Direct Products and Publications*

50 **What products are there? Is the relation to target groups successful?**

- ☐ The planned products are present and reach the target groups, because ...
- ☐ The planned products are present, but do not reach the target groups, because...
- ☐ The products deviate from the goal (due to revision of the project), with the result that ...
- ☐ The products deviate from the goal and fail to reach the recipients, because ...
- ☐

Requirements: The existing products should be listed (research report, guide for practice, user concept, assessment/ranking, etc.). A clear and differentiated division between products for various target groups in science and in the realm of practice and their respective language and form of presentation should be made. Using the list, it should be examined whether scientific and practice-oriented products have been created for the target groups important for the distribution and implementation of research results and whether these products were prepared in a manner suitable for the target groups. To this end, feedback should be obtained from the target groups or it should be determined whether there is resonance from the target groups.
It should also be assessed whether the project provides further, unused potential for results from which further products can be created and whether this would be an important support for reaching the project goal.
For the purpose of this question, products are results intended not for publication, but for research-tied purposes or as products created for a limited circle of addressees(for example research reports, user concepts for the commissioning parties, assessments/rankings). These can include products not put into writing.

51 **What publications are there? Is the relation to target groups successful?**

- ☐ The planned publications are present and reach the target groups, because ...
- ☐ The planned publications are present, but do not reach the target groups, because...
- ☐ The publications deviate from the goal (due to revision of the project), with the result that ...
- ☐ The publications deviate from the goal and fail to reach the recipients, because ...
- ☐

Requirements: What publications or publicizing measures are there

- ☐ in refereed journals of the participating disciplines
- ☐ in books
- ☐ in popular scientific publications
- ☐ on television/the radio
- ☐ in other spezialized journals
- ☐ in series of their own
- ☐ in the press
- ☐ in the internet
- ☐ in conference publications?

On the basis of this list, it should be asked whether scientific and practice-oriented publications have been created for the target groups important for the distribution and implementation of research results and whether these publications were prepared in a manner suitable for the target groups. Necessary thereby are a clear and differentiated division between products for various target groups in science and in the realm of practice, as well as attention to the respective language and form of presentation. It should be determined whether there is resonance from the target groups.
If the project has a scientific focus, it should be determined whether there are refereed journals for the integrated results and whether these results have been published therein (improbable – see **Additional Remarks**). The same should be determined, if applicable, in regard to individual disciplinary results.
Publications are project results in written form that, in distinction from "products", are offered to a larger target group (for example, articles in specialized journals, books [monographs and anthologies], publications in series of their own, guides, handbooks, popular scientific publications, publications in the press, publications in the Internet).
Additional remarks: A lack of publications in scientific journals is not necessarily an indication of a faulty publication strategy. In many cases, there are no suitable organs for the integrated result context. The transdisciplinary context makes it seem advisable to allocate funds from the project budget for a book publication that – if the project has carried out successful transdisciplinary knowledge integration – can be used for a printing cost subsidy, which publishers often demand when the topic does not fit their program or does not seem profitable or in conformity with the market.

C.2.2 Products Describing the Process

52 **Is there a description of the transdisciplinary research methodology?**

- ☐ Yes: precisely, ...
- ☐ There is one, but ...
- ☐ No, because ...
- ☐

Requirements: Successes, problems, and wrong turns in the chosen (transdisciplinary) approach should be comprehensively described.
Not only the content of the research, but also its dealings with specific transdisciplinary challenges (for example, reformulation of the problem from everyday life into scientific questions, formulation of a common research goal, integration into practice, dissemination and implementation of research results in the realm of practical action) are things worthy of publication or at least documentation, so that the store of experience with transdisciplinary methodology and ways of working is expanded and made available for possible further use (see also C.1.1 "Scientific Results and Methods").

53 **Is there a description of the methods and procedures of the transdisciplinary knowledge integration?**

- ☐ Yes: precisely, ...
- ☐ There is one, but ...
- ☐ No, because ...
- ☐

Requirements: The methods and procedures of the transdisciplinary knowledge integration should be described. This explicitly includes interdisciplinary methods of research and organization (iteration procedures, interdisciplinary teams, etc.). The description of the knowledge integration should result in a gain in knowledge for the scientific community. In particular with projects that have a focus in the realm of practice and whose publication strategy is directed toward actors in the realm of practice, such a description should be made, in order to document a gain in knowledge for science beyond use solely in the realm of practice.
The methods and processes of integrating scientific and practical knowledge are specific to transdisciplinary research. To this comes the unrenouncable interaction between social and cognitive integration (see A.1.2 and B.1.1). It should be ensured that the methods and substantive knowledge of knowledge integration are presented, so that the store of experience with this complex point of transdisciplinary research activity is expanded and made available for possible further use.

C.3 Generalizability and Implementability of Results

The Basic Criteria for Section ⌧ C.3 deal with:

- Generalizability of the Project Results

54 **Is there a description of the generalizability of the context-related results?**

- ☐ Yes, specifically ...
- ☐ There is one, but ...
- ☐ No, because ...
- ☐

Requirements: The conditions for the generalizability of the results of transdisciplinary research, for example the impetus for innovation in broader contexts of use that is produced in the framework of a project, should be analyzed and elucidated in the presentation of results. This can be done from the viewpoint of the scientific team members as well as from the viewpoint of the practice partners involved.
The greater the standardization of the framework assumptions under which a research problem is analyzed (systematizing focus) and the greater the degree of generality of the formulation of the questions addressed, the easier it is to show the transferability or generalizability of knowledge. If a project relates to a concrete context (for example, a model case), the description of generalizability is an essential demand, if the research results are to provide impetus for innovation beyond the given context.

55 **Does the preparation of the research results for implementation in practice adequately consider the societal and institutional framework conditions?**

- ☐ Yes, in that ...
- ☐ The research results have been prepared, but ...
- ☐ No, because ...
- ☐

Requirements: The consideration of societal and institutional framework conditions in the field of action should be described in the context of formulating strategies for implementation. It should be described how it can be ensured that the research results will be implemented in the field of practical action in question. If applicable, the description should be reviewed again after a longer interval after the end of the project.

C.4 Justification of the Transdisciplinary Approach

The Basic Criteria for Section ⌦ C.4 deal with:

- *Additional Use* of the Transdisciplinary approach

56 How can the ***additional use*** that justifies the transdisciplinary approach be described?

- ☐ There is an explanation: precisely, ...
- ☐ There is one, but ...
- ☐ No, because ...
- ☐

Requirements: To clarify whether the described additional use is achieved with the research approach, the reasons why the transdisciplinary approach is justified should be given in the context of the research results.
The relatively high degree of effort and expense involved in transdisciplinary collaboration can be justified only if a greater gain in knowledge can be expected than with a disciplinary, multi-disciplinary, or interdisciplinary approach or if the collaboration with the realm of practice promises especially good chances of transformation.

IX. Appendix

Theme-Centered Criteria Matrix

Assignment of the *Basic* and *Detailed Criteria* to Overarching Themes

Theme	Basic Criteria			Detailed Criteria		
	A	B	C	A	B	C
Project Generation, Team Formation, and Competence	1, 2, 3, 4, 5, 8	12, 13		1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16		
Project Design in Relation to Content, Project Focus	1, 3, 4, 5, 6, 7, 8, 9	12	19	3, 4, 5, 8, 11, 12, 13, 14,15, 16, 17, 18, 19, 20, 24, 25, 29		
Project Structure and Management	9, 10, 11	12, 13, 15, 16		4, 5, 7, 9, 10, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29	30, 31, 32, 39, 40	46, 49
Learning and Reflection	6, 8, 11	12, 15, 16	19	1, 6, 15, 17, 22, 23, 29	30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	41, 45, 46, 52, 53, 56
Interdisciplinary Integration	5, 9, 10	14, 15		6, 14, 18, 23, 25	30, 31, 33, 34	
Transdisciplinary Integration	5, 9, 10	14, 15	21, 24	6, 7, 14, 18, 23, 25	30, 31, 33, 34, 37	41, 42, 52, 53, 56
Scientific Results	1, 8, 9		17, 19, 20, 21, 22, 23, 24	3, 12, 15, 16, 17, 19, 20, 28	35, 36	41, 42, 43, 47, 48, 50, 51, 52, 53, 54, 56
Practical Results	2, 8, 9		18, 19, 20, 22, 24	7, 8, 13, 15, 19, 20, 26, 27, 28	35, 36	41, 44, 45, 46, 47, 48, 50, 51, 54, 55
Detailed Criteria requiring special attention when evaluating projects in which several scientific institutions and institutions from the realm of practice collaborate				4, 5, 10, 16, 21, 22, 23	30, 31, 32, 38, 39, 40	
Detailed Criteria requiring special attention when evaluating projects with close collaboration involving practice partners				2, 5, 7, 8, 10, 12, 13, 14, 17, 19, 20, 24, 26, 27	31, 35, 36, 37	45, 46, 54, 55
Detailed Criteria with verification tasks that arise in the course of the project [22]					21, 22, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39	

[22] Because of the great consultation efforts required, a project team in transdisciplinary research must usually live with a relatively large number of insecurity factors in regard to project planning. It thus makes sense to review the planning during the course of research. For this purpose, "points of revision" were introduced for certain criteria.

Members of the Evalunet Project Group

Dr. Matthias Bergmann (Project Manager)
Institute for Social-Ecological Research (ISOE)
Hamburger Allee 45, 60486 Frankfurt am Main
Phone +49 69 707 69 19-0, Fax +49 69 707 69 19-11
info@isoe.de, http://www.isoe.de

Wissenschaftskolleg zu Berlin – Institute for Advanced Study
Wallotstr. 19, 14193 Berlin
Phone +49 30 89001-142, Fax +49 30 89001-100
bergmann@wiko-berlin.de, http://www.wiko-berlin.de

Dr. Bettina Brohmann
Öko-Institut e.V., Institute for Applied Ecology
Rheinstr. 95, 64295 Darmstadt
Phone +49 6151 8191-0, Fax +49 6151 8191-33
info@oeko.de, http://www.oeko.de

Esther Hoffmann
Institute for Ecological Economic Research (IÖW)
Potsdamer Str. 105, 10785 Berlin
Phone +49 30 88 45 95-0, Fax +49 30 882 54 39
kommunikation@ioew.de, http://www.ioew.de

Dr. M. Céline Loibl
Austrian Ecology Institute for Applied Environmental Research
Seidengasse 13, 1070 Vienna, Austria
Phone +43 1 523 61 05-0, Fax +43 1 523 58 43
oekoinstitut@ecology.at, http://www.ecology.at

Regine Rehaag
KATALYSE Institute for Applied Environmental Research
Volksgartenstr. 34, 50677 Cologne
Phone +49 221 94 40 48-0, Fax +49 221 94 40 48-9
info@katalyse.de, http://katalyse.de

Dr. Engelbert Schramm
Institute for Social-Ecological Research (ISOE)
Hamburger Allee 45, 60486 Frankfurt am Main
Phone +49 69 707 69 19-0, Fax +49 69 707 69 19-11
info@isoe.de, http://www.isoe.de

Jan-Peter Voß
Öko-Institut e.V., Institute for Applied Ecology
Novalisstr. 10, 10115 Berlin
Phone +49 30 280 486 80, Fax +49 30 280 486 88
info@oeko.de, http://oeko.de

List of the Evaluated Projects

Along with the knowledge and experience of the Evalunet members at the beginning of the project and the catalog of questions developed from the assessment of the specialized literature and iteratively adapted in the course of the project, an essential foundation for the knowledge assembled in this document emerged from the results of the discursive analyses of six research projects:

(1) Nachhaltiges Sanieren im Bestand – Integrierte Dienstleistungen für zukunftsfähige Wohnstile (NaSa) (Sustainable Renovation in the Existing Stock – Integrated Services for Sustainable Styles of Dwelling), a model project in the bmb+f research funding program Nachhaltiges Wirtschaften (Sustainable Economy) (Institute for Social-Ecological Research, Öko-Institut, and Institute for Ecological Economic Research; practice partner and team member: Wohnungsgesellschaft Nassauische Heimstätte-Gesellschaft für innovative Projekte im Wohnungsbau mbH, a subsidiary of the Nassauische Heimstätte Wohnungs- und Entwicklungsgesellschaft mbH.

(2) ROLAND (Rohstoff Landschaft – Die Nutzung flächengebundener Energieträger und nachwachsender Rohstoffe als Determinante der Kulturlandschaftsentwicklung) (The Use of Surface-Tied Energy-Bearers and Renewable Raw Materials as Determinants in the Development of Cultural Landscapes) funded in the research funding program Austrian Landscape Research of the Austrian Federal Ministry for Education, Science and Culture (Austrian Ecology Institute; Institute for Interdisciplinary Research and Education Vienna, Department of Social Ecology, Klagenfurt University; Institute for Industrial Research, Vienna; consulting agency ÖKONOMIA, Vienna; practice partner and team member: Firma Agrar plus.

(3) Minderung der Umweltbelastungen des Freizeit- und Tourismusverkehrs (Mobilitätsstile in der Freizeit) (Reducing Environmental Burdens of Leisure and Tourism Traffic – Leisure Mobility Styles), commissioned by the Federal Environmental Agency (Institute for Social-Ecological Research, Öko-Institut).

(4) Produkte länger und intensiver nutzen – Möglichkeiten der Gestaltung und Diffusion Neuer Nutzungsstrategien in lokal-regionalen Akteursnetzen – Teil A Regionale Ansätze, (Using Products Longer and More Intensively – Possibilities of Designing and Diffusing New Strategies of Use in Local-Regional Networks of Actors) in the bmb+f research funding program Möglichkeiten und Grenzen neuer Nutzungsstrategien (Possibilities and Limits of New Strategies of Use) – Part A, Regional Approaches (Institute for Ecological Economic Research; Practice Network Weitergeben e.V. “Pass it On”).

(5) SYNOIKOS – Nachhaltigkeit und urbane Gestaltung im Raum “Kreuzung Schweizer Mittelland” (Sustainability and Urban Design in the Swiss “Mittelland” Region) (ETH Zurich, 27 scientists, mostly from the faculties for Resource and Waste Management Technology and Architecture and City Planning).

(6) Ernährungswende – Strategien für sozial-ökologische Transformationen im gesellschaftlichen Handlungsfeld Umwelt-Ernährung-Gesundheit (Nutrition Turnaround – Strategies for Social-Ecological Transformations in the Societal Field of Action Environment-Nutrition-Health) from the bmb+f research funding program Social-Ecological Research (Öko-Institut, Institute for Social Ecological Research, Institute for Ecological Economic Research, KATALYSE, Austrian Ecology Institute).

Experience and reflection from a project already completed in 1998 and not included in Evalunet's assessments were used as a supplementary source:

(7) Stadtverträgliche Mobilität – Handlungsstrategien für eine ökologisch und sozial verträgliche, ökonomisch effiziente Verkehrsentwicklung in Stadtregionen (Strategies for a Sustainable Urban Mobility) was the name of a transdisciplinary research project carried out between 1994 and 1998 by 16 scientists from the research association CITY:*mobil*. Five research institutes participated (four of them from the ökoforum), along with two practice partners (the cities of Freiburg and Schwerin). The project was funded in the context of the bmb+f research funding program Urban Ecology.

In various functions, the following persons supported the process of forming criteria in Evalunet:[23]

Members of the Evaluated Projects[24]

(1) Nachhaltiges Sanieren im Bestand – Integrierte Dienstleistungen für zukunftsfähige Wohnstile (NaSa)
Dr. Irmgard Schultz, Institute for Social Ecological Research (ISOE), Frankfurt am Main
Dr. Matthias Buchert, Öko-Institut, Institute for Applied Ecology, Darmstadt
Michael Steinfeldt, Institute for Ecological Economic Research IÖW, Berlin
Immanuel Stieß, Institute for Social Ecological Research (ISOE), Frankfurt am Main

(2) ROLAND (Rohstoff Landschaft – Die Nutzung flächengebundener Energieträger und nachwachsender Rohstoffe als Determinante der Kulturlandschaftsentwicklung)
Heidelinde Adensam, Austrian Ecology Institute for Applied Environmental Research, Vienna
Josef Breinesberger, AGRAR PLUS Ges. m.b.H., St. Pölten
Susanne Geissler, Austrian Ecology Institute for Applied Environmental Research, Vienna
Dr. Fridolin Krausmann, Klagenfurt University, Institute for Interdisciplinary Research and Education (IFF) Department of Social Ecology

(3) Minderung der Umweltbelastungen des Freizeit- und Tourismusverkehrs (Mobilitätsstile in der Freizeit)
Konrad Götz, Institute for Social Ecological Research (ISOE), Frankfurt am Main
Willi Loose, Öko-Institut, Institute for Applied Ecology, Freiburg
Steffi Schubert, Institute for Social Ecological Research (ISOE), Frankfurt am Main
Christiana Jasper, Federal Environmental Agency, Berlin

(4) Produkte länger und intensiver nutzen – Möglichkeiten der Gestaltung und Diffusion Neuer Nutzungsstrategien in lokal-regionalen Akteursnetzen
Gerd Scholl, Institut für ökologische Wirtschaftsforschung IÖW, Berlin
Annegret Brandt, Weitergeben e.V. – Pass it On, Heidelberg
Dr. Wilfried Konrad, Institute for Ecological Economic Research IÖW, Heidelberg
Ulrich Wellhöfer, Wellhöfer-Marketing, Mannheim

[23] The institutional affiliations listed are those existing at the time of their participation in Evalunet.

[24] Only those persons are listed who took part directly in the Evalunet process (four per project).

(5) SYNOIKOS – Nachhaltigkeit und urbane Gestaltung im Raum 'Kreuzung Schweizer Mittelland'
Prof. Dr. Peter Baccini, ETH, Resource and Waste Management Technology
Prof. Franz Oswald, Office for Architecture and Urban Research, Bern
Christoph Blaser, ETH Zurich, Institute for Urban Construction
Prof. Dr. Susanne Kytzia, ETH Zurich, Institute for Regional and Landscape Development

(6) Ernährungswende – Strategien für sozial-ökologische Transformationen im gesellschaftlichen Handlungsfeld Umwelt-Ernährung-Gesundheit
Dr. Ulrike Eberle, Öko-Institut, Institute for Applied Ecology, Freiburg
Dr. Doris Hayn, Institute for Social Ecological Research (ISOE), Frankfurt am Main
Dr. Ulla Simshäuser, Institute for Ecological Economic Research IÖW, Heidelberg
Frank Waskow, KATALYSE Institute for Applied Environmental Research, Cologne

Experts and Commentators in the Project Analyses

Prof. Dr. Adelheid Biesecker, Universität Bremen, Institute for Institutional and Social Economy
Dr. Stephanie Dorandt, Universität Giessen, Institute for Nutrition Science
Dr. Frank Ebinger, Universität Freiburg, Institute for Forest Economics
Dr. Norbert Gestring, Universität Oldenburg, Institute for Sociology
Dr. Walter Grossenbacher-Mansuy, Center for Technology Assessment TA-Swiss, Bern
Dr. Michael Guggenheim, ETH Zurich, Science Studies and Philosophy of Science
PD Dr. Gertrude Hirsch Hadorn, ETH Zurich, Department Environmental Sciences; President of SAGUF, Bern
Prof. Dr. Sabine Hofmeister, Universität Lüneburg, Institute for Environmental Strategies
Kirsten Hollaender, Universität Köln, Research Institute for Sociology
Dr. Niels Jungbluth, ESU Services, Uster, Switzerland
Rainer Kamber, Universität Basel, Center Human, Society, Environment
PD Dr. Thomas Kluge, Institute for Social-Ecological Research, Frankfurt am Main, ISOE
Prof. Dr. Wolfgang Krohn, Universität Bielefeld, Faculty for Sociology, Institute for Science and Technology Research
Kay Lachmann, KATALYSE Institute for Applied Environmental Research, Cologne
Robert Lechner, Austrian Ecology Institute for Applied Environmental Research, Vienna
Prof. Dr. Heiner Monheim, Universität Trier, Land Use Planning
Dr. Guido Nischwitz, Institute for Ecological Economic Research IÖW, Wuppertal
Maria-Theresia Pernter, Ökoinstitut Südtirol/Alto Adige, Bozen
Dr. Christian Pohl, ETH Zurich, td-net - Network for Transdisciplinarity
Dr. Lucia Reisch, Universität Hohenheim, Institute for Household and Consumption Economics
Dr. Ulrike Schell, Consumer Advice Center NRW
Dr. Susanne Schön, Technische Universität Berlin, Center for Technology and Society
Willi Sieber, Austrian Ecology Institute for Applied Environmental Research, Bregenz
Prof. Thomas Sieverts, SKAT Architects, Bonn
PD Dr. Jörg Strübing, Technical University Berlin, Institute for Sociology
Dr. Reinhold Vetter, Institute for Environmentally Sound Agriculture and the State Office for Plant Cultivation Baden-Württemberg, Forchheim
Karin Walch, Austrian Ecology Institute for Applied Environmental Research, Vienna
Frank Waskow, KATALYSE Institute for Applied Environmental Research, Cologne

Experts of the Stakeholder Workshops and the Conclave

(1) Criteria for the Evaluation of Transdisciplinary Research
Ingrid Balzer, GSF – Project Management Agency Environmental and Climate Research, Munich
Prof. Dr. Georges Fülgraff, Chairman of the Strategic Advisory Board Social-Ecological Research, Technische Universität Berlin, Center for Public Health
Prof. Dr. Bernd Hansjürgens, Member of the Appraisal Committee for the Evaluation of the Research funding Program Social-Ecological Research/Center for Environmental Research Leipzig-Halle, Faculty of Social-Scientific Environmental Research – Department of Economics
Dr. Thomas Jahn, Institute for Social-Ecological Research (ISOE), Frankfurt am Main
Prof. Dr. Ruth Kaufmann-Hayoz, Deputy Chairman of the Strategy Advisory Board Social-Ecological Research/Universität Bern, Interfaculty Coordination Office for General Ecology
Dr. Reiner Manstetten, Center for Environmental Research Leipzig-Halle, Faculty of Social-Scientific Environmental Research – Department of Economics
Dr. Dagmar Simon, EvaConsult/Social Science Research Center Berlin
Dr. Monika Wächter, GSF – Project Management Agency Environmental and Climate Research, Munich
Dr. Angelika Willms-Herget, Federal Ministry for Education and Research, Department of Science and Society

(2) Evaluation and Quality Assurance in the ökoforum Institutes
Dr. Thomas Jahn, Institute for Social-Ecological Research (ISOE), Frankfurt am Main
Alexandra Lux, Institute for Social-Ecological Research (ISOE), Frankfurt am Main
Dr. Joachim Lohse, Öko-Institut e.V., Institute for Applied Ecology, Freiburg
Franziska Wolff, Öko-Institut e.V., Institute for Applied Ecology, Berlin
Alexandra Dehnhardt, Institute for Ecological Economic Research IÖW, Berlin
Dr. Wilfried Konrad, Institute for Ecological Economic Research IÖW, Heidelberg
Svend Ulmer, KATALYSE Institute for Applied Environmental Research, Cologne
Maike Bruse, KATALYSE Institute for Applied Environmental Research, Cologne
Antonia Wenisch, Austrian Ecology Institute for Applied Environmental Research, Vienna
Christian Pladerer, Austrian Ecology Institute for Applied Environmental Research, Vienna

(3) Conclave
Dr. Jakob Edler, Fraunhofer Institute for Systems Technology and Innovation Research (ISI), Karlsruhe
Dr. Gertrude Hirsch Hadorn, ETH Zurich, Department for Environmental Sciences; President of the SAGUF, Bern
Dr. Thomas Jahn, Institute for Social-Ecological Research (ISOE), Frankfurt am Main
Prof. Dr. Wolfgang Krohn, Universität Bielefeld, Faculty for Sociology, Institute for Science and Technology Research
Dr. Susanne Schön, Technische Universität Berlin, Center for Technology and Society
Dr. Angelika Willms-Herget, Federal Ministry for Education and Research, Department of Science and Society

Literature

Bammé, A. (2004): Science Wars. Von der akademischen zur postakademischen Wissenschaft. Frankfurt a.M., New York: Campus

Becker, E./T. Jahn (2000): Sozial-ökologische Transformationen. Theoretische und methodische Probleme transdisziplinärer Nachhaltigkeitsforschung. In: K.-W Brand. (Hg.): Nachhaltigkeit und Transdisziplinarität. Berlin: Analytica, 68–84

Bergmann, M. (2003): Indikatoren für eine diskursive Evaluation transdisziplinärer Forschung. In: Technikfolgenabschätzung – Theorie und Praxis, 12 (1). Karlsruhe, 65–75

Bergmann, M./T. Jahn (1999): Learning not only by doing – Erfahrungen eines interdisziplinären Forschungsverbundes am Beispiel von „CITY:*mobil*". In: J. Friedrichs/K. Hollaender: Stadtökologische Forschung. Theorien und Anwendungen. Berlin: Analytica, 251–275

Brand, K.-W. (Hg.) (2000): Nachhaltige Entwicklung und Transdisziplinarität. Besonderheiten, Probleme und Erfordernisse der Nachhaltigkeitsforschung, Berlin: Analytica

Defila, R./Di Giulio, A. (1999): Evaluationskriterien für inter- und transdisziplinäre Forschung. Projektbericht. In: Transdisziplinarität evaluieren – aber wie? Panorama, Sondernummer 99. Bern: Interfakultäre Koordinationsstelle für Allgemeine Ökologie

Funtowicz, S./J.R. Ravetz (1993): Science for the Post-Normal Age. In: Futures, 25, 735–755

Gallopín, G.C./S. Funtowicz/M. O'Connor/J.R. Ravetz (2001): Science for the 21st century: from social contract to the scientific core. In: International Journal of Social Science, 168, 219–229

Gibbons, M./C. Limoges/H. Nowotny/S. Schwartzman/P. Scott/M. Trow (1994): The New Production of Knowledge. The dynamics of science and research in contemporary societies. London: Sage

Grunwald, A. (1999): Transdisziplinäre Umweltforschung: Methodische Probleme der Qualitätssicherung. In: TA-Datenbank Nachrichten, 8 (3–4), 32–39

Häberli, R./W. Grossenbacher-Mansuy (1998): Transdisziplinarität zwischen Förderung und Überforderung. In: GAIA 7(3). Baden-Baden: Nomos, 196–213

Hirsch Hadorn, G./S. Maier/S. Wölfing Kast (2002): Transdisziplinäre Forschung in Aktion – Optionen und Restriktionen nachhaltiger Ernährung. Zürich: vdf

Hirsch Hadorn, G./Ch. Pohl/M. Scheringer (2002): Methodology of Transdisciplinary Research. In: G. Hirsch Hadorn (Hg.): Unity of Knowledge (in Transdisciplinary Research for Sustainability). In: Encyclopedia of Life Support Systems, Oxford UK: EOLSS Publishers [http://www.eolss.net]

Hollaender, K./J. Libbe (2000): Kooperation von Wissenschaft und Praxis – Erfahrungen und Schlussfolgerungen aus dem Förderschwerpunkt „Stadtökologie" des BMBF. In: K.-W. Brand: Nachhaltige Entwicklung und Transdisziplinarität. Berlin: Analytica, 161–179

Hollaender, K./M.C. Loibl/A. Wilts (2002): Management of Transdisciplinary Research. In: G. Hirsch Hadorn (Hg.): Unity of Knowledge in Transdisciplinary Research for Sustainability. Encyclopedia of Life Support Systems. Oxford: EOLSS Publisher Co. [http://www.eolss.net]

Jaeger, J./M. Scheringer (1998): Transdisziplinarität: Problemorientierung ohne Methodenzwang. In: GAIA 7 (1). Baden-Baden: Nomos, 10–25

Jahn, T. (2005): Soziale Ökologie, Kognitive Integration und Transdisziplinarität. In: Technikfolgenabschätzung – Theorie und Praxis, 14 (2). Karlsruhe, 32–38

Krott, M. (2002): Evaluation of Transdisciplinary Research. In: Encyclopedia of Life Support Systems (EOLSS), Vol. 3, Chapter 19. „Technology Information and Systems Management Resources". Oxford: EOLSS Publishers [http://www.eolss.net]

Kuhlmann, S. (2003): Leistungsmessung oder Lernmedium? Evaluation in der Forschungs- und Innovationspolitik. In: Technikfolgenabschätzung – Theorie und Praxis, 12 (1). Karlsruhe, 11–19

Loibl, M.C. (2003): Spannungen in heterogenen Forschungsteams. Prioritätenkonflikte nach Wissenschaftskulturen, institutionellen Zugehörigkeiten und Gender. In: J. Gläser/M. Meister/I. Schulz-Schaeffer/J. Strübing (Hg.): Kooperation im Niemandsland. Neue Perspektiven auf Zusammenarbeit in Wissenschaft und Technik. Opladen: Leske+Budrich und Westdeutscher Verlag

Loibl, M.C. (2005): Spannungen in Forschungsteams. Hintergründe und Methoden zum konstruktiven Abbau von Konflikten in inter- und transdisziplinären Projekten. Heidelberg: Carl-Auer Verlag

Mogalle, M. (2001): Management transdisziplinärer Forschungsprozesse. Basel: Birkhäuser

Nölting, B./J.-P. Voß/D. Hayn (2004): Nachhaltigkeitsforschung – jenseits von Disziplinierung und „anything goes". In: GAIA, 13 (4). München: oekom, 272–279

Nowotny, H./P. Scott/M. Gibbons (2001): Re-thinking Science. Knowledge and the Public in an Age of Uncertainty. Cambridge: Polity Press

Pohl, C. (2004): Guidelines für die transdisziplinäre Forschung. Bern: td-net [http://www.transdisciplinarity.ch](Stand 1. September 2004)

Ravetz, J.R./S. Funtowicz (1999): Post-Normal Science – An Insight Now Maturing. In: Futures, 31, 641–646

Röbbecke, M./D. Simon (2001): Reflexive Evaluation. Ziele, Verfahren und Instrumente der Bewertung von Forschungsinstituten. Berlin: Sigma

Schophaus, M./S. Schön/H.-L. Dienel (Hg.) (2004): Transdisziplinäres Kooperationsmanagement. Neue Wege in der Zusammenarbeit zwischen Wissenschaft und Gesellschaft, München: ökom

Thompson Klein, J. (1996): Crossing Boundaries: Knowledge, Disciplinarities & Interdisciplinarities. Charlottesville: University Press of Virginia

Thompson Klein, J./W. Grossenbacher-Mansuy/R. Häberli/A. Bill/R.W. Scholz/M. Welti (Hg.) (2001): Transdisciplinarity – Joint Problem Solving among Science, Technology, and Society: An Effective Way for Managing Complexity. Basel: Birkhäuser

Weingart, P. (1997): Interdisziplinarität – Der paradoxe Diskurs. In: Ethik und Sozialwissenschaften 8, 521–529

Weingart, P. (1997/1999): Neue Formen der Wissensproduktion: Fakt, Fiktion und Mode. In: TA-Datenbank-Nachrichten, 8 (3/4 1999). Karlsruhe, 48–57

Weingart, P. (2001): Die Stunde der Wahrheit? Zum Verhältnis der Wissenschaft zu Politik, Wirtschaft und Medien in der Wissensgesellschaft. Weilerswist: Velbrück

Weingart, P./N. Stehr (Hg.) (1999): Practising Interdisciplinarity. Toronto: University of Toronto Press

Institute for Social-Ecological Research (ISOE) GmbH
Hamburger Allee 45 , 60486 Frankfurt/Main
www.isoe.de ▪ info@isoe.de